



NEW YORK COLLEGE
THE INTERNATIONAL COLLEGE OF GREECE

7th Annual PhD Symposium

New York College
Athens Campus

13-14 December 2024

Volume of Proceedings

Edited by
Dr. Evgenia Pavlaku
Dr. Konstantinos Kalachanis

ATHENS 2025



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7th Annual PhD Symposium 2024 Volume of Proceedings

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**MESSAGE FROM THE PRESIDENT
OF NEW YORK COLLEGE EDUCATIONAL GROUP,
Dr. ILIAS FOUTSIS, Hon PhD**



Distinguished members of the academic and research community,

It is a great pleasure to introduce the Proceedings Volume of the 7th Annual PhD Symposium, held at the Athens Campus of New York College on December 13-14, 2024. The volume you are holding represents the culmination of the core principles of New York College: innovation, education, and academic excellence.

Since its establishment, New York College has prioritized cultivating an academic environment that inspires knowledge, creativity, and interdisciplinary collaboration. By supporting pioneering research efforts, we provide our students with opportunities to develop their skills and advance both professionally and academically.

This volume showcases the exceptional work of our students, who, through New York College, have the opportunity to earn their doctoral degrees from a distinguished British institution, the University of Greater Manchester. In close collaboration with their supervisors and with the support of the academic team at New York College, our students contribute to advancing science. Moreover, it also includes scientific articles from the supervisors in their academic fields, showcasing their contribution to science.

I would like to warmly congratulate all participants for their efforts and remarkable achievements. I am confident that the content of this volume will serve as a source of inspiration and knowledge for the academic community.

Sincerely,

Elias Foutsis Hon PhD

President and Founder,
New York College Educational Group

Αξιότιμα μέλη της ακαδημαϊκής και ερευνητικής κοινότητας,

Είναι ιδιαίτερη χαρά για εμένα να προλογίσω τον Τόμο των Πρακτικών του 7th Annual PhD Symposium, που έλαβε χώρα στο Athens Campus του New York College, στις 13-14 Δεκεμβρίου 2024. Ο τόμος που κρατάτε στα χέρια σας αποτελεί το επιστέγασμα των αρχών που διέπουν το New York College, ήτοι: καινοτομία, εκπαίδευση και ακαδημαϊκή αριστεία.

Το New York College, από την ίδρυσή του, έχει θέσει ως προτεραιότητα την καλλιέργεια ενός ακαδημαϊκού περιβάλλοντος που εμπνέει τη γνώση, τη δημιουργικότητα και τη διεπιστημονική συνεργασία. Μέσω της υποστήριξης πρωτοποριακών ερευνητικών προσπαθειών, προσφέρουμε στους φοιτητές μας τις ευκαιρίες να αναπτύξουν τις ικανότητές τους και να εξελιχθούν επαγγελματικά και ακαδημαϊκά.

Ο παρών τόμος αποτελεί δείγμα της εξαιρετικής δουλειάς των φοιτητών μας, οι οποίοι, μέσω του New York College, έχουν την ευκαιρία να αποκτήσουν το διδακτορικό τους δίπλωμα από ένα σπουδαίο βρετανικό πανεπιστήμιο, το University of Greater Manchester. Σε στενή συνεργασία με τους επόπτες τους και με τη στήριξη της ακαδημαϊκής ομάδας του New York College, οι φοιτητές μας προάγουν την επιστήμη. Εκτός αυτού όμως, περιλαμβάνει και επιστημονικά άρθρα από τους επόπτες στο ακαδημαϊκό τους πεδίο, δείγμα της συνεισφοράς τους στην επιστήμη.

Θα ήθελα να συγχαρώ θερμά όλους τους συμμετέχοντες για τις προσπάθειες και τα εξαιρετικά επιτεύγματά τους. Είμαι βέβαιος ότι το περιεχόμενο αυτού του τόμου θα αποτελέσει πηγή έμπνευσης και γνώσης για την ακαδημαϊκή κοινότητα.

Με τιμή,

Ηλίας Φούτσης Hon PhD

Πρόεδρος και Ιδρυτής

Εκπαιδευτικού Ομίλου New York College

EDITORIAL: THE 7TH ANNUAL PHD SYMPOSIUM ORGANISED BY UNIVERSITY OF GREATER MANCHESTER AND NEW YORK COLLEGE, ATHENS

It is with great pride and enthusiasm that I present the proceedings of the 7th Annual PhD Symposium, jointly organised by New York College Athens and the University of Greater Manchester, held on the 13th and 14th of December 2024. This collaborative event provided a platform for scholars, researchers, and practitioners from various disciplines to engage in critical discussions on contemporary global challenges. The symposium showcased a diverse range of research contributions, addressing the intersections of digital transformation, ethics in higher education, mental health, sustainability, governance, industry innovation, and cultural studies.

The multidisciplinary nature of the symposium highlighted the dynamic landscape of academia and industry, encouraging cross-sector dialogue and collaborative solutions to some of the most pressing issues of our time. The research presented was not only academically rigorous but also held real-world implications, demonstrating the vital role that scholarship plays in shaping industries, policies, and societies.

Overview of Contributions

Digital Transformation and Ethics in Higher Education

A significant portion of the symposium was dedicated to exploring how digital technologies are reshaping the education landscape. Several papers examined the ethical, pedagogical, and practical aspects of integrating digital tools into higher education.

The first paper by Palazli (2025) provided a critical examination of how university students in Greece navigate digital platforms. The study addressed key concerns regarding digital literacy, ethical dilemmas, and responsible online behaviour, underscoring the need for universities to enhance digital ethics education.

"Utilitarian Perspective of AI in Linguistics Education: Exploring Instructor Experiences and Evaluating Benefits and Limitations in Fairness and Students' Agency in Greek Higher Education" the second paper by Kritikos (2025) explored the role of artificial intelligence in linguistics education. The study examined instructors' experiences in using AI-powered tools, assessing the benefits and challenges in ensuring fairness and maintaining student agency in learning.

Media, Culture, and Social Influence

The symposium also explored the profound impact of media and cultural representations on modern society. Papamichali (2025) provided an insightful exploration of how ancient mythology continues to shape modern storytelling. The study analysed the enduring influence of the Artemis archetype in contemporary film and television, demonstrating the relevance of classical themes in modern narratives. Uyanik in his paper "A Grounded Theory Investigation of the Impacts of Media Exposure to the 2023 Earthquake in Turkey" assessed how media coverage of natural disasters affects public perception and mental health.

The study explored the psychological impacts of disaster reporting and proposed ways to ensure responsible journalism in crisis situations.

Sustainability, Governance, and Economic Research

Sustainability and governance were a key theme at the conference, with a focus on corporate responsibility, regulatory frameworks, and financial decision-making. Anyaegbu (2025) examined the Impact of the Economic and Financial Crimes Commission (EFCC) on the fight against corruption in Nigeria. These provided a critical analysis of anti-corruption efforts in Nigeria, assessing the effectiveness of the EFCC in combating financial crimes.

Industry Innovation and Technological Advancements

The role of technology in shaping industries was another focal point, with research exploring logistics, accounting, and construction. Mouzakis (2024) presented a unique approach to improving efficiency in financial management by integrating concepts from physics into accounting practices.

Education

Olusesi and Harrison (2025) provides a comprehensive review of sustainable leadership competencies across organisational hierarchies. They explored the evolving nature of leadership in sustainability-focused organisations, offering insights into the competencies required at different management levels.

Psychological Capital

Pavlaou (2025) focuses on the notion of Psychological Capital (PsyCap) through HERO model and explores its impact on employee well-being and performance. Her analysis also includes a review of the flourishing role of educational interventions in enhancing Psychological Capital.

History of Astronomy -Philosophy

Kalachanis (2025) makes a critical review of Galileo discoveries in Astronomy with the use of telescope under the framework of the theory of scientific revolutions of Thomas Kuhn. Astronomical observations of Galileo challenged the dominant geocentric system. New scientific data can lead to a paradigm shift in science.

Conclusion and Future Research Direction

Altogether, the contributions selected in these proceedings serve their own original aims but more importantly encourage more thought on research that addresses contemporary global challenges. We believe that together, the papers inspire research directions that will explore the origins, processes, dynamics as well as their contextualised interpretations. This diverse collection of research highlights the interdisciplinary nature of contemporary academic inquiry, showcasing how digital transformation, ethics, mental health, sustainability, and industry innovation are interconnected in shaping the future.

Nonetheless, while this proceeding provides new insights, I recognise that it simultaneously produces new avenues that demand further investigations. I encourage more research in several countries that can expand the scope of the study. Such research across countries will provide novel thoughts and a more holistic picture.

Finally, I extend my deepest appreciation to all participants, presenters, and organisers for making this symposium a resounding success. Special thanks to Dr Evgenia Pavlaku and Sofia Kotsini for their hard work and bringing the symposium to life. I hope that these proceedings serve as an invaluable resource for researchers, educators, and practitioners, inspiring future scholarship and collaboration.

Professor Christian Harrison

Professor of Leadership and Enterprise
Director, Centre for Leadership and Empowerment
University of Greater Manchester

MESSAGE FROM THE EDITORS OF THE VOLUME

Dear colleagues and students,

The year 2025 was a landmark year for the PhD department at New York College due to its organization of the 7th Annual PhD Symposium. This event has evolved into a dynamic forum for exchanging ideas, research projects, and fostering interaction among New York College students and the broader academic community. This scientific volume compiles presentations from PhD candidates at the University of Greater Manchester, who, through New York College's educational programs, have the opportunity to pursue academic research and, with the skills they develop, excel professionally as well.

Completing a doctoral dissertation is no easy task; it demands dedication, passion for research, flexibility, methodical approaches, and organizational skills. The following articles showcase the research efforts of PhD candidates who, with the support of their supervisors and the entire New York College educational organization, contribute original research to the scientific community, simultaneously highlighting the interdisciplinary nature of modern academic inquiry.

The publication of this volume also aims to familiarize PhD candidates with the process of scientific publishing, through which research findings are shared with the academic community for scrutiny and evaluation.

We would like to take this opportunity to express our gratitude to all the authors, reviewers, and members of the Scientific and Organizing Committees, whose dedication and hard work were crucial to the completion of this volume. A special thanks is also extended to our partner, the University of Greater Manchester, and especially to Professor Christian Harrison, for their ongoing support of academic research and excellence.

As editors, it has been our privilege to oversee this volume, and we hope it will enrich the scientific literature in our country.

With best regards,

Dr. Evgenia Pavlaku

Dr. Konstantinos Kalachanis

Editors of the Proceedings Volume

New York College, Athens

ΜΗΝΥΜΑ ΤΩΝ ΕΠΙΜΕΛΗΤΩΝ ΤΟΥ ΤΟΜΟΥ

Αγαπητοί συνάδελφοι και φοιτητές

Το 2025 υπήρξε έτος ορόσημο για το τμήμα διδακτορικών σπουδών του New York College, λόγω της οργάνωσής του 7th Annual PhD Symposium το οποίο έχει εξελιχθεί σε ένα δυναμικό φόρουμ ανταλλαγής ιδεών, ερευνητικών πρότζεκτ και γενικότερης αλληλεπίδρασης των φοιτητών του New York College με την ακαδημαϊκή κοινότητα. Στον παρόντα επιστημονικό τόμο συγκεντρώνονται εισηγήσεις των υποψήφιων διδασκάλων του University of Greater Manchester οι οποίοι μέσω του εκπαιδευτικού οργανισμού New York College έχουν την ευκαιρία να σταδιοδρομήσουν στην ακαδημαϊκή έρευνα και με τις δεξιότητες που αναπτύσσουν, να διαπρέψουν και στον επαγγελματικό στίβο.

Η εκπόνηση μιας διδακτορικής διατριβής δεν είναι ένα εύκολο έργο αλλά απαιτεί αφοσίωση, αγάπη για την έρευνα, ευελιξία, μεθοδικότητα και οργάνωση. Στα άρθρα που ακολουθούν παρουσιάζονται οι ερευνητικές προσπάθειες των υποψηφίων διδασκάλων, οι οποίοι με την στήριξη των εποπτών τους, αλλά και ολόκληρου του Εκπαιδευτικού Οργανισμού του New York College συνεισφέρουν στην επιστήμη με πρωτότυπες έρευνες, αναδεικνύοντας συνάμα και τον διεπιστημονικό χαρακτήρα της σύγχρονης ακαδημαϊκής έρευνας.

Η έκδοση του παρόντος Τόμου επίσης, φιλοδοξεί να εισάγει τους υποψηφίους διδάκτορες στην διαδικασία της επιστημονικής δημοσίευσης, μέσω της οποίας κοινοποιούνται στην επιστημονική κοινότητα όλα τα ερευνητικά πορίσματα προς έλεγχο και αξιολόγηση.

Ευκαιρίας δοθείσης θα θέλαμε να εκφράσουμε την ευγνωμοσύνη μας προς όλους τους συγγραφείς, τους κριτές και τα μέλη των Επιστημονικών και Οργανωτικών Επιτροπών, των οποίων η αφοσίωση και η προσπάθεια συνέβαλαν καθοριστικά στην ολοκλήρωση αυτής της έκδοσης. Ένα ιδιαίτερο ευχαριστώ απευθύνουμε επίσης στο συνεργαζόμενο University of Greater Manchester και ιδιαιτέρως στον Professor Christian Harrison για τη συνεχή στήριξή τους στην ακαδημαϊκή έρευνα και αριστεία.

Ως επιμελητές, ήταν προνόμιό μας να επιμεληθούμε αυτόν τον τόμο, και ελπίζουμε θα συμβάλλει στον εμπλουτισμό της επιστημονικής βιβλιογραφίας στην χώρα μας.

Με εκτίμηση,

Δρ. Ευγενία Παυλάκου

Δρ. Κωνσταντίνος Καλαχάνης

Επιμελητές του Τόμου Πρακτικών
New York College, Αθήνα

I. CONFERENCE PROCEEDINGS

**A GROUNDED THEORY INVESTIGATION OF THE IMPACTS OF MEDIA
EXPOSURE OF THE 2023 EARTHQUAKE IN TURKEY**

Deniz Uyanik

BSCEcon, MBA, MSC, MBACP,

Ph.D. Candidate

Department of Psychology, New York College, Athens, Greece

uyanikdeniz@gmail.com

Abstract

Millions of people watched the February 2023 Earthquake which claimed more than 50.000 people's lives from their tv and social media. Using Reflexive Grounded theory methodology this study aims to explore people's reactions about behavioural and emotional changes, processes, worldviews and recovery using semi structured interviews with Turkish Adults who did not directly experience the earthquake. The results intend to build theory about the process of change when people experience mass trauma events through media/tv/social media. The findings will have implications for news agencies, legislators, psychotherapeutic practices along with providing further evidence towards the effects of secondary trauma literature.

Keywords: trauma, social media, earthquake, Turkey

1. Introduction

Technology allows us to be informed about news constantly. Social media offers a platform for news to be delivered into our hands continuously from news outlets and individuals alike. An emerging body of research about secondary media exposure points out that individuals are experiencing post-traumatic stress after being exposed to the news regardless of proximity and/or relevance, however, compared the primary trauma symptomatology of the media trauma dissipates faster (Niitsu et al., 2014; Pfefferbaum et al., 2019).

Secondary trauma research expended after the 9/11 into secondary media exposure. For example, Ahern et al. found out that people living in New York City exposed to the 9/11 attacks through media showed significant post-traumatic stress a year after the attacks (2002, 2004). However, more studies observed similar findings from unlikely places and populations (children, elderly and Adults) post-traumatic stress and other events such as missile attacks, earthquakes, typhoons, terrorism regardless of proximity (Pfefferbaum et al., 2019).

On February 6th, 2023, the southeastern part of Turkey was hit by an earthquake 7.8. A second earthquake with a magnitude of 7.5 hit the region (BBC, 2023). The official death toll reached 50.000 (REUTERS, 2023), and Turkish media outlets started to call it "the disaster of the century". Following the earthquake, videos of collapsing buildings, drone footage of the area, calls from the people under the rubble, and people trying to rescue their relatives and loved ones, started to flood social media, news coverage and rescue attempts from all over the country quickly started to be organised online (CNN, 2023).

This study aims to investigate the effects of news and social media posts on the people of Turkey after the February 2023 earthquake using grounded theory from Charmaz's reflexive constructive approach.

2. Methodology

The research questions are the following:

- To explore how people reacted to the earthquake of the century. Are there any behavioural or emotional changes since the event and if so, which?
- To investigate what processes are involved when people are exposed to mass trauma via news and social media.
- To examine if people's meaning making processes and worldviews have changed after the trauma exposure.
- o explore pathways to recovery. What are the circumstances that promoted / are promoting recovery.

The research questions focus on the process, thoughts, emotions, meaning making, worldviews, and recovery such topics. Furthermore, there are no studies yet identify research questions within literature. Hence this study will be considered as qualitative and will use qualitative interviews which are commonly used to determine patterns of meaning making, worldviews. When it comes to meaning making process, worldviews, response to trauma no person's reaction is alike (Ai et al., 2005, 2005; Atwoli et al., 2015; Fiona Kau et al., 2024). Hence this study will interpret the world from phenomenological perspective by viewing multiple individuals who have responded to February 2023 earthquake media coverage.

3. Ethical considerations

There are many ethical considerations due to trauma and the possible political nature of the views. Therefore, the participants are informed of the topic of the research. All participants' information is randomised to ensure privacy. The researcher (a registered BACP psychotherapist with MSC in Cognitive Behavioural Psychotherapies with extensive trauma experience) is conducting semi-structured interviews. The British Psychological Society Human Research Ethics Code and the University of Bolton research guidelines were followed. The interviews were recorded with the participant's permission. The participants also offered to withdraw from the study at any point before the data analysis phase starts. If any participants experience psychological stress, public help information was shared with participants. Participants also informed that they could stop interviews if they choose to do so. Due to mass trauma, the researcher is not exempt from the effects of media exposure. Therefore, as suggested by Charmaz, reflexive approaches will be adopted to incorporate the researchers' view of the data analysis process (Charmaz, 2006).

4. Participants and materials

A Series of semi-structured interviews are conducted with adult Turkish speakers (age 18 and older) exposed to events through media and social media until the theoretical saturation has been reached (Charmaz & Thornberg, 2021). However, the number of interviews is yet to be determined because of the grounded theory requirements. Turkish-speaking participants living outside of Turkey will also be invited to participate. The exclusion criteria are the following:

- Directly exposed, such as people who experienced the earthquake in Turkey.
- Indirectly exposed, for example, people who lost a loved one or close friend experience the earthquake, along with rescue workers and volunteers.

The interviews are conducted for 45-90 minutes in Turkish which are translated before the analysis. Analysis is conducted in English. The participants might be asked to join for second or third shorter meetings to ask about possible emerging new themes. The interviews are conducted via scheduled online meetings. A demographic information questionnaire also administered.

5. Analysis

As the Grounded Theory methodology suggests, a semi-structured interview guide is used to conduct the interviews. Each interview recorded, transcribed, and the data entered Atlas.ti (Scientific Software Development GmbH, 2023) for further analysis. Extensive memos and researchers' reactions to the interviews are also kept. Throughout the analysis process, first, the interviews are translated into line-by-line codes. Following by selective coding. Codes were sorted into categories and sub-categories, evolving with every new interview and eventually turning into theory as the links between categories and literature integrate, as it is suggested by Charmaz (Charmaz, 2006; Charmaz & Thornberg, 2021).

6. Current progress / results

The evidence towards impact of exposure to mass traumatic events through media through different nations and events points in one direction. Exposure produces significant post-traumatic stress. However, unlike primary exposure it rarely leads to PTSD. (Niitsu et al., 2014; Pfefferbaum et al., 2019) The preliminary results from this research show that it is creating major changes in the world views. Furthermore, influencing people's lives significantly such as moving to safe housing, reducing trust to social and governmental structures which is part of the resilience response.

Future research should focus on quantitative aspects of these responses focusing on world views and resilience. Another important finding is generational trauma. Turkish people frequently experience devastating earthquakes. The stories from previous disasters, safety behaviours and responses were present, but the extent of this effect is still unknown. Finally, more research is needed to understand the extent and effects of moderation from the social media companies and governments during these events for fake news, political propaganda and people who try to take advantage of the tragedy.

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UTILITARIAN PERSPECTIVE OF AI IN LINGUISTICS EDUCATION: EXPLORING INSTRUCTOR EXPERIENCES AND EVALUATING BENEFITS AND LIMITATIONS IN FAIRNESS AND STUDENT AGENCY IN GREEK HIGHER EDUCATION

Theodore Kritikos
Ph.D. Candidate
University of Greater Manchester
kritikostheodore@yahoo.co.uk

Abstract

Despite the rapid implementation of AI technology in higher education, there exists a significant lack of comprehension in understanding how it can be effectively utilized within linguistics education, particularly in Greece, a country striving to harness its transformative potential to promote economic and social progress for collective welfare. This study aims to conduct a comprehensive evaluation of the integration of AI in linguistics within the Greek higher education context through a utilitarian lens, focusing on the experiences of instructors. It seeks to elucidate both the benefits and challenges associated with AI adoption, particularly regarding fairness and student agency. The objectives of this research are to examine instructors' experiences with AI tools, explore their perceived benefits in enhancing fairness and student agency, and investigate the limitations and challenges these technologies present. By utilizing semi-structured interviews and focus group discussions, fourteen technologically proficient language teaching educators will provide insights into their educational scenarios. The subsequent thematic and discourse analysis will address these critical issues and identify ways to enhance teaching quality. This study aspires to inform policymakers, educational practitioners, and stakeholders about the undeniable impact of AI on education, contributing to the growing body of research on this pivotal topic and offering practical recommendations to improve teaching experiences and outcomes in Greek higher education linguistics.

Keywords: AI, Utilitarianism, Fairness, Student Agency, Higher Education Linguistics

1. Introduction

AI investments reached \$92 billion in 2022, a sixfold increase from 2016, with projections estimating the market value will hit \$2 trillion by 2030 (Thormundsson, 2023). The global adoption of AI in education, including in Greece, is rapidly accelerating (Crompton & Burke, 2023), underscored by Google's \$400 million acquisition of DeepMind, which highlights AI's transformative impact on higher education (Popenici & Kerr, 2017).

However, AI research has largely focused on engineering and computer science (Cantú-Ortiz et al., 2020), with limited attention given to its effect on teaching quality in the humanities, particularly linguistics. In Greece, education is central to economic and social development, aligning with national goals to create a digitally literate workforce by 2025 (Schmidt et al., 2021).

Effective AI integration requires a thorough understanding of its potential and constraints (Dai et al., 2020). Education plays a crucial role in preparing students for a tech-driven future (Zimmerman, 2018), with the EU aiming to incorporate AI into all education levels and China striving to lead AI innovation by 2030.

This research focuses on ensuring fairness in AI use and addressing concerns about its potential to diminish student agency. Grounded in utilitarian philosophy, it examines instructors' experiences to balance AI's benefits and limitations. Overall, the study aims to develop a model for AI integration in Greek linguistics education that can address Greece's specific educational needs and be applied globally, contributing to the discourse on AI in higher education.

2. Literature review

AI brings significant benefits to education, such as automating repetitive tasks like grading, enabling personalized learning, providing feedback to students and tutors, and transforming the way information is accessed and analyzed (Abdelaziz, 2019). Various tools and applications offer unique educational advantages: ChatGPT generates prompts for formative assessments, supporting evaluation (Baidoo-Anu & Ansah, 2023); Carnegie Learning mimics human tutors, enhancing cognitive skills and personalizing learning; Fetchy aids in creating lesson plans, optimizing time management and decision-making; and Century Tech tracks student progress, identifies learning gaps, and provides tailored recommendations for improvement.

Currently, AI implementation is confined to specific disciplines (Ng et al., 2021), highlighting the need for broader integration across campuses to truly transform the learning experience. However, over-reliance on AI for information delivery could undermine learner agency (Williamson, 2019). Addressing biases is also crucial to ensuring fairness in education (Leslie et al., 2021). From a utilitarian perspective, AI should aim to maximize happiness and minimize harm, advocating for equitable benefits and fair treatment, while empowering students as active agents in their learning. This requires balancing fairness, agency, and collective well-being.

In AI research, methodological shortcomings include an over-reliance on quantitative methods and a lack of pedagogical perspectives (Bartolomé et al., 2018). Holistic studies are needed to address ethics, fairness, and agency, and to develop AI frameworks that enhance education while safeguarding student rights. Research on AI in education often overlooks areas beyond academic progression, and concerns about automatism may lead to suboptimal pedagogical practices. A comprehensive examination is required to balance the technological and human aspects of AI (Miao et al., 2021).

AI literacy should be embedded within digital literacy frameworks, incorporating both human and technological competencies. Critical questions arise about whether AI tools reinforce the human and social aspects of learning, whether they support or diminish educators' roles, and whether they effectively address educational needs. This research contributes to the literature by exploring the relationship between AI, fairness, and student agency, offering evidence-based insights for ethical AI integration in education, and informing policies aimed at enhancing the Greek higher education experience in linguistics.

Aim of the study:

- Evaluate the integration of AI in Greek higher education linguistics through a utilitarian lens, focusing on instructors' experiences, benefits, and limitations in relation to fairness and student agency.

Research Questions:

- How do instructors experience the utility of AI tools in Greek higher education linguistics?
- What benefits related to fairness and student agency do instructors anticipate
- What challenges regarding fairness and student agency are identified?

Objectives:

- Examine instructors' experiences with AI tools in Greek higher education linguistics.
- Explore benefits in fairness and student agency anticipated by instructors.
- Investigate challenges in ensuring fairness and promoting student agencies.

3. Methodology

Qualitative methods are essential for exploring complex phenomena and understanding people's experiences (Rosenthal, 2018). Data collection includes semi-structured interviews, which allow for open expression and provide reliable, rich data (Knot et al., 2022), and focus group discussions, offering a natural conversational environment to explore beliefs and exchange views (Harding, 2018).

The purposeful sampling method is used to select participants based on the researcher's judgment, ensuring they provide relevant and accurate information (Palinkas et al., 2015). The target participants are fourteen experienced second language educators with Master's degrees in educational technologies from U.K. universities, with the sample size determined by the principle of data saturation (Aguboshim, 2021).

The implementation process includes a 3-hour AI literacy seminar on AI tools in language learning, during which participants create lesson plans using these tools. Post-implementation interviews assess participants' teaching experiences and explore AI's role in fairness and student agency.

Data analysis involves thematic analysis to identify patterns in experiences (Braun & Clarke, 2021), and discourse analysis to examine power dynamics, ideologies, and societal influences in language (Johnstone & Andrus, 2024).

4. Conclusion

This study explores the integration of AI in Greek higher education linguistics, focusing on instructors' experiences and its impact on fairness and student agency. The literature review highlights AI's potential to enhance teaching but also raises concerns about student agency and biases in AI tools.

The qualitative methodology includes semi-structured interviews and focus group discussions with educators. While the research is yet to be conducted, this study lays the foundation for further investigation into effective AI integration in linguistics education.

Ultimately, the study aims to contribute to global discussions on AI in education and inform future educational policies

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THE ARTEMIS ARCHETYPE IN MODERN CINEMA AND TV

Olga Papamichali
MPhil. cand. B.A in Film Studies
New York College, Athens, Greece
olgaki.papamichali@gmail.com

Abstract

Artemis as a goddess inspired the creation of a new archetype in cinema. Young and attractive women took their bow and quiver full of arrows venturing out in the wilderness seeking for adventure. However, despite women becoming more active, they are still playing secondary roles, or they adopt a more muscular identity, which causes fears of castration to male viewers. Artemis heroines became a mainstream trend within the fantastic genre leaving on the outside more realistic depictions of the Artemis spirit or even having more realistic representations with alternative body and age types. Moreover, the majority of the Artemis women although in the end of the films succeed their goal, they suffer a terrible loss, or they adapt in a more domestic style hanging their bow. The creation of these cinematic heroines rose the following questions: Can Artemis-like heroines be presented in a more positive psychology manner? Do "Artemis-like" characters remain independent, causing relatability to female viewers? Do they retain their femininity, or do they lose it and what are the consequences? Can Artemis women be seen in a film/series of more realistic genres? Can Artemis-like women have a chance in happy ending: accomplish their aim and find love?

Keywords: Positive Psychology, role modeling, archetypes, cinematic representation.

1. Introduction

Goddess Artemis as an archetype embodies independence, female empowerment, and self-sufficiency resonating with Positive Psychology's focus on well-being. Embracing the Artemis archetype offers significant psychological benefits particularly in overcoming obstacles, traumas and societal constraints (Wu, 2024; Çam & Demirkol, 2019). According to Bolen (2014) Artemis inspires people that identify with her to overcome adversity more easily than those who don't. Cinema's imaginative qualities shape how people perceive themselves and the world (Kailik 2008: 2). Hence, it should be concerning what is delivered to viewers as healthy/ unhealthy role models (Gordon, 2017).

However, under these multi-praised Artemisian heroines, there are those who promote patriarchal ideologies, fears of castration, and unattainable beauty standards. Distinguishing between a true Artemis figure and a pseudo-Artemis may be challenging especially considering the misrepresentation or absence of Artemis in mythological based films (e.g. *The Immortals*, directed by Singh 2011, and *Percy Jackson*, directed by Columbus 2010). Sexually appealing Artemis heroines often fall into one of these categories: 1) the 'damsel in distress', 2) the femme fatale, while masculine Artemis heroines are reinforcing fears of castration (E. Creed, 1993). In terms of age representation, while younger women are frequently depicted as empowered, women between ages forty to eighty are underrepresented as weak (Towbin et al., 2003). However, examples like Emily Prentiss in *Criminal Minds* (2023) show that older women can embody the Artemis spirit, too. Furthermore, Bolen (2014) suggests that Artemis manifests in all women, including those beyond idealized young and sexually appealing.

This is crucial evidence when considering underrepresented groups such as older, overweight, and multi-racial women.

Films with Artemis-like heroines are often limited to a narrow ideal of how women should look or how they should behave, especially when dealing with issues like romance. While Artemis is mostly depicted as independent, romantic entanglements may lead her to adopt characteristics of the Aphrodite archetype (Redington, 2016). However, these romantic narratives lead to tragic outcomes for Artemis-like heroines such as: death, rape, inability to have children, and full of blood labors, which undermine the essence of Artemis and create a fear of becoming a mother to the female viewers.

The main symbol of Artemis is her bow making her identified with every modern media heroine who carries it. However, the lack of Artemis-like heroines in realistic genres contribute to the false narrative that Artemis-like women only exist in fairy tales stripping Artemis of her arrows (Hall, 2014). The absence of Artemis in modern settings demonstrates a need for more up-to-date portrayals of Artemis with empowering qualities without the need of super-strength or violence.

2. Aim and Research Objectives

The research's aim is the creation of a new type of cinematic Artemis heroines that would present healthier role models to viewers. This would address issues of gender, age, race and body discrimination, offering an empowering role model to the audience. This research would be divided into two parts: a theoretical essay and a documentary. Using both quantitative and artistic methodologies, it would provide a comprehensive understanding of Artemis' impact on viewers' psychosynthesis and well-being. The Research's objectives are:

1. To investigate the influence of Artemis-inspired characters in modern cinema and TV on challenging traditional gender roles and stereotypes.
2. To evaluate the significance of Artemis archetype in modern media for empowering women and girls, focusing on self-confidence and role modeling.
3. To explore the relationship between the Artemis archetype and modern feminism, liberating women from the objectifying male gaze.
4. To assess whether the Artemis archetype serves as a unifying force for women from diverse backgrounds and cultures.
5. To analyze how modern portrayals of female heroines emphasize either physical strength or emotional resilience.
6. To examine fears of castration and fears of becoming a mother due to Artemis imagery.

3. Methodology: The New Artemis Creation

The film project would explore the Artemis' phenomenon in a more positive manner by using the goddess iconography of feminist spirituality (Eller, 2000) demonstrating a new, non-objectifying way to portray women. Filming women from a female director's point of view challenges cultural norms and traditional stereotypes of beauty, youth and power. This aligns with positive psychology demystifying the Hollywood's Artemis with a new re-imagined and more positively inclusive Artemis. The documentary will be screened at New York College, followed by a questionnaire to assess audience perceptions of the Artemis archetype. The Questionnaire's Structure would consist of:

Demographics: basic information about the respondents.

- Section 1: Artemis' impact on Gender Roles and Stereotypes.
- Section 2: Empowerment through Artemis portrayals.
- Section 3: Artemis Archetype and Modern Feminism.
- Section 4: Diversity and Artemis' Representation.
- Section 5: Artemis and Societal Impact.

4. Contribution to Knowledge

This research aims to critically analyze and reimagine the representation of Artemis in media, offering empowering alternatives integrating Positive Psychology and promote equity and well-being. For this purpose, the research will:

- Expose problematic representations of Artemis in the media.
- Foster critical thinking about Artemis' influence on audiences.
- Offer a new female-directed Artemis on screen.
- Combine Positive-psychology and cine-education to combat gender, age, and racial discriminations.
- Provide an alternative to Hollywood's standard Artemis representation, by using the 6 virtues and the 24-character strengths of positive psychology (Seligman, 2004).
- Help to eliminate the fear of castration.
- Empower women with images of women who can achieve both professional and personal well-being.

5. Conclusion

The Artemis archetype in modern cinema explores resilience, independence and finding personal meaning which are main principles of positive psychology. However, as this research already reveals, the misrepresentations of Artemis-like heroines often limit their potential as empowering role models. By creating a new, more inclusive Artemis, this project aims in challenging outdated societal norms by offering a positive-psychology Artemis role model that can resonate with diverse audiences. Hence, future research may explore deeper connections between these mythic archetypes, like Artemis, and the evolving concepts of human flourishing and empowerment through media representations.

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DIGITAL CITIZENSHIP AND DIGITAL ETHICS IN HIGHER EDUCATION IN GREECE: AN INVESTIGATION OF THE USES OF DIGITAL TECHNOLOGIES BY POSTSECONDARY STUDENTS

Seitzan Palazli
MA, PhD (cand.)
School of Education, University of Bolton,
Greater Manchester, United Kingdom
zeitzan.palazli@gmail.com

Abstract

In today's digital age, technology has become an essential part of daily life, this is increasingly important as our world becomes more digitally driven. However, there is limited education on the appropriate use of digital technologies. While students may be adept at using technology, they often lack digital literacy. The widespread presence of digital tools highlights the importance of teaching digital citizenship, which helps students develop the skills and values necessary to use technology ethically. Globally, educational institutions have taken steps to incorporate digital citizenship into school curricula. Some institutions are actively addressing the challenge by implementing strategies to teach digital citizenship skills. Unfortunately, this is not the case in Greece.

This research aims to address this gap by examining how Greek postsecondary institutions promote the ethical use of digital technologies and new media. The study will focus on Greek postsecondary institutions, adopting a qualitative comparative case study methodology. It will include semi-structured interviews with students and educators, as well as document analysis of Greece's "Digital Transformation Bible," the national strategy for the country's digital transformation. Constructivism will serve as the study's philosophical framework, and Braun and Clarke's (2006) thematic analysis method will be used to analyse the findings.

Keywords: education, digital citizenship, digital ethics

1. Introduction

The need to investigate how students use and interact with digital technologies in an ethical manner is highlighted by the growing integration of these tools into higher education. Higher education institutions play a key role in promoting digital citizenship in Greece through the ethical and responsible use of digital technology. The study's two main goals are to learn how Greek postsecondary students view digital citizenship and to look at how educational institutions promote digital citizenship through their curriculum.

According to the latest statistics in Eurostat (2023), 84% of Greek citizens used the internet in 2022, but only 52% of them possess a basic knowledge of digital skills. Digital citizenship is described as "the norms of behaviour with regard to technology use" (Ribble et al., 2004, p.7), and therefore refer to the educational factor of digital citizenship, where users have to be educated on the ethical and responsible ways of using digital technologies and the media.

Moreover, Buchholz et al. (2020) in their research examined the effects of the global pandemic on the application of digital citizenship and emphasised the importance of shifting from a theoretical to a practical approach. Significant gaps in preparing students to navigate digital spaces ethically were found by Gleason et al. (2018), who looked at digital citizenship instruction in secondary education. They also highlighted the need for more robust ethical instruction at all educational levels, including higher education.

Additionally, Greece's Digital Transformation Strategy (Ministry of Education, 2022) while outlines plans for digital reform in Greece, provided little information on how digital citizenship and ethics could be incorporated into higher education systems. Research into context-specific strategies for promoting digital citizenship is necessary to address this gap.

Lastly, the significance of considering cultural contexts in digital citizenship education has been underlined by a number of studies. Raikou et al. (2020) examined how Greek universities managed the pandemic's digital changes and found that cultural sensitivity was necessary when creating training programs and policies on digital ethics.

Methodology

This research aims to investigate how do Greek postsecondary institutions promote the ethical use of digital technologies and new media. I would like to emphasise the importance of constructivism as the philosophical framework for this study. Constructivism studies "the multiple realities constructed by people and the implications of those constructions for their lives and interactions with others" (Patton, 2002, p. 96), in constructivism the evaluator plays a central role.

The study will use a qualitative approach, guided by Braun and Clarke's thematic analysis framework (2006). The main goal of the qualitative approach is to better understand the experiences of the people and the world they live in (Jones et al., 2006).

The research design will incorporate a comparative case study to examine the teaching of digital citizenship within the Greek higher education context. The approach engages two logics of comparison: first, the more common compare and contrast logic; and second, a "tracing across" sites or scales (Bartlett and Vavrus, 2017, p. 6). The data collection will include literature review, semi structured interviews and document analysis of public policy documents, strategy documents and official curricula.

In validating the findings of the study and thus enhance the research's validity triangulation will also be incorporated (Bryman, 2012). The sampling will include educators who will be recruited through purposeful sampling, and postsecondary students who will be selected through homogenous sampling (Miles and Huberman, 1994). After being fully informed of their rights and the use of their data, participants will be asked to give their consent and adherence to ethical standards will be guaranteed by anonymity and safe data storage.

2. Expected Findings

Although the study has not been completed yet, expected outcomes can be predicated based on previous studies.

Postsecondary students are expected to exhibit a range of levels of understanding regarding digital citizenship (Bucholz et al., 2020). Issues of privacy and consent might also emerge (Gleason et al., 2018). Postsecondary institutions may place more emphasis on technical skills proficiency and digital literacy than on encouraging moral behaviour (Oberländer et al., 2020). Embedding digital citizenship into the educational curriculum may be prevented by a lack of official policies, inadequate teacher training, and a lack of funding (Braun et al., 2006).

3. Future directions

The study aims to open the door for future research and further investigation. Prospective future recommendations may include:

- Encouraging policymakers to integrate digital ethics and citizenship into the higher education curriculum.
- Developing educator training programs focused on digital ethics.

- Examining the same topic across different countries.
- Highlighting the role of cultural differences in perceptions of digital citizenship.

4. Conclusion

This study aims to investigate a relatively unexplored area in Greece: how postsecondary institutions promote the ethical use of digital technologies and new media. Recent statistics highlight the growing importance of digital technologies in daily life, emphasising the need for researchers, educators, and policymakers to understand digital citizenship and ethical technology use. Promoting these concepts to students and young adults is essential for fostering responsible and informed engagement with technology.

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**THE IMPACT OF THE ECONOMIC AND FINANCIAL CRIMES COMMISSION
(EFCC) ON THE FIGHT AGAINST CORRUPTION IN NIGERIA**

David Anyaegbu

MA, PhD (cand.)

Department of Political Science, University of Bolton, Greater Manchester,

United Kingdom

danyaegbu@nyc.gr

Abstract

This study investigates the effectiveness of Nigeria's fight to eradicate corruption through its anti-graft agency, the Economic and Financial Crimes Commission (EFCC). To understand how effective the EFCC has been, the study aside from conducting a sample survey and interview also attempts to juxtapose the efforts of the EFCC with the successes recorded in other global South countries that appear to have done well in fighting corruption. The study beams the searchlight on China's anti-graft agency, the National Supervisory Commission (NSC) and the anti corruption policies in Ghana. It tries to understand the pace of the EFCC in combating corruption amidst Nigeria's rising population and the potential global humanitarian crisis Nigeria may constitute if corruption is left unaddressed. The study is of paramount importance because it provides a thorough understanding regarding whether or not Nigeria should continue spending billions of naira of taxpayers' money to fund the EFCC. It is also unique because it aggregates not only the opinion of scholars and government officials on the EFCC and corruption in Nigeria but also samples the opinion of ordinary people who interact with the Nigerian state on regular basis. The study finds that there is a perception that the EFCC has not delivered on its mandate to combat corruption in Nigeria. To change this narrative, there is an urgent need for deepening of political will in Nigeria and international cooperation, among others.

Keywords: Corruption, Nigeria, Economic and Financial Crimes Commission, EFCC, Corruption fight in Nigeria and China, Corruption fight in Nigeria and Ghana.

1. Introduction

The study on the EFCC and corruption in Nigeria essentially focused on utilizing a research framework that best ensures all research questions on the subject of study are addressed and answered objectively and empirically. To collect data for the study, questions were meticulously developed around the theme of study "the impact of the EFCC on Nigeria's fight to combat corruption". The study sought to identify the possible questions that would help establish what impact the EFCC had. Prominent among the questions, were the research questions on whether corruption was on the decrease or rise in Nigeria, the effect of the EFCC and whether the organization should be scrapped or reformed.

2. Methodology

The study employed a mixed quantitative approach of phenomenological and case study method. Data was derived from interviews, study of existing literature on corruption in Nigeria and sample survey of 1,000 people to perform a subjective qualitative analysis of the results of people's perception on corruption, rather than a deep statistical analysis. The study utilized pragmatism Paradigm which enabled application of a suitable method to address the research questions.

To create the sample of 1,000 people, the study utilized both the Convenience Sampling model and the Stratified Sampling model which enabled the leeway to derive data from a conveniently available pool of respondents and to ensure representativeness. On daily basis, an average of 80 persons visits the consular section of the Nigerian Mission in New York, USA. The composition of the visitors include all traits and characteristics typical in the entire Nigerian populace, including religion, culture, dual citizenship, non-Nigerians and other diversity, among others. The study administered the questionnaire by randomly accosting visitors to complete the questionnaire.

A consent form was completed by the three prominent people who participated in the interview for the study.

3. Key Findings or Insights

3.1 Findings from sample survey

On the research question 1, "is corruption on the decrease or on the rise in Nigeria", the study found that 616 out of the 1,000 respondents believe corruption was on the rise in Nigeria, which is an overwhelming number to say the least. 227 said corruption remained the same, 125 were not sure, while 32 believe corruption was on the decrease in Nigeria.

Most respondents who said corruption was on the rise, cited increase in poverty and the lack of meaningful development in Nigeria despite its huge resources to buttress their position, while the very few who said corruption was on the decrease cited the commitments of the Nigerian government to eradicate corruption.

3.2 Findings from interview

On root cause of corruption in Nigeria, the President of the 74th Session of the United Nations General Assembly, His Excellency, Professor Tijjani Muhammad-Bande in a recorded interview for the study said that as relevant as poverty may seem, it does not explain the greed of the rich elite in Nigeria who illicitly amass more wealth despite how rich they are.

On research question two, the impact of the EFCC on Nigeria's fight to eradicate corruption, Her Excellency, Ambassador Noamey Nwachukwu, Charge d' Affaires of the Nigerian Embassy, Spain, in a recorded interview for my study, identified unseen influences and the lack of political will as some of the factors which have hampered the EFCC from living up to expectation.

4. Interpretation

From the findings in the study, it does appear that there is a perception that corruption is on the rise in Nigeria, and this matches the methodologies put forth by the likes of Transparency International, who, each year, releases a Corruption Perception Index.

The feedback and data from the study indicate that scrapping the EFCC is not the solution to Nigeria's corruption problem inasmuch their seeming ineffectiveness in combating corruption. The feedback also indicates that the EFCC is not as effective as the National Supervisory Commission (NSC) in China in the corruption fight.

5. Future directions

5.1 Next steps

Nigeria's corruption fight has to assume a whole of society approach, with traditional and religious institutions leading in the sensitization campaign as identified by Ambassador Bande in the interview for the study. Religious institutions as secondary agents of socialization have a significant role to play in molding the character of followers towards state building and patriotism. If respected traditional leaders and religious clerics in Nigeria speak more about the demerits of corruption to their adherent followers and community, this perhaps would go a long way in dissuading people from perpetrating corrupt practices.

Nigeria must also engender visionary leadership that would demonstrate political will in the fight against corruption. China's President Xi Jinping in his book "Up and Out of Poverty" (2016), notes that "we (china) have reached a point, though, where the corruption of a small number of people within the Party (Communist Party of China) has reached an intolerable point. We must punish them to assuage the people's anger." It goes without saying that Nigeria needs a leadership that would demonstrate political will like Xi to overcome its corruption problem.

6. Collaboration

Nigeria/the EFCC is encouraged to learn from other countries, especially global South countries that have recorded successes in the fight against corruption. The Chinese experience as highlighted in the study, may be useful because China had to control corruption to get to where it is today and become the second largest economy in the world and the largest by Purchasing Power Parity (PPP). Nigeria can learn valuable lessons from China's anti-graft agency, NSC.

7. Discussion / Conclusions

Nigeria seems not to be lacking in policy direction to tackle corruption. Comparatively, the EFCC was established 15 years prior (2003) to the establishment of China's National Supervisory Commission in 2018. Yet, China appears to have done well in Nigeria seems not to be lacking in policy direction to tackle corruption. Comparatively, the EFCC was established 15 years prior (2003) to the establishment of China's National Supervisory Commission in 2018. Yet, China appears to have done well in controlling corruption in a population of over 1.4 billion far more than Nigeria with a population of over 200 million. What seems to be the major challenge in Nigeria lies in the urgent need to mobilize political will, eradicate poverty, engender economic reform, sensitize on the demerits of corruption and broaden international collaboration, among others to tackle corruption.

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**MANAGERIAL INFOPHYSICS EXPLORED: PRELIMINARY FINDINGS FROM A
SYSTEMATIC LITERATURE REVIEW ON THE INTEGRATION OF BUSINESS
PROCESS MANAGEMENT (BPM) AND INFORMATION ENTROPY ANALYSIS**

Apostolos Mouzakitīs

PhD Cand., UoB, MBA-TQM, UniPi, BSc (Stat & Ins), UniPi
amouzakitīs@nyc.gr

Abstract

This systematic literature review presents preliminary findings on managerial infophysics, a novel framework integrating Business Process Management (BPM) principles with entropy-based metrics to address organizational uncertainty and enhance decision-making in complex environments. Using the PRISMA methodology, the review spans 2018–2024, analysing peer-reviewed research from 21 databases in BPM, econophysics, and informatics. An initial 16,101 records were screened to ensure relevance and validity. The findings suggest entropy-based metrics offer a dynamic alternative to traditional KPIs, quantifying process variability and extending BPM's applicability to high-variability sectors like healthcare and finance. Despite challenges in aligning BPM's efficiency focus with entropy's probabilistic nature, the evidence supports this interdisciplinary framework as a means to enhance resilience and adaptability. These preliminary results set the stage for further empirical validation in an upcoming peer-reviewed publication.

Keywords: Managerial Infophysics, Business Process Management (BPM), Econophysics, Information Entropy, PRISMA Methodology

1. Introduction

BPM frameworks optimize workflows, reduce inefficiencies, and manage complex business processes effectively, but they often struggle with unpredictability in dynamic environments (Nousias et al., 2024). Leveraging entropy metrics, organizations can quantify uncertainty, enhancing decision-making in fields like finance and management (Abad-Segura et al., 2021). This study proposes managerial infophysics, integrating BPM principles with entropy to tackle variability and unpredictability, providing managers with adaptive tools for streamlining operations (Tomaskova et al., 2023). Shannon entropy, effective in finance and healthcare, offers similar potential for reducing inefficiencies in BPM while balancing efficiency with complexity (Natal et al., 2021). Empirical validation through case studies could showcase entropy-based BPM as a transformative approach to managing complex processes (Jung et al., 2011).

The PRISMA 2020 statement ensures transparent and replicable systematic reviews by emphasizing structured reporting standards, enhanced by recent advancements like AI technologies to improve reliability across disciplines (Page et al., 2021). This study conducted three thematic cycles—BPM, Econophysics, and Thermodynamics—between 2018 and 2024, synthesizing interdisciplinary literature using the PRISMA framework to uncover converging insights. Utilizing 21 databases (e.g., Science Direct, Springer), 241 queries with 435 identification terms were employed to ensure comprehensive coverage. From 16,101 records initially retrieved, 15,207 were excluded based on criteria such as irrelevance, language barriers, non-peer-reviewed sources, and duplication. After rigorous screening, 894 records advanced to eligibility, with 191 finalized following exclusions for retractions, errata, or dataset issues (see Table 1 for exclusions).

Table 1. PRISMA Data Summary.

PRISMA Data Summary		
Identification	Databases searched	21
	Records found in databases	16.101
	Records excluded due to missing keywords	1.221
	Non-English records excluded	72
	Records excluded (inappropriate publication type)	10.172
	Records excluded (irrelevant scope)	3.708
	Duplicates (removed manually)	34
	Total records removed before screening	15.207
Screening	Records screened	894
	Records excluded (irrelevant information)	251
	Records excluded (duplicate information)	417
	Total records excluded in screening	668
Eligibility	Records sought for retrieval	226
	Records not retrieved (DOI issues)	11
	Records assessed for eligibility	215
	Records excluded (retracted articles)	6
	Records excluded (errata published)	5
	Records excluded (small datasets)	13
	Total records excluded in eligibility	24
Included	Records included in review	191

Table 1. PRISMA Data Summary

This meticulous process maintained alignment with BPM, entropy, and econophysics themes while ensuring methodological rigor. Records were categorized into thematic units, refined with Boolean queries incorporating synonyms and nuanced terms for relevance. A narrative synthesis grouped the 191 eligible studies into BPM, Econophysics, and Entropy, revealing interdisciplinary links and gaps. Key steps were documented using the PRISMA 2020 Flow Diagram (Figure 1), enabling a structured and transparent approach to literature synthesis.

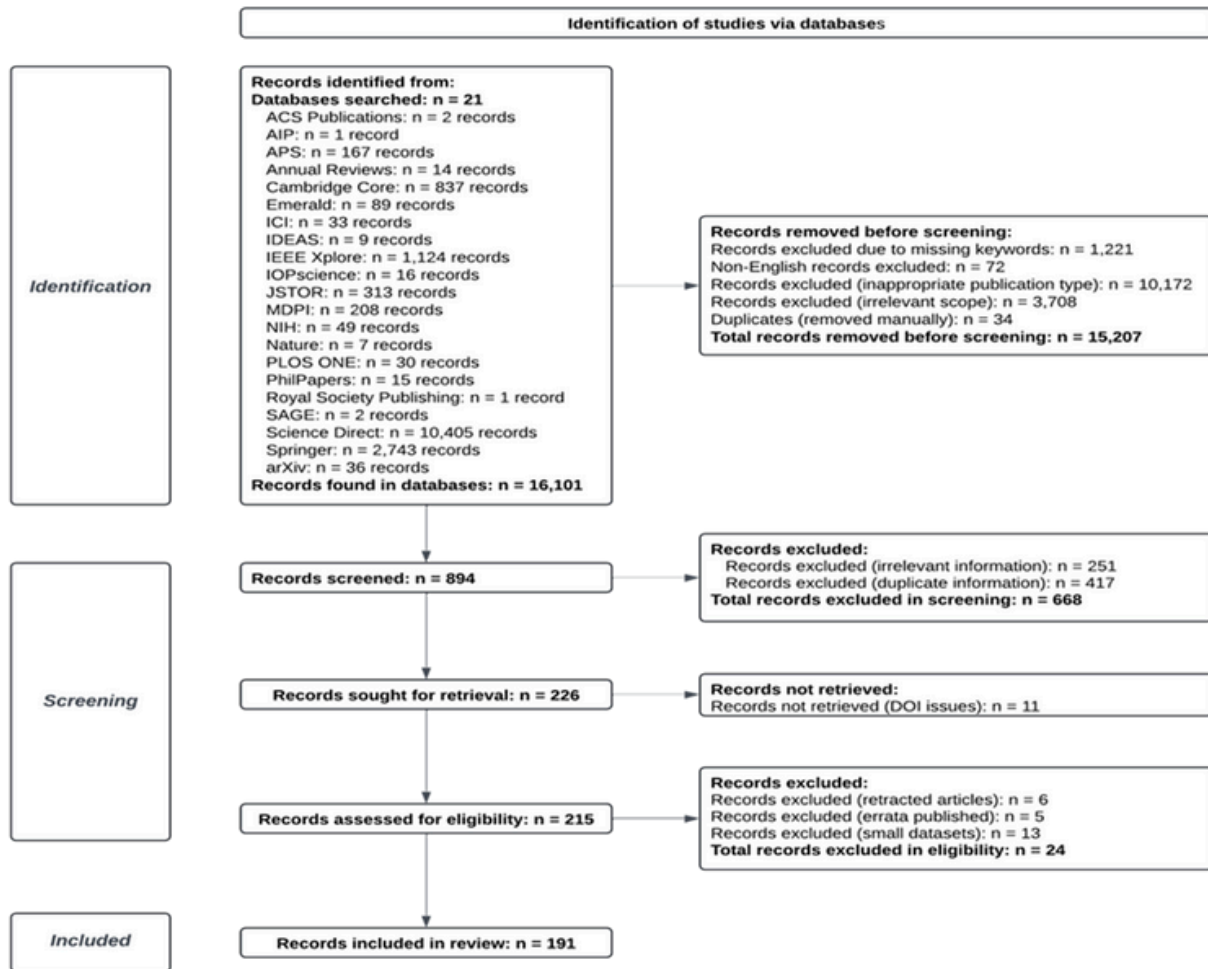


Figure 1. PRISMA 2020 Flow Diagram

3. Results

BPM systematically manages and improves processes to meet organizational goals, employing tools like SIPOC for clarity and frameworks such as EFQM and ISO for consistency (Rodríguez-Mantilla et al., 2020). The BPM life cycle follows the PDCA model, encompassing design, implementation, operation, and control stages to address inefficiencies and ensure customer satisfaction (Ben Haj Ayeche et al., 2021). Processes are classified by execution type (static to unstructured) or interaction mode (peer-to-peer, person-to-application, application-to-application), necessitating adaptive BPM systems (Kerpedzhiev et al., 2021). Key BPM principles include value creation, process optimization, and standardization, supported by IT-driven Paradigms like BPR, AI, and blockchain (Badakhshan et al., 2023). Tools such as BPMN 2.0 bridge theoretical frameworks and practical implementation, enabling visual process evaluation while maintaining compliance (Pufahl et al., 2022). Entropy metrics complement traditional metrics, quantifying uncertainty, and inefficiencies; higher entropy signals unpredictability, while lower entropy enhances planning and execution (Zhao et al., 2016). Interdisciplinary advancements in big data and network science drive innovation, aligning BPM with econophysics and sociophysics to solve complex problems (Pluchino et al., 2019). Entropy's foundational role in BPM is validated through empirical applications in healthcare and finance, optimizing workflows and improving resource allocation (Wang et al., 2024). These integrations demonstrate BPM's adaptability and efficacy in dynamic environments.

4. Discussion

Integrating Shannon's entropy principles into BPM creates a cohesive framework termed managerial infophysics, enhancing process efficiency and adaptability by addressing variability through physical principles (Abdar et al., 2021). This integration enriches BPM by addressing uncertainties and optimizing processes, with PRISMA-reviewed studies validating its theoretical and practical potential across sectors like healthcare and resource management (Mehmood and Anees, 2020). The Mouzakitīs-Liapakis Qualitative Lemma underscores the convergence of BPM and entropy under the conceptual metaParadigm of infophysics, demonstrating transformative potential for managing variability and efficiency (Mouzakitīs and Liapakis, 2025). This interdisciplinary synthesis bridges traditional methods, offering enhanced adaptability in complex systems. Applications in healthcare and finance highlight entropy-driven frameworks' ability to optimize resource allocation and financial risk assessments (Baiyere et al., 2020). However, challenges persist, including outdated tools, fragmented methods, and socio-technical barriers (Polančič and Orban, 2023). Emerging technologies, such as Digital Process Twins and IIoT, enhance real-time optimization but face scalability and empirical validation issues (Beerepoot et al., 2023; Grisold et al., 2019). Future research should focus on predictive models integrating entropy with machine learning, explorative BPM addressing external trends, and entropy-driven frameworks tackling uncertainty in dynamic environments. These innovations aim to balance efficiency and adaptability, redefining BPM's role in modern industries.

5. Conclusion

This study, initially focused on merging econophysics and managerial science, expanded to incorporate informatics, reflecting the broader interplay between physics, information science, and BPM. Feedback from the 33rd European Conference on Operational Research refined its scope and rigor, leading to a focus on entropy-based metrics for measuring process variability and inefficiencies (Mouzakitīs and Liapakis, 2024). Analogical induction applies thermodynamic principles to BPM, offering innovative tools to enhance adaptability and reduce variability (Pluchino et al., 2019). While promising, these concepts require empirical validation. Entropy connects theory and practice, supporting resource optimization and strategic decision-making, vital to advancing managerial infophysics (Jung et al., 2011). The full systematic review is available as a preprint (Mouzakitīs and Liapakis, 2025), as the finalized version is currently undergoing peer review at the time of this preliminary report.

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II. SCIENTIFIC ARTICLES

BRIDGING THE GAPS: A COMPREHENSIVE REVIEW OF SUSTAINABLE LEADERSHIP COMPETENCIES ACROSS ORGANIZATIONAL HIERARCHIES

Lateef Damilare Olusesi
Greater Manchester Business School
University of Greater Manchester
Greater Manchester,
Bolton
BL3 5AB
Ldo1res@bolton.ac.uk

Professor Christian Harrison
Director, Centre for Leadership and Empowerment
Off-Campus Division | University of Greater Manchester, University Way, Bolton
BL3 5AB
c.harrison2@bolton.ac.uk

Abstract

Sustainable leadership is a critical paradigm integrating economic viability, social responsibility, and environmental stewardship. This review explores the conceptual underpinnings of sustainable leadership by examining current research from multiple scholarly perspectives. Emphasis is placed on the competencies needed for effective, sustainable leadership and on how these competencies could address organizational shortcomings. Differences in leadership competencies at the top, middle, and lower levels are examined, and strategies to bridge competency gaps are proposed.

This review integrates stakeholder, institutional, transformational, and triple bottom line theories to underpin the need for sustainable leadership and competencies. By synthesizing insights from reviewed studies, this research presents a complex understanding of sustainable leadership and its pragmatic consequences across organizational hierarchies. This comprehensive review reveals the disparities in leadership competencies across management levels, while the proposed strategies aim to bridge these gaps. It offers a nuanced understanding of sustainable leadership and its practical implications across organizational hierarchies, offering actionable recommendations for leadership development and organizational change.

Keywords: Sustainable Leadership, Competencies, Organizational Hierarchies, Management Levels, and Sustainability.

1. Introduction

In the contemporary, dynamic, and intricate business landscape, the notion of leadership has experienced substantial evolution. Conventional leadership approaches, characterized by hierarchical frameworks and top-down decision-making, are inadequate for addressing the issues of sustainability, globalization, technological progress, and economic volatility (Kezar, 2023). Sustainable leadership has become an essential idea that acknowledges the necessity for leaders to sustain, develop, and navigate enterprises amid uncertainty, transformation, and upheaval. Leadership allows an organization to maintain a singular focus on its operations, as an overabundance of workers may hinder the smooth functioning of the company due to conflicting decision-making attempts (Goleman, 2011). Leadership abilities can be developed through the acquisition of various talents (Rohana and Abdullah, 2017).

Sustainable development has emerged as a critical worldwide problem (Vargas and Cooper, 2024). Various stakeholders, such as governmental bodies, the public, and non-governmental organizations, are urging businesses to function sustainably within a complex framework (Amoah and Eweje, 2022). Sustainability requires leaders who can advocate for sustainable practices in their communities and organizations while fostering economic growth (Ned and Umesi, 2023). Sustainable leadership has emerged as an effective leadership approach (Liao, 2022). It is an evolving idea that many struggle to fully comprehend. Fry and Egel (2021) assert that sustainable leaders engage in deliberate acts that advance, maintain, and safeguard three critical dimensions: economic, environmental, and social systems. Liao (2022) contends that the components of sustainable leadership; social, economic, and environmental embody the fundamental characteristics of a sustainable leader. A sustainable leader could equilibrate the company's social obligations, including the enhancement of relationships with stakeholders, customers, and the public. They might achieve economic success by fulfilling the company's financial objectives and establishing market supremacy, while being cognizant of environmental considerations. Also, this could effectively address environmental concerns by incorporating long-term sustainability into their production system, enhancing efficiency, and using lean manufacturing methods (Schmitt et al., 2021).

Sustainable leadership advocates for sustainability principles at the interpersonal, organizational, and societal levels (Liao, 2022). Sustainable leaders prioritize capacity development, enduring transformation, and long-term outcomes (Iqbal and Ahmad, 2021), hence necessitating the pursuit of Sustainable Development Goals (SDGs). Sustainable leadership techniques, include employee valuation, a shared vision, social responsibility, and harmonious labour relations, substantially enhance long-term organizational success (Ahsan, 2024). However, it remains in its nascent phase, necessitating an expansion of the literature in this field (Iqbal and Ahmad, 2021). Organizations all around are under increased pressure to include sustainability into their business strategies as growing issues about environmental degradation, social inequity, and long-term economic stability call attention. Sustainable leadership presents a structure for handling these problems and ensuring business success. Unlike traditional leadership, sustainable leadership focuses on long-term value creation rather than quick profits, considering the implications of decisions on society, the environment, and future generations (Avery & Bergsteiner, 2011).

Although sustainable leadership is becoming more and more relevant, its actual application poses challenges particularly in terms of creating expertise at many levels of the firm. While top management usually have ideas on sustainability strategies, middle and lower management's performance of these strategies primarily depends on their competency levels, therefore, skillful implementation may be limited (Maak & Pless, 2006). This study points up management level deficiencies, looks at the competencies required for sustainable leadership, and offers practical suggestions to address these weaknesses. To contribute to this gap, this paper seeks to examine the following research objectives:

- i. Explore the concept of sustainable leadership.
- ii. To identify key sustainable leadership competencies across organizational levels.

2. Literature review - Exploring Sustainable Leadership

In the contemporary, dynamic, and intricate business landscape, the notion of a sustainable leader provides the environment primary concern, profit, and long-term welfare of people. Including sustainability into operational processes and corporate strategy vision helps to surpass business social obligation (Hargreaves & Fink, 2006). Sustainable leaders stress resilience, ethical decision-making, stakeholder involvement, and creativity in order to reconcile financial performance with society needs. New research underscore how important sustainable leadership is in building organizational sustainability, employee engagement, and firm resilience (Tideman, Arts, & Zandee, 2013).

Sustainability leadership emphasises the significance of current information to enhance our comprehension of leadership and the achievement of sustainable outcomes (Boeske, 2023). Organizational learning is significantly improved by sustainable leadership (Hargreaves & Fink, 2005). Systematic thinking, significant collaboration, and fundamental assumptions about business and its objectives are prioritized by learning organizations. Organizational learning is a social activity that is influenced by contextual factors. It is shaped by leadership, comprehensive thinking, and a shared vision. Enhancing learning necessitates management assistance.

Under more and more relevance is the moral and ethical commitment towards all stakeholders a concept that matches sustainable leadership (Maak & Pless, 2009). Moreover, research reveal that in businesses motivated by sustainability, effective leadership depends on a values-based approach motivating shared vision and responsibility (Waldman & Siegel, 2008). Increasing volumes of studies also illustrate how sustainable leadership fosters corporate innovation, so matching corporate models to social and environmental standards (Linnenluecke & Griffiths, 2010). Sustainable leadership also means a commitment to lifetime learning and adaptation whereby businesses actively participate in sustainability-oriented adjustments to fit society expectations (Doppelt, 2017). According to scholars, sustainable leaders must be very adaptable to ensure that new sustainability trends and customer expectations fit corporate operations (Metcalf & Benn, 2013). Moreover, sustainable leadership contains elements of servant leadership where leaders give their staff members and stakeholders priority so encouraging inclusiveness and moral government (Greenleaf, 1977).

Sustainable leadership confers a competitive advantage to organizations (Nisha et al., 2022; Iqbal and Ahmad, 2021). It provides organizations with opportunities for innovation, ongoing growth, sustained competitive advantage, and lasting success (Avery & Bergsteiner, 2011). Sustainable leadership creates an environmental vision via cultural transformation and promotes collaboration with many stakeholders to combat climate change, hence supporting green initiatives and ecological performance inside organizations (Iqbal et al., 2020).

Furthermore, sustainable leadership improves organizational performance by reducing costs and increasing potential revenue. Sustainable leaders have a proactive stance, consistently evaluating the environment to track external market trends (Achmad & Wiratmadja, 2024), while fostering lasting relationships with internal and external stakeholders. Sustainable leaders exhibit a long-term vision, emphasize environmental initiatives, recognize sustainability challenges, establish green management systems, and promote both incremental and radical innovation (Avery & Bergsteiner, 2011). External sustainable leaders focus on attaining optimal performance for both society and the environment (Avery & Bergsteiner, 2011). Through sustainable leadership, organizations gain numerous benefits, including the conservation of natural resources and the efficient utilization of resources.

3. Synthesizing metatheories and leadership theories to derive sustainable leadership competencies

In order to effectively promote sustainability across organizational levels, sustainable leadership competences were derived by synthesizing these metatheories and leadership theories.

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	Theory	Orientation	Leadership competencies
Metatheories	<p>Institutional theory Sotarauta, et al. (2012); Trisoglio (1996); Novawan and Aisyiyah (2020); and Lobel (2004).</p> <p>Stakeholder theory Parmar, et al. (2010); Freeman, et al. (2010); Fontaine, et al. (2006); and Phillips (2011)</p> <p>Triple bottom line theory Elkington (1997); Zak (2015); Hammer and Pivo (2017); Rogers and Hudson (2011); and Norman and MacDonald (2004)</p>	<p>Adapting to Societal norms and regulations</p> <p>Balancing diverse stakeholder interest</p> <p>Economic, social, and environmental</p>	<p>Shaping leaders' decisions to emphasizing conformity and legitimacy with organizational values.</p> <p>Diverse stakeholder interest, ensuring ethical decisions and long organizational sustainability.</p> <p>Prioritize balancing social, environmental, and financial outcome, ethical decision-making, long-term value creation, well-being, and economic viability.</p>
Change-orientation leadership	<p>Situational leadership Hersey and Blanchard (1997); Johansen (1990); and Nicholls (1985)</p> <p>Sustainable development leadership Iqbal and Ahmad (2021); Streimikiene (et al. 2019)</p> <p>Managerial leadership Yukl (1989), Holmberg and Tyrstrup (2010); Sveningsson et al. (2012); and Karim et al. (2023)</p> <p>Transformational leadership Leithwood and Jantzi (2005); Bass and Riggio (2006); Díaz-Sáenz (2011)</p> <p>Visionary leadership Ubaidillah et al (2019); Prestiadi et al. (2019); Lashway (1997)</p>	<p>Variety of competencies and ability to engender flexibility</p> <p>Sustainable development agenda 2030 Organizational efficiency, transferable skills, task delegation, and performance management</p> <p>Motivation oriented</p> <p>Long-term goals, innovation,</p>	<p>Task focus, skill uniqueness, problem solving, team maturity, and demands for success.</p> <p>Team readiness, individual capabilities, assess team needs, task complexity, and optimal outcomes.</p> <p>Accountability, situational sensitivity, ethical decision-making, organizational success, long-term planning, and resource management.</p> <p>Pro-activeness, intellectual simulation; inspirational, empower, develop followers, innovation, and ethical goals.</p> <p>Strategic foresights, motivation, change agent, motivation, and innovation.</p>
Collaborative leadership theories	<p>Distributed leadership Gronn (2008); Bolden (2011); Harrison (2018); Harrison (2012); Clark and Harrison (2018). and Zaghmout and Harrison (2025)</p> <p>Adaptive leadership DeRue (2011); Dunn (2020); Cojocar (2008); Hayashi and Soo (2012).</p>	<p>Shared responsibility, empowerment.</p> <p>Flexibility, change, learning, innovation</p>	<p>Collective decision-making, trust, team autonomy, decision-making responsibilities, and engagement.</p> <p>Problem-solving, creativity, mutual trust, and shared responsibilities.</p>

Table 1: Metatheories and leadership theories to derive sustainable leadership competencies.

In recent years, the idea of "sustainable leadership traits" has grown in importance as a way for businesses to make a profit in the long run while also improving the quality of life for people and the environment. Through their skills, abilities, and behaviors, leaders with sustainable leadership competencies can handle the complexity of sustainability while also balancing social, economic, and environmental issues (Subrahmanyam, 2025). The integration of metatheories with leadership theories offers a framework for the systematic development, evaluation, and improvement of sustainable leadership qualities. This study underscores the importance of leadership in advancing sustainability by clarifying the skills needed for future leaders and integrating relevant concepts.

Fundamentally, metatheories assist one to understand how leadership responds to various stakeholder interests, laws, and societal expectations. From institutional theory to stakeholder theory to the triple bottom line theory, these metatheories cover wide frameworks that influence leadership behavior in demanding environments. Sotarauta et al. (2012) proposed that institutional theory emphasises the need to harmonize institutionalized ideas, social expectations, and legislation with the leadership actions. Sustainable leadership involves following societal ideals that support long-term corporate performance and ensuring that leadership actions are not just moral but also successful. Leaders have to demonstrate conformance, legitimacy, and organizational alignment, that is, competencies in conformity, legitimacy, and organizational alignment. Promoting sustainability and innovation, leaders must negotiate institutional limitations and the legal environment (Lobel, 2004).

According to Parmar et al. (2010) and Freeman et al. (2010), the stakeholder theory holds that leaders have to strike a balance between the interests of many stakeholders to guarantee that moral choices support long-term sustainability. This calls for moral judgement, stakeholder management, and dispute resolution, among other skills. Leaders have to interact effectively with the stakeholders, shareholders, staff, and communities and match organizational plans to more general society demands (Fontaine et al., 2006). In the framework of sustainable leadership, it is imperative to be able to make judgements that are not just socially but also financially feasible (Phillips, 2011). Elkington's 1997 Triple Bottom Line (TBL) theory expands the scope of leadership to include social, environmental, and financial aspects. Sustainable leaders must thus give long-term value generation, ethical decision-making, social and environmental responsibilities priority. Leaders that want to balance the three pillars of TBL; resource management, sustainable practices, and economic viability must possess competencies in these areas. Leaders must guarantee that their policies and choices support sustainable development in line with the Sustainable Development Agenda 2030 (Hammer & Pivo, 2017).

According to the situational leadership theory developed by Hersey & Blanchard (1997), successful leadership is defined by the surroundings including team maturity and task type. Leaders must be able to assess the complexity of tasks and the capacity of their team to ensure that decisions produce best results (Nicholls, 1985). This flexibility and situational awareness of sustainable leadership enable leaders to solve not only urgent problems but also meet long-term goals in a sustainable manner.

Leaders in this sense have to be adept in task prioritization, resource management, and assigning (Yukl, 1989). These abilities cover long-term planning and moral decision-making ensuring environmental, social, and financial sustainability for sustainable leadership. Managerial leaders have to make sure that their organizational goals support sustainability goals so that operations and strategies emphasize long-term sustainability rather than only short-term advantages (Holmberg & Tyrstrup, 2010).

Bass and Riggio (2006) assert that transformational leadership emphasises motivating and empowering subordinates to reach better degrees of performance and personal growth. Leaders applying this approach have to be inspirational, empower others, and be creative (Leithwood & Jantzi, 2005). Transformational leaders inspire and enable organizational transformation in line with long-term sustainable goals, hence they are vital for sustainability.

Encouragement of followers to give ethical objectives, inventiveness, and social responsibility top priority guarantees that sustainability will be included into the corporate culture (Díaz-Sáenz, 2011). Also, visionary leadership (Ubaidillah et al., 2019) demand leaders to have a clear future vision and the capacity to inspire their people to reach that vision. This approach calls for strategic insight, drive, and change leadership essential abilities. Visionary leaders inside the sustainability framework have to concentrate on developing and presenting a sustainable vision that leads the company towards long-term success (Prestiadi et al., 2019). They have to be able to motivate individuals to support sustainable practices as well as innovation matched with long-term society and environmental goals.

Many theoretical models enhance environmentally friendly leadership. According to stakeholder theory, companies have responsibilities beyond their owners which involves employees, surrounding companies, and the environment (Freeman, 1984). This review suggests that leaders should give sustainability some thought when making decisions if they want to be successful over the long haul. Emphasizing the connections among social, environmental, and financial sustainability, the triple bottom line framework (Elkington, 1997) leaders have to make sure that activities on sustainability support business goals, thereby fostering a logical attitude to corporate responsibility. According to transformational leadership theory, transformational leaders promote sustainability projects and organizational change (Bass, 1985). Those that encourage and motivate staff members towards a sustainability-oriented culture will be able to properly apply sustainable practices all around a business.

By means of assuming that external elements such legislative frameworks, industry standards, and society expectations affect leadership conduct and organizational sustainability goals, institutional theory also offers insights on sustainable leadership. Studies show that companies implementing sustainability-driven leadership occasionally acquire legitimacy, therefore enhancing their reputation and trustworthiness among their customers (Bansal & Roth, 2000). Promoting leaders to give ethical responsibility, employee well-being, and community impact top priority, servant leadership theory also helps to create sustainable leadership debate (Liden et al., 2008).

4. Gaps identified in Sustainable Leadership: Challenges and Opportunities for Development

The review indicates distinct disparities in the cultivation and implementation of sustainable leadership competencies across various companies. These discrepancies underscore significant issues with the integration of environmental policy into political tactics. The primary concern is the absence of explicit guidance for leaders about certain competencies related to sustainability. Many businesses still stress traditional leadership competencies such as operational ability and financial acumen above environmental awareness. Leaders may lack the tools required to include social, environmental, and financial sustainability in their decision-making process (Sekerka and Stimel, 2012). The absence of knowledge about sustainable leadership and education reduces companies' chances to produce leaders qualified to foster sustainability.

One main obstacle is the unequal distribution of sustainable leadership competencies along the organizational hierarchy. While top executives might be strategically cognizant and dedicated to sustainability, middle and lower-level managers mostly lack knowledge of sustainability and its skills. Subordinate personnel assigned to implement these initiatives may struggle to convert concepts into viable plans (Beste and Klakegg, 2022). Diverse leadership styles provide distinct competencies, impacting organizations' ability to achieve comprehensive, enterprise-wide sustainability objectives and leading to a decentralized approach to sustainability. Furthermore, the occasional divergence between the strategic objectives of upper-level management and the practical capabilities of middle and lower-level management leads to misinterpretation, and inadequate coordination in achieving environmental goals, and inefficiencies.

The continuous focus on short-term financial performance above long-term sustainability aggravates these problems even more. Many companies still give fast economic development priority above environmental policies. This limited perspective stunts the growth of the abilities required for constant leadership. Sometimes companies' focus on quick results and quarterly success reduces the incentive to invest in long-term development of sustainability-related competencies including ethical decision-making, sustainable resource management, and stakeholder involvement (Garel and Petit-Romec, 201). The possible conflict between long-term sustainability and short-term profit could limit leaders' ability to make strategic decisions in line with the main social and environmental goals. Many companies have strong opposition to change, which makes it difficult to carry out sustainable strategies as advised (Kotter, 1996). Thus, resistance to change is a fundamental challenge to sustainability projects in companies where sustainability is perceived more as an extra responsibility than a pragmatic decision.

Addressing these gaps asks for a hybrid strategy involving better education and training on sustainability, aligning sustainability goals with organizational strategies, developing a culture of long-term thinking, and producing leadership competences capable of pushing change. Companies looking for long-term financial, social, and environmental success expect leaders at all levels to have the necessary skills and create an organizational culture giving sustainability top importance.

5. Research Objective 1: Sustainable leadership explored

Sustainable leadership has emerged as a highly pertinent paradigm in the current corporate landscape, as it integrates environmental stewardship, social responsibility, and economic viability. This notion surpasses traditional leadership approaches, needing a shift in focus towards long-term value generation and the incorporation of sustainability concepts into corporate objectives. This review explores the concept of sustainable leadership, looking at its guiding principles, stakeholder focus, ethical issues, and role in promoting innovation and adaptability. It does this by drawing on recent research and a variety of scholarly viewpoints. It fundamentally involves the intentional and proactive measures taken by leaders to promote, sustain, and protect economic, environmental, and social systems. Jerab and Mabrouk (2023) highlight this concept, stressing the interrelation of these dimensions and the necessity for leaders to evaluate their influence on all three. Sajjad, et al. (2024) endorse this perspective, claiming that the core traits of a sustainable leader are embodied in these social, economic, and environmental components. This holistic approach necessitates a departure from traditional, short-term profit-driven models towards a more comprehensive and responsible approach to organizational management.

Sustainable leadership transcends conventional hierarchical structures and unilateral decision-making processes. Avery and Bergsteiner (2011) underscore this distinction, prioritizing long-term value creation over the pursuit of immediate financial returns. This change in viewpoint necessitates that leaders contemplate the wider consequences of their decisions on society, the environment, and future generations. By adopting a long-term vision, sustainable leaders may avoid potential hazards, capitalize on emerging opportunities, and develop resilient organizations that can thrive in an ever-changing world.

Essential components of sustainable leadership are the active participation of stakeholders and the balance of various needs and interests. Rondinelli and Berry (2000) emphasize how important it is to go above and beyond corporate social responsibility to address the requirements of the environment, workers, and local communities. Leaders are motivated by this stakeholder-centric approach to engage with a variety of groups, solicit their opinions, and incorporate their concerns into company operations. All stakeholders' trust is increased, connections are strengthened, and shared values are established as a result of sustainable leaders' open communication and collaboration. At its core, sustainable leadership is built on ethical principles.

Maguate (2024) emphasizes the moral and ethical responsibilities of all participants by fusing notions of responsible leadership with those of sustainable leadership. Because of this ethical component, leaders must behave with accountability, transparency, and integrity, making sure that their choices are in line with moral principles and societal objectives. Purnomo and Ausat (2024) support the implementation of sustainable organizational practices through a values-driven approach, shared vision, and accountability.

Therefore, sustainable leadership is a comprehensive and progressive organizational management strategy that integrates economic, social, and environmental factors. Leaders must be ethical, visionary, adaptive, and engage with stakeholders in a collaborative and transparent manner. Organizations may improve their resilience, generate value, and cultivate a more sustainable future by incorporating these concepts.

6. Research Objective 2: Key sustainable leadership competencies across organizational level

Effectively promoting sustainability inside a firm requires a deep understanding of the required leadership competencies. This study explores the core skills of sustainable leadership by combining metatheories (institutional theory, stakeholder theory, triple bottom line) with contemporary leadership theories (situational, managerial, and transformational). This method offers a comprehensive framework for determining the skills and behaviors required to promote sustainable practices at all organizational levels. Metatheories offer a comprehensive understanding of how leadership, stakeholder interests, legal systems, and public expectations interact. They provide a perspective from which to analyze the external elements influencing organizational behavior and the duties that leaders must perform to secure the organization's long-term viability.

Institutional theory underlines the need of matching institutionalized beliefs, social expectations, legal obligations with leadership behaviors. Arjoon, et al. (2018) emphasize the need for leaders matching their behaviour with society ideals to guarantee that their organizational methods not only are moral but also successful. Shandilya, et al. (2024) underline even more the requirement of leaders navigating institutional constraints and the legal environment, so fostering sustainability and innovation while following regulatory frameworks. Leaders must thus show competencies in conformance, legitimacy, and organizational alignment to make sure their actions match legal criteria and society expectations.

Stakeholder theory posits that in order to ensure that ethical actions promote long-term sustainability, leaders must balance the interests of numerous stakeholders. Olutimehin et al. (2024) and Freeman et al. (2010) underscore the importance of stakeholder engagement, encouraging leaders to establish meaningful connections with employees, communities, and other stakeholders. Weiss (2021) stresses the importance of executives aligning business objectives with broader societal demands, emphasizing the importance of moral judgement, stakeholder management, and dispute resolution strategies. While Phillips (2011) highlights the importance of making decisions that are both financially viable and socially responsible in order to guarantee the sustainability of enterprises.

The Triple Bottom Line (TBL) theory broadens the definition of leadership to include financial, social, and environmental factors. According to Ajiake (2015), sustainable leaders must prioritize the generation of long-term value, ethical decision-making, and social and environmental responsibilities.

Chams and García-Blandón (2019) underscore the necessity for leaders to possess skills in economic viability, sustainable practices, and resource management, thereby emphasizing the significance of aligning policies and activities with the Sustainable Development Agenda 2030. This exhaustive strategy guarantees that organizations consider the interplay of financial, environmental, and social factors during the decision-making process. In addition to metatheories, established leadership theories provide insights into the specific behaviors and skills that are essential for sustainable driving practices. Ireh and Bailey's (1999) situational leadership theory highlights the importance of matching leadership style to unique situations, such as team maturity and job type.

This requires leaders to focus on tasks, assess team maturity, and demonstrate adaptation in the context of sustainability. Yukl and Lepsinger (2004) stress the importance of leaders assessing the complexities of roles and their teams' capabilities in order to achieve optimal decision-making results. This agility and situational awareness allow leaders to effectively address both long-term goals and immediate obstacles. Yukl (1989) defines managerial leadership as an emphasis on organizational performance management and efficiency. This requires leaders to excel in task prioritization, resource allocation, and talent assignment within the context of sustainability. Wu and Pagell (2011) stress the importance of managing leaders ensuring that organizational objectives coincide with sustainability goals, hence prioritizing long-term sustainability over transitory operational and strategic gains. Leaders must make ethical decisions based on social, economic, and environmental sustainability.

According to Spreitzer et al. (1999), transformational leadership focusses on inspiring and empowering subordinates to attain higher levels of performance and personal growth. Leaders using this strategy should be creative, motivated, and capable of empowering others (Zhang and Bartol, 2010). Transformational leaders are critical for sustainability because they inspire and support organizational transformation that is aligned with long-term sustainability objectives. Leaders must therefore define a compelling vision for a sustainable future, enable people to take ownership of sustainability activities, and foster an environment of innovation and continual improvement.

While these skills are essential at all levels of the company, their precise application and emphasis may vary. While intermediate management may focus on turning sustainability objectives into workable plans and sustainable resource management, senior management may give strategic alignment with institutional requirements top priority. Under lower management, team projects and implementing sustainable practices in daily operations may take front stage. Sustainable leadership calls for a mix of skills and traits that let leaders balance social, economic, and environmental issues while handling the nuances of sustainability (Metcalf and Benn, 2013). These skills provide a whole framework for successful, sustainable leadership since they result from a synthesis of metatheories and accepted leadership theories. Essential skills include commitment to ethical decision-making, thereby ensuring that choices match long-term value creation and social welfare (Hartman, DesJardins, and MacDonald, 2011). The engagement of stakeholders calls for effective communication, negotiation, and teamwork among several groups to balance their interests and minimize possible conflicts.

Sustainable leaders show situational awareness and flexibility, changing their approach to fit the particular environment, team development, and task requirements. Work must be given top priority; resource management must be maximized; and team members should be allowed to take ownership of environmental projects. Developing a culture of sustainability and enabling organizational change in line with long-term sustainable goals depends on transformational leadership behaviors. While the Triple Bottom Line helps leaders to include economic, environmental, and social elements into all decision-making processes, understanding of institutional theory is crucial for managing external rules and matching organizational practices with society expectations. These attributes enable leaders to promote sustainability at personal, organizational, and societal levels, therefore guaranteeing ongoing organizational success and supporting a more sustainable future.

Finally, based on tested metatheories and leadership theories, the identification of fundamental sustainable leadership competencies provides a strong foundation for developing sustainable leadership abilities across different organizational levels. Organizations can offer resources to specialized training programs, include sustainability into performance management systems, and foster a culture of shared responsibility by understanding the fundamental skills, knowledge, and attitudes needed for supporting sustainable practices.

7. Practical implications for business

To achieve sustainable leadership, organizations should engage in staff development and training programs (Kaušikaitė, 2024). These programs must be methodically planned to foster sustainable leadership competences at all levels of management, providing leaders with the necessary skills and knowledge to incorporate sustainability into their fundamental organizational strategies and decision-making processes. This training should focus on ethical decision-making, thereby strengthening the ability to balance social and environmental costs with economic rewards. To effectively address the needs and concerns of multiple stakeholders, leaders must be skilled in stakeholder engagement, communication, negotiation, and collaboration; thus, their perspectives will be recognized and integrated into strategic planning (Aakhus and Bzdak, 2015).

Furthermore, it is critical to incorporate sustainability into the performance management system, supporting sustainable practices and behaviors throughout the company (Saeed et al. 2019). This demands explicitly defined, measurable sustainability goals, such as lower carbon emissions, better waste management methods, greater diversity and inclusion, and increased local community engagement. Connecting performance to sustainability outcomes allows businesses to hold leaders accountable for their contributions to these essential goals. Furthermore, encouraging cross-functional collaboration is critical since it fosters a shared knowledge of environmental goals inside the organization. This approach can be facilitated by forming cross-functional teams to address specific sustainability concerns, arranging seminars and training sessions to educate personnel, and building communication channels to share best practices and new ideas. Businesses should actively connect with stakeholders (workers, customers, suppliers, investors, and community members) to receive meaningful feedback and incorporate varied perspectives into sustainability initiatives. Focus groups and surveys can be used to analyze stakeholder requirements and expectations; advisory boards or committees can be formed to assist with sustainability projects; and open communication with stakeholders can help to alleviate worries and build confidence. A broad culture transformation is also required to promote sustainability throughout the company. Explicit sustainability targets, effective communication of the importance of sustainability to all employees, and excellent sustainable leadership models can help with this cultural transition. Finally, businesses should encourage creativity and stay open to adopting novel technology and business models that correspond with sustainable ideals. Organizations that adopt these pragmatic outcomes can effectively include sustainable leadership, advance progress towards their sustainability objectives, and create enduring value for all stakeholders involved.

8. Theoretical implications

The paper emphasises a variety of theoretical implications, the majority of which are linked to the integration and synthesis of existing theories, to offer a more comprehensive comprehension of sustainable leadership. This study contributes to the establishment of a more comprehensive theoretical foundation for sustainable leadership by incorporating institutional theory, stakeholder theory, transformational leadership theory, and the triple bottom line framework. This integration underscores the necessity for leaders to be able to navigate the external environment, maintain control over stakeholder relationships, and strike a balance between economic, social, and environmental concerns regarding the organization, in addition to the dynamics that occur within the company. Additionally, the paper underscores the importance of aligning the actions of leaders with the values and norms of society in order to ensure the long-term success and legitimacy of organizations. This challenge conventional leadership theories, which emphasize hierarchical control and short-term profitability, by advocating for a more comprehensive and responsible approach.

The paper was able to identify a collection of fundamental abilities that enable leaders to effectively manage environmental concerns and stimulate organizational transformation by utilizing metatheories in conjunction with conventional leadership theories.

Ethical judgement, resource management, flexibility, inspirational motivation, and stakeholder management are among the skills that fall under this category. This affects the development of leadership skills, as it emphasises the importance of prioritizing the acquisition of these specific competencies in future leaders.

Additionally, the paper's emphasis on organizational learning underscores the importance of systematic thinking, collaboration, and the testing of fundamental presumptions regarding corporate objectives. This emphasises the importance of businesses cultivating a culture of adaptability and continuous education in response to the challenges of sustainability. In summary, this article serves to reconcile the gaps between existing theories and establishes a framework for future research and practice in this emerging field. Consequently, it leads to a more thorough comprehension of sustainable leadership.

9. Conclusion and Recommendations

The findings of this paper underscore the importance of sustainable leadership in modern businesses, which are at the intersection of social responsibility, economic viability, and environmental preservation. It paints a comprehensive picture of sustainable leadership as a multifaceted notion that goes beyond the frames of traditional leadership principles. By incorporating well-known metatheories and leadership theories, as well as synthesizing different scholarly points of view, this objective can be accomplished. An effective foundation for boosting sustainable leadership skills and producing positive change inside firms is provided by the identification of fundamental competencies that are transferable across organizational levels.

Despite this, it is important to acknowledge the constraints that this evaluation imposes and to conduct an exhaustive investigation into the assumptions that underpin the idea of sustainable leadership. Although the literature places a significant amount of emphasis on the necessity of environmental stewardship, ethical decision-making, and stakeholder involvement, the actual application of these concepts occasionally presents difficulties. There is a possibility that organizations may be confronted with ethical dilemmas, competing stakeholder interests, and financial constraints, all of which have the potential to hinder their capacity to fully implement sustainable practices. Furthermore, the idea of sustainable leadership is frequently offered as a management tool that the organization would profit from everywhere, and that is generally positive. On the other hand, it is essential to come to terms with the fact that policies that are intended to achieve sustainability may have unintended consequences, such as the loss of jobs, an increase in costs, and a decrease in competitiveness.

There is a responsibility on the part of businesses to conduct exhaustive analyses of these potential trade-offs and to make every effort to mitigate any adverse effects that may be inevitable. Notwithstanding the mentioned constraints, sustainable leadership remains a crucial engine of organizational success and society well-being. Organizations that are attempting to handle the challenging issues of climate change, social injustice, and resource restrictions are becoming increasingly aware of the need for leaders who can manage these issues with vision, integrity, and dedication to the growth of long-term value.

Based on the analysis and critical conclusion, the following recommendations are proposed:

- **Develop Targeted Competency Development Programs:** Organizations should invest in comprehensive training programs to cultivate the identified sustainable leadership competencies across all management levels. These programs should be tailored to address the specific needs and responsibilities of each level, incorporating experiential learning activities, case studies, and simulations.
- **Integrate Sustainability into Performance Management Systems:** Sustainability-related goals and metrics should be incorporated into performance management systems to incentivize sustainable behaviors and practices. This integration should extend beyond environmental metrics to include social and ethical considerations, such as employee well-being, diversity and inclusion, and community engagement.

- **Foster Cross-Functional Collaboration:** Encourage collaboration between different departments and levels within the organization to promote a shared understanding of sustainability goals and facilitate knowledge sharing. This can be achieved through cross-functional teams, workshops, and communication platforms.
- **Implement Stakeholder Engagement Initiatives:** Actively engage with stakeholders to gather feedback and incorporate their perspectives into sustainability strategies. This can involve surveys, focus groups, community forums, and partnerships with non-governmental organizations.
- **Embed Sustainable Leadership into Organizational Culture:** Integrate sustainability into the organizational culture by promoting values-based leadership, ethical decision-making, and a commitment to social and environmental responsibility. This can be achieved through leadership development programs, employee training, and communication campaigns.
- **Promote Transparency and Accountability:** Establish clear reporting mechanisms to track progress on sustainability goals and to ensure transparency and accountability for sustainable practices. This can involve publishing annual sustainability reports, conducting independent audits, and engaging with stakeholders on sustainability performance.
- **Incentivize Sustainable Innovation:** Foster a culture of innovation by providing resources and incentives for employees to develop new products, services, and processes that address sustainability challenges. This can involve innovation challenges, seed funding for sustainable projects, and recognition programs for sustainable innovations.

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THE FLOURISHING IMPACT OF PSYCHOLOGICAL CAPITAL IN THE WORKPLACE

Evgenia Pavlakou

New York College, Athens, Greece

PhD in Marketing & Communication, Athens University of Economics & Business

epavlakou@nyc.gr

Abstract

Psychological Capital (PsyCap) extends the HERO (Hope, Efficacy, Resilience, Optimism) model of Positive Organizational Behavior (POB). By definition, it extends beyond the traditional notion of economical capital since it fosters factors like knowledge, abilities, and experiences (human capital) and social capital. PsyCap has several advantages such as reduction of job stress and enhancement of well-being. PsyCap can be improved through the conduction of educational interventions with more positive impact on work performance, motivation, life satisfaction and mental health.

Keywords: Psychological Capital, HERO model, mental health, educational interventions

1. Introduction

Psychological Capital (PsyCap), developed as an extension of Positive Organizational Behavior (POB), represents a comprehensive framework encompassing hope, efficacy, resilience, and optimism (HERO model). This paper explores the theoretical framework of PsyCap, its positive impacts on employee well-being and organizational outcomes, and the role of targeted educational interventions in fostering its development. Through an analysis of existing literature, the potential of PsyCap as a transformative resource for individuals and organizations is examined.

2. Defining PsyCap

The theoretical framework of PsyCap as developed by Luthans et al. (2015) refers to a positive psychological state characterized by: 1. Confidence (self-efficacy) to invest the effort needed to succeed in challenging tasks. 2. Optimism regarding current and future success. 3. Persistence in achieving goals while creating alternative paths when necessary. 4. Resilience to recover from failures and setbacks in order to achieve the objectives (see also Pavlakou, 2024). The HERO model of which PsyCap consists (Hope, Efficacy, Resilience, Optimism) was the main novelty introduced by Luthans, in that it is a concept that is significantly more expansive than POB. Hope, Efficacy, Resilience and Optimism (the POB criteria and abilities) are included in this significant conceptual construct, allowing PsyCap to work as a totality that is more efficient than the combination of its individual elements. These references undoubtedly add considerably to the concept of capital, as they offer additional factors to the core ones that are important for evaluating personnel in a commercial context, such as knowledge, different abilities, and experiences (human capital), as well as social capital (Avey, et al. 2009). Nowadays, there is a greater emphasis on factors related to a person's personality and, more importantly, on the perspectives that person possesses. Luthans et al. (2010) conclude that in general, human capital development provides a significant competitive advantage because another company cannot replicate these practices. Alignment with corporate strategy is a significant multiplier of the potential of a firm's human capital utilization (Luthans et al. 2010)

3. Positive impacts of PsyCap

The main positive impact of PsyCap is the reduction of job-related stress symptoms that contributes against the employees' willingness to leave their job (Avey, et al. 2009) while enhancing their wellbeing (Avey et al. 2010). Moreover, in research is highlighted the correlation between Positive Psychology (which is also the theoretical ground where both PsyCap and POB are based), job satisfaction. and well-being, explaining these interactions largely through PsyCap.

Studies show that targeted educational interventions improve PsyCap and have positive effects on economic indicators, despite the need for further research in this area (Luthans et al. 2016). The initial findings are promising, demonstrating potential for economic and organizational benefits.

PsyCap also activates cognitive, emotional, and social mechanisms that promote happiness and well-being (Youssef & Luthans, 2013). Cognitive mechanisms involve positive appraisals of circumstances and success likelihood, enhancing effort, motivation, and persistence, leading to expanded thinking and the building of physical, psychological, and social resources thus enhancing employee well-being (Youssef & Luthans, 2015).

Furthermore, PsyCap is linked to Organizational Citizenship Behavior (OCB), a discretionary behavior that, while not formally rewarded, enhances organizational effectiveness through actions such as altruism and innovative suggestions. OCB correlates with Organizational Trust (OT), involving positive relationships among employees and with the organization. High PsyCap moderates the relationship between OT and OCB, as seen in employees with high trust levels exhibiting increased OCB (Yildiz, 2019).

Research also suggests studying the interaction between PsyCap and employee identification with their organization to better understand its role in fostering OCB (Yildiz, 2019). These findings demonstrate that PsyCap can be studied across various work environments to develop mechanisms that improve not only employee performance but also their psychological well-being.

4. Educational interventions for developing PsyCap

Educational interventions are a fundamental and effective way to enhance psychological capital (PsyCap), with proven positive impacts on workplace performance and participant well-being (Luthans et al., 2010). These interventions not only improve PsyCap but also foster increased happiness, life satisfaction, motivation, and engagement in various tasks and activities (Da, 2020). Luthans and Broad (2022) highlight the importance of identifying and cultivating positive PsyCap resources to mitigate the mental health impacts of the pandemic and prepare for future challenges. Overall, training interventions targeting PsyCap have demonstrated broad benefits for individuals and organizations, improving mental health, well-being, and performance. Further research in multiple fields is needed to quantitatively and qualitatively assess these benefits.

Luthans et al. (2006) introduced the PsyCap Intervention (PCI) model, providing guidelines for developing self-efficacy, resilience, hope, and optimism. The role of hope is also significant in designing interventions to promote active and flexible thinking and improve social support. Snyder's theory emphasizes using different pathways to achieve goals, such as motivational interviewing and behavioral activation techniques. These methods help individuals set specific and meaningful objectives. Such interventions have been proved to be very effective in improving PsyCap in healthcare professionals with very beneficial results in patient satisfaction (Pavlaou, 2024).

5. Conclusions

The theoretical framework of PsyCap, as developed by Luthans et al. (2015), highlights its role as a positive psychological state characterized by confidence, optimism, persistence, and resilience. By extending beyond the HERO model, PsyCap integrates human and social capital, providing a holistic approach to evaluating and developing personnel. Its benefits, such as reducing job-related stress, enhancing well-being, and fostering Organizational Citizenship Behavior (OCB), emphasize its significance in modern workplaces. Educational interventions further demonstrate the potential to enhance PsyCap, offering practical applications to improve performance, motivation, and mental health. PsyCap thus emerges as a critical asset, aligning personal and organizational growth with broader economic and social benefits.

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SHIFTING THE SCIENTIFIC PARADIGM: FROM GEOCENTRICISM TO HELIOCENTRICISM- THE CONTRIBUTION OF GALILEO

Konstantinos Kalachanis
New York College, Athens, Greece
Phd in Philosophy, National & Kapodistrian University of Athens
kkalachanis@nyc.gr

Abstract

Galileo Galilei was one of the most prominent astronomers of all times who used advanced astronomical equipment (telescope) for his observations. His major accomplishments were the observation of the phases of Venus and Jupiter's moons. Although these observations were crucial since they challenged the dominant geocentric Paradigm that was used to explain the Universe for centuries. Based on the notion of Paradigm as described by Thomas Kuhn model of scientific revolutions this paper aims to show the contriqt of Galileo in refining the Parafigm of Cosmology a fact that caused his interrogation from the Inquisition.

Keywords: Galileo, Moon, Jupiter, telescope, Paradigm, Kuhn

1. Introduction

The contribution of Galileo Galilei (1564-1642) in the history of Astronomy and Science has been recognized by all scholars since his work included advanced astronomical observations with the use of telescope. If his discoveries are interpreted through Thomas Kuhn's (1922-1976) theory of scientific revolutions it will be seen that actually they were decisive in the shift of the geocentric Paradigm that placed the Earth at the center of the Universe. In this paper initially will be examined the notion of Paradigm according to Thomas Kuhn that distinguishes normally from revolutiuonary science. Later will be presented the geocentrical model that dominated cosmology for centuries and finally will follow the astronomical discoveries of Galileo that contributed in the adoption of heliocentric model.

2. The role of Paradigm in Science

A milestone book in the field of Epistemology and in the History of Sciences is the Structure of Scientific Revolutions authored by Thomas Kuhn. In this work he argues that scientific progress is not linear, but it depends on scientific breakthroughs that occur. The Paradigm is actually defined as a framework consisting of certain theories, methodologies setting the boundaries of scientific enquiry, guiding research and interpreting results. The Paradigm is also widely accepted by most scholars.

In case of a dominant Paradigm most researchers follow a pattern that includes an accepted theoretical structure who refine existin knowledge instead of questioning its foundations. According to Kuhn this is normal science. On the contrary, revolutionary science redefines the accepted Paradigm by examining anomalies and phenomena occurring and cannot be adequately explained from the accepted norms. In such case errors may occur and the scientific community may face a crisis with unsatisfactory explanations of natural phenomena like the transition from Aristolelian physics to Newtonian (Kuhn, 2008, passim).

The traditional scientific method suggests that scientists work on research gaps in order to expand scientific knowledge according to a dominant Paradigm. New findings may show that the current Paradigm is not enough to explain certain anomalous results. As a result, the need for a new Paradigm emerges (Evoldsen, 2017)

3. Geocentric system: an ancient Paradigm of interpreting the Universe

In the history of Philosophy and Astronomy a key issue is the view of the cosmos that creates a Paradigm setting the human being at the center in the Universe since the Earth is considered to be the center with the celestial sphere rotating around it. But how did this model emerge?

The answer seems to be rather practical since as observers located the Earth the geocentric system is used as a reference system for observing the celestial sphere. Thus, the Sun appears to move from east to west, following a path known as the ecliptic, where the Moon's orbit intersects, leading to lunar eclipses. Ancient astronomers also observed that planets sometimes exhibited retrograde motion (Figure 1), disrupting the perfect circular harmony of celestial orbits (for an extended view Theodossiou, 2007).

That model was widely accepted by ancient philosophers. Aristotle argued that Earth must be stationary, as motion would require an external force. He also divided the cosmos into the supralunar (ether-filled) and sublunar realms, shaping medieval cosmology (Aristoteles, *De caelo*, 296 b, 21 & *Meteorologica* 339 b, 16). His ideas shaped a cosmological model that was accepted until the Middle Ages. Furthermore, Eudoxus of Cnidus (4th century BC) established a 27-sphere model in order to explain planetary motion while Apollonius of Perga (3rd century BC) introduced epicycles (Figure ἀριθμός) and eccentric cycles trying to explain planetary motion. Finally of great importance was the treatise of Claudius Ptolemy (2nd century BC) *Syntaxis Mathematica* (Almagest)

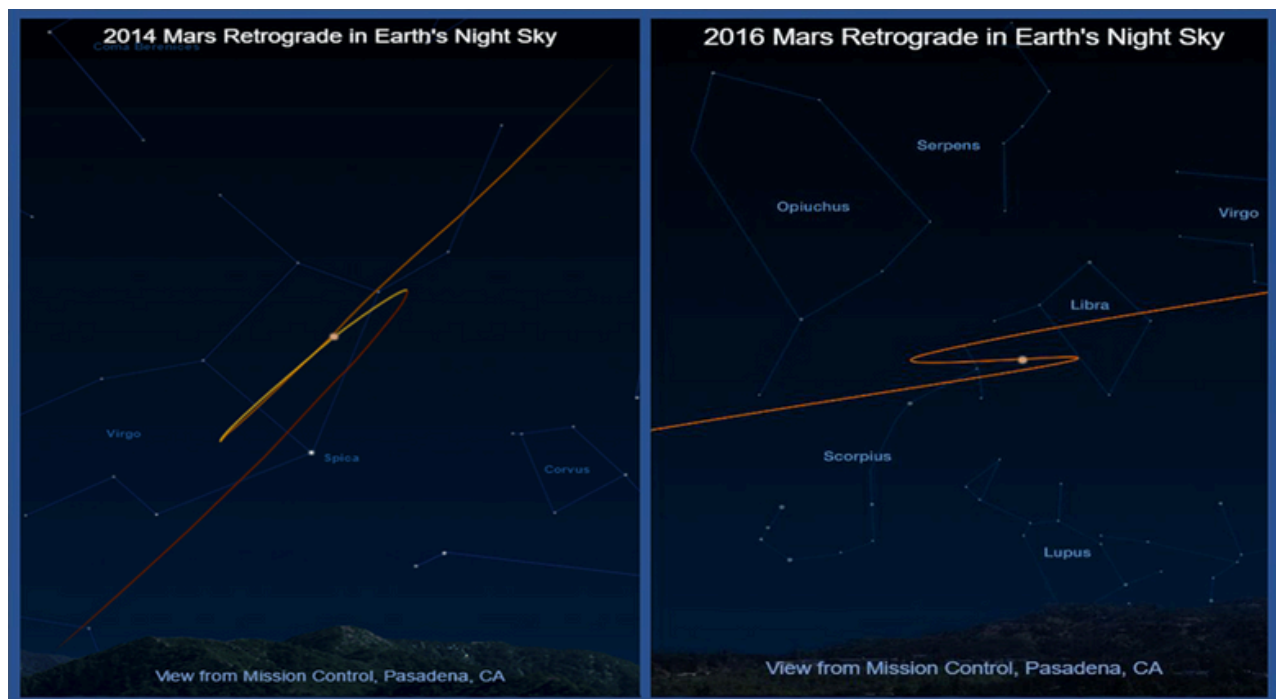


Figure 1: the retrograde motion of planet Mars
as seen from Earth in different time periods
Source: <https://mars.nasa.gov>

The Ptolemaic model managed to explain planetary motions and remained the dominant model for centuries until Nicholas of Cusa (1401–1464), Nicolaus Copernicus (1473–1543), Tycho Brahe (1546–1601), Giordano Bruno (1548–1600), Galileo Galilei (1564–1642) and Johannes Kepler (1571–1630) deconstructed it setting the basis of heliocentrism. It should be also highlighted that Bruno and Galileo faced the Inquisition.

3. Galileo's discoveries shift the Paradigm

Galileo's work was a milestone in the history of Science and Astronomy (Theodossiou, 2007), since using the telescope he observed the lunar surface (mountains, valleys) in detail and explained why the Moon shows always the same face to the Earth attributing it to the fact that the Moon's rotation around its axis and its orbit around the Earth have the same period. Moreover, he observed sunspots the ring surrounding Saturn and discovered the stellar nature of our Galaxy

Galileo's discoveries of the phases of Venus and the moons of Jupiter (Ganymede, Europa, Callisto, and Io) named them the Medicean Stars in honor of Cosimo II de' Medici strengthened his argument in favor of the heliocentric system. Regarding Venus he observed that the planet goes through several phases (Figure 2) (crescent, half, gibbous, full) a phenomenon that can be explained only if Venus orbits the Sun. Moreover the fact that he observed an entire system of moons orbiting Jupiter revealed a small-scale version of the solar system shaking the belief that the Earth was located at the center of the Universe. Galileo included all these discoveries in his 1610 work *Sidereus Nuncius* (The Starry Messenger).



Figure 2: The phases of Venus
Source: Wikipedia

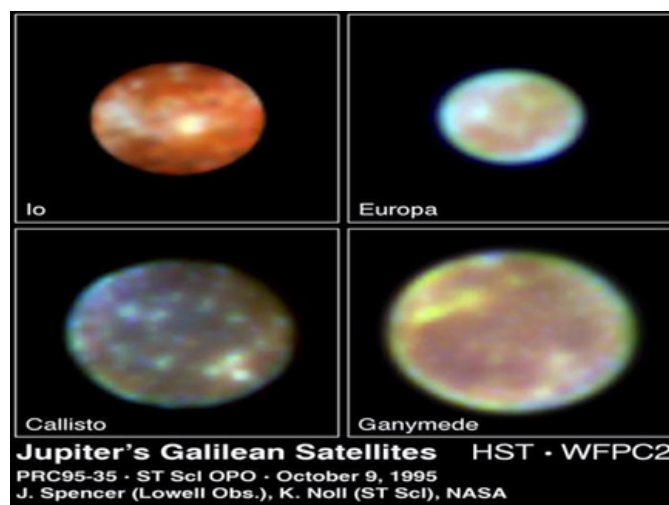


Figure 3: The four Galilean moons of Jupiter
Source: Jet Propulsion Laboratory, NASA

Galileo's observations with the telescope provided science with evidence that the geocentric model had failed to describe the Universe. But the scientific Paradigm that he adopted

Despite the fact that Galileo had observational data that the Earth was not at the center of the Universe he attracted opponents. Moreover, his book published in 1632 and entitled *Dialogo sopra i due massimi sistemi del mondo, tolemaico e copernicano*, (Dialogue Concerning the Two Chief World Systems, Ptolemaic and Copernican), explained his arguments in favor of heliocentric theory thus causing the reaction of the Catholic church that had already adopted the Aristotelian and Ptolemaic view of the Universe as geocentric. Moreover, in the Bible is mentioned the incident of Gibeon where Joshua asked the Lord to cause the Sun and the Moon to stand still as it really happened. "Sun, stand still at Gibeon, and moon, in the Valley of Aijalon. And the sun stood still, and the moon stopped" (Septuaginta, Josue 10, 12, 5 - 10, 13, 1).

Galileo was aware that his discovery did not contradict the Bible since biblical passages should not be regarded as sources of discovering truths about nature although the fact that they include some scientific truths is then duty of wise men to interpret them (Carroll, 1999). Then he had to face the Inquisition and the cardinal Roberto Bellarmine who asked him to refute his views even though Galileo continued to teach them. Finally, instead of being executed (like Giordano Bruno earlier) he was placed under house arrest.

Discussion - Conclusion

Galileo's contribution in the history and evolution of science should not only be limited to his discoveries that shifted the model of the Universe from geocentric to heliocentric but should expand in his confrontation with what Thomas Kuhn called dominant Paradigm. Aristotelian and Ptolemaic views of the Universe that were accepted by scholars as the best models of the Universe were challenged by the scientific equipment of Galileo introducing anomalies in the old geocentric Paradigm (moons of Jupiter, phases of Venus) that could not be explained thus creating a crisis in the scientific community. This is how according to Kuhn (2008, passim) a scientific revolution emerges when a new Paradigm is in line with empirical observations that the old cannot explain. Thus, the contribution of Galileo should be regarded as a practical application of Kuhn's theory of scientific revolutions that changed the dominant Paradigm.

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**NYC ATHENS
CAMPUS**
ATHENS, SYNTAGMA

38 Amalias Str.,
Syntagma
Tel.: (0030) 2103225961
email: info@nyc.gr



**NYC PYTHAGORAS
HALL**
ATHENS, KALLITHEA

286 Thessalonikis Str.,
Kallithea
Tel: (0030) 2104838071
email: info@nyc.gr



**NYC THESSALONIKI
CAMPUS**
THESSALONIKI

138 Egnatia and
P.P. Germanou Str.
Tel.: (0030) 2310889879
email: info@nyc.gr



**UNIVERSITY OF
NEW YORK
IN PRAGUE (UNYP)**
PRAGUE (CZECH REPUBLIC)

Londýnská 41, Praha
Tel.: (0042) 0224221261
email: unyp@unyp.cz,
www.unyp.cz

info@nyc.gr, www.nyc.gr

