SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2025
ORGANIZATION AND MANAGEMENT SERIES NO. 227

LOSS OF YOUNG MARINE SPECIALISTS: A BRIEF OVERVIEW OF REASONS TO LEAVE

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Purpose: The purpose of this paper is to highlight the urgent need for specialists in marine research and conservation, particularly due to the unprecedented pressures from human activities on marine biodiversity. The paper aims to address the complex challenges facing ocean ecosystems by emphasizing the importance of interdisciplinary approaches and diverse expertise for effective conservation and sustainable management of marine resources.
Design/methodology/approach: This paper presents the results of a systematic review of literature focused on the experiences of young marine scientists. The review aims to identify the reasons behind their departure from the profession, providing insights into the barriers present within the field. The scope of the paper includes a broad evaluation of various interdisciplinary approaches necessary for addressing marine conservation challenges.
Findings: The systematic review reveals that diverse problems and solutions in marine sciences require a workforce representing a variety of backgrounds, disciplines, and cultural perspectives. The findings indicate that specific issues need urgent resolution to prevent the loss of expertise and to remove barriers that hinder the development of the field.
Research limitations/implications: This study is limited by the availability of published literature focused on young marine scientists' experiences. Future research could involve empirical studies that include surveys and interviews to provide a more comprehensive understanding of the challenges faced by early-career marine researchers.
Practical implications: Understanding the reasons for young marine scientists leaving the field can inform policy changes, institutional practices, and mentorship programs aimed at retaining talent and promoting diversity within marine sciences.
Social implications: By addressing barriers within marine research and conservation, the findings can contribute to more effective conservation strategies, which have broader implications for biodiversity preservation, public awareness, and environmental policies.
Originality/value: This paper provides valuable insights into the challenges faced by young marine scientists, a relatively underexplored topic. The findings contribute to the broader discussion on improving retention, inclusivity, and diversity in marine sciences, which is essential for addressing complex marine ecosystem challenges.
Keywords: sustainable development, loss of personnel, oceanography, young scientists.
Category of the paper: Research paper.

1. Introduction

Like other aspects of nature, the marine environment is undergoing profound changes (Higgason, Brown, 2009). Given the importance of equitable and long-term access to ocean resources from an economic perspective, protecting marine ecosystems is becoming an environmental and political issue of great complexity (Barbier et al., 2018; Bax et al., 2021). At the same time, the well-being and human rights of marine scientists are disproportionately challenged by severe geographic, racial, and gender inequalities (Österblum et al., 2020; Giakoumi et al., 2021; Srinivasan, 2018; Thompson et al., 2011). According to UN Ocean Decade (UNOD), achieving marine sustainability requires a proactive commitment to developing the human capital that is key to the future. In this context, recognizing the importance of Early Career Researchers (ECRs) in marine science becomes essential, as they are expected to take on the role of next-generation scientific leaders in marine conservation and research, making them key in navigating the complexities associated with UNOD (Schadeberg et al., 2022). This paper aims to identify the main factors influencing the decisions of ECRs to leave the profession.

In context of environmental and social sustainability, we need to remember that young adults, who are starting their professional careers, play a key role in the labor market thanks to their skills, creativity, and enthusiasm for work. However, the global recession that began in 2008 has posed a significant challenge to the youth labor market, making it difficult to effectively use the potential of these people in competitive economies (europa.eu; Wei-Jun, Yi, 2020). In November 2022, comparative analyses of average unemployment rates across age groups revealed that in both the United States (US) and the EU, youth unemployment (aged 15-30) was as high as 19% (europa.eu). In 2021, the average share of young people who were neither in employment nor in education or training (NEET) in the EU was 13.1%. (Statistics on young people neither in employment nor in education or training (Statistics Explained: europa.eu; Youth unemployment: europa.eu). Yet, Schneider and Harknett (2023) prove that since early 2021, 51% of service sector young employees (ages 18 to 24) left their positions at least once between Spring 2020 and Spring 2022. This rate is considerably higher than the 25% of older service sector workers (aged 25 and above) who reported similar employment transitions during the same period. These findings are consistent with other recent studies comparing employment patterns between younger and older workers. This situation builds a question of motives for leaving job by young workers during despite high unemployment rates, especially in fields connected to sustainability.

This study examines the urgent need for young specialists in marine research and conservation, emphasizing the interdisciplinary approaches essential for addressing challenges posed by human impacts on marine biodiversity. It aims to identify reasons contributing to the departure of early-career researchers (ECRs) from marine sciences and arrange them according to Herzberg's Two-Factor Theory of Motivation.

2. Theoretical framework

In his theory Herzberg suggested that job satisfaction stems from motivational factors, when at the same time job dissatisfaction arises from hygiene factors like job insecurity and organizational policies (Herzberg., Mausner, Snyderman, 1959).

Table 1.
Herzberg's Hygiene-Motivation factors

Hygiene: Job Dissatisfaction	Motivation: Job Satisfaction
Company Policy and Administration	Achievement
Supervison	Recognition
Interpersonal Relations	Work itself
Working Conditions	Responsibility
Safety	Advancement
Status	Growth
Security	

Source: (Herzberg, Mausner, Snyderman, 1959).

Numerous studies have proven, that motivators such as recognition and career advancement significantly enhance job satisfaction, while hygiene factors like salary and working conditions primarily prevent dissatisfaction (Jaffar et al., 2024; Vijayakumar, Saxena, 2015).

If these factors are unmet, employees may leave companies to seek the environment that better matches their needs. (Byrne, 2006). Poor working conditions can lead to increased absenteeism and higher turnover rates, as employees leave jobs lacking in motivation and satisfaction. (Oliveira et al., 2023)

Yet, it is important to remember that job satisfaction and dissatisfaction are not opposites, because the opposite of satisfaction is lack of satisfaction, while the opposite of dissatisfaction is lack of dissatisfaction. This is why getting rid of dissatisfaction and its reasons will not create satisfaction. (Herzberg, Hamlin, 1961).

The connection between leaving a job and Herzberg's Two-Factor Theory is significant, as it highlights how job satisfaction influences employees' intent to quit. Herzberg's theory distinguishes between hygiene factors, which prevent dissatisfaction, and motivators, which enhance satisfaction. Understanding this relationship can help organizations improve retention rates. (Mitsakis, Galanski, 2022) have found intheir study that the lack of Herzberg's hygiene factors, such as working conditions and supervisor feedback, contributes to increased employee turnover. Conversely, strong motivational factors like recognition and achievement enhance job satisfaction, reducing the likelihood of leaving a job (Mitsakis, Galanski, 2022).

Similar findings have been shown by (Nyame-Mireku, 2012), who have proven that higher satisfaction correlates with lower turnover intentions among hospital pharmacists (Nyame-Mireku, 2012).

3. Research Method and Results

Three research procedures were selected to achieve the research objective:

1) document review, triangulation of sources (Eurostat, EMIS database, global indices, others),
2) literature review: literature review using Boolean logic and the Denyer, Transfield, Smart (2003) procedure (modified, see Table 1); analysis of original research papers, case studies and points of view using the search engine on the Scopus platform,
3) factors highlighted in document and literature review were matched with Herzberg Theory.

The literature review process involved four search rounds to gather relevant sources related to young marine scientists and early career researchers (ECRs) within marine and ocean sciences. The search criteria were systematically defined to maximize coverage and relevance of the literature. The phrases used in each search round were as follows:

- Round 1: "marine"; "ecr".
- Round 2: "ocean"; "ecr".
- Round 3: "marine"; "early career researcher".
- Round 4: "ocean"; "early career researcher".

The initial search yielded a total of 154 literature sources in Round 1 (Table 2), 149 in Round 2, 95 in Round 3, and 51 in Round 4. After eliminating duplicate entries, 134 unique sources remained. Subsequent verification of abstracts reduced the number of relevant studies to 92. Further in-depth text analysis led to the final inclusion of 52 literature sources for comprehensive review.

The systematic approach adopted ensures that the most pertinent studies were included while minimizing redundancy and enhancing the accuracy of the review. This methodological rigor provides a robust foundation for analyzing the experiences and challenges faced by young marine scientists.

Table 2.
Search criteria

Search criteria	Search round no.			
	1	2	3	4
No. of literature sources	154	149	95	51
After removing duplicates	134			
After abstract verification	92			
After text analysis	52			

Phrases in search round: TITLE-ABS-KEY: 1. ("marine"; "ecr"); 2. ("ocean"; "ecr"); 3. ("marine"; "early career researcher"); 4. ("ocean"; "early career researcher").

Source: own work.

The in-depth analysis of 52 pieces of literature gave author the possibility to name 13 factors of ECRs retention, that have occurred during literature review:

Factor #1: Being Unpaid - Internships Many ECR employees begin their careers in unpaid internships, which create financial burdens and limit diversity in recruitment. People from disadvantaged backgrounds are disproportionately affected (Satterthwaite et al., 2022; Cavaleri et al., 2024). ECRs not only volunteer for some projects where accommodation and living costs are covered, but also participate in pay-to-volunteer projects. (De Vos et al., 2023). Between 2000 and 2021, the number of entry-level jobs that were described as unpaid, voluntary, requiring entry fees, with stipends or paying below minimum wage in marine sciences ranged between 33% and 55% (Osiecka et al., 2021; Whitaker, 2003; Jensen et al., 2021). Such practices can lead to underestimating the work and undervaluing the project (Kreuser, Bishop, Meyer-Gutbrod, 2023).

Factor #2: Workload and Stress - The demanding nature of marine research, combined with competition for funding, publication pressures and interdisciplinary work, contribute to significant stress and burnout (Andrews, et al., 2020).

Factor #3: Workplace Environment - Discrimination, abuse, and exclusivity in the workplace negatively impact job satisfaction. Women and non-binary individuals report higher levels of dissatisfaction (Osiecka et al., 2022). Christian et al. (2020) list factors that influence workplace culture that also affect job satisfaction and research quality. These factors may include job insecurity, workplace culture, mentoring, and questionable research practices (Christian, 2020).

Factor #4: Career Advancement Challenges - Limited career opportunities and lack of integration into research workflows discourage ECRs. The transient nature of postdoctoral positions and perceived career stagnation contribute to dissatisfaction. On the other hand, the faction assumes that the adversities faced by ECRs can shape a workforce that is both more resilient and innovative, because those who persevere may be more committed to fixing the systemic challenges common to the discipline (Constable, 2014; Brasier, 2020; Conroy 2020).

Factor #5: Limited Funding and Job Insecurity - Securing sustainable funding is a pervasive struggle for ECRs. The competitive nature of grant systems requires significant time and effort, often drawing away from real research activities. This environment fosters job insecurity, as positions are often dependent on short-term grants. The study found that almost half of the researchers surveyed left academia within ten years of their first publication, with both men and women showing similar rates of attrition (Coddington, 2024).

Factor #6: Lack of Institutional Support and Mentorship - Inadequate institutional support for personal and professional development, and limited mentoring. An imbalance between personal and professional commitments can increase stress and hinder career development, for example by affecting research progress and personal well-being (Andrews et al., 2020).

Factor #7: Competitive and Restrictive Funding Systems - The overwhelming focus on obtaining grants often distracts researchers from conducting meaningful research. This disconnect can lead to frustration and decreased motivation. The highly competitive nature of grant funding systems requires ECRs to invest significant time in proposal writing, often at the expense of conducting research. This environment can distract from original research questions to more funded topics, leading to frustration and a sense of disconnect from personal research interests. Instead, ECRs should work with Indigenous knowledge keepers, economists and sociologists on a platform that promotes equality, diversity and inclusion, from student recruitment to research chairs (Duke et al., 2023; Meyer-Gutbrod, Pierson, Behl, 2023).

Factor #8: Mental Health Challenges - The aforementioned challenges, such as inadequate institutional support and frequent relocations, can contribute to isolation and mental health problems. (Gushulak et al., 2023). The pressures of academia significantly impact mental health. ECRs often struggle with stressors such as funding uncertainty, publication pressure, and job instability. These factors contribute to elevated levels of anxiety and depression among researchers. Notably, postdoctoral researchers face unique challenges, including limited institutional support and frequent relocations, which can exacerbate feelings of isolation and stress (Cale et al., 2023).

Factor #9: Work-Life Balance and Personal Well-being - Achieving a healthy work-life balance is particularly challenging in marine sciences, where fieldwork demands can be extensive. Long periods away from home and irregular work hours disrupt personal life, leading to burnout. The transient nature of academic positions further complicates personal commitments, making long-term planning difficult (Cale et al., 2023).

Factor #10: Gender Inequities and Harassment - Female ECRs often face additional challenges, including unfair recruitment practices and harassment by those in management positions. Other reports cite not only harassment but also discrimination and/or abuse in the workplace. These issues contribute to job dissatisfaction and can lead talented researchers to seek careers outside academia (Conroy, 2020; Johannesen et al., 2023; Maia et al., 2024; Isma, 2023; Kaikkonen et al., 2024).

Factor #11: Social and Economic Barriers - Economic strain, unpaid work, and workplace discrimination are prevalent issues. Unpaid work often does not lead to career advancement and is associated with workplace abuse. These factors contribute to high dissatisfaction and burnout rates, particularly among women and non-binary individuals (Osiecka et al., 2022; Schadeberg et al., 2022). Limited support for balancing personal and professional commitments and ineffective supervisory support further exacerbate these issues. The steep learning curve in interdisciplinary research adds to the pressure (Andrews et al., 2020; Akram, Young, 2020).

Factor #12: Attraction to Industry Roles - Some ECRs pursue industry roles for enhanced remuneration, stability, and opportunities for practical skill application. Positions in industry may provide more tangible applications of research and development, which can be more

appealing compared to the theoretical emphasis often found in academia (Ro, 2023). Early-career female researchers may depart from academia due to structural and cultural dynamics, underscoring the necessity for adaptive decision-making in academic career trajectories (Nielsen, 2017).

Factor #13: Impact of COVID-19 - The pandemic has exacerbated pre-existing challenges faced by marine ECRs, including social isolation, job insecurity, and increased work demands. It has disrupted critical activities such as networking, acquiring practical experience, and publishing, which are essential for career progression. (Schadeberg et al., 2022; Pardo, 2020; Osiecka et al., 2022).

Table 3.
Research results

Factor #	Factor Description	Herzberg Hygiene-Moti Category	Effect
1	Being Unpaid	Company Policy, Security, Status	Higher dissatisfaction
2	Workload and Stress	Working Conditions, Safety	Higher dissatisfaction
3	Workplace Environment	Interpersonal Relations, Supervision, Safety	Higher dissatisfaction
4	Career Advancement Challenges	Achievement, recognition	Lower satisfaction
5	Limited Funding and Job Insecurity	Security, Company Policy	Higher dissatisfaction
6	Lack of Institutional Support and Mentorship	Supervision, Interpersonal Relations	Higher dissatisfaction
7	Competitive & Restrictive Funding Systems	Company Policy	Higher dissatisfaction
8	Mental Health Challenges	Safety	Higher dissatisfaction
9	Work-Life Balance and Personal Well-being	Working Conditions	Higher dissatisfaction
10	Gender Inequities and Harassment	Safety, Interpersonal Relations, Status	Higher dissatisfaction
11	Social and Economic Barriers	Status, Security, Working Conditions	Higher dissatisfaction
12	Attraction to Industry Roles	Achievement, recognition	Lower satisfaction
13	Impact of COVID-19	Safety, Interpersonal Relations	Higher dissatisfaction

Source: own work.

The table 3 categorizes literature-review-based factors affecting employee retention using Herzberg's framework. The majority of 11 out of 13 factors are linked to higher dissatisfaction, all corresponding to deficiencies in hygiene factors. Only two factors (Career Advancement Challenges and Attraction to Industry Roles) are related to lower satisfaction, reflecting a lack of motivators (achievement, recognition). This suggests that young professionals leave more often due to dissatisfaction caused by safety concern, poor working conditions, policy issues, lack of support, than simply due to unmet aspirations. Safety (6 factors), Company Policy (4 factors), and Interpersonal Relations (4 factors) dominate, showing young staff are highly sensitive to psychological and physical safety and bureaucratic or relational failures.

4. Discussion

The role of young professionals in the modern economy cannot be overestimated, as their contribution to innovation, entrepreneurship, and overall economic growth (e.g. job creation and economic resilience) is significant. Their education equips them with the necessary skills to manage and develop in a knowledge-based economy, making them key to future economic development (Kurtanidze, 2022). Education strengthens the ability to critically evaluate economic phenomena, supporting sustainable business practices (Brătăşanu, 2020; Firsova et al., 2021). Young professionals are the driving force of economic growth of cities by attracting investments and innovations (Manuel, 2004).

There are many factors that can influence the decision of young researchers (ECRs) to leave their jobs, such as financial, relational, and organizational factors. A negative workplace climate, including poor relationships with superiors and colleagues, has a significant impact on decisions to leave (Bartczak, Szymankowska, 2019; Queiri, Dwaikat, 2016). In particular, the COVID-19 pandemic has drawn attention to work culture and work ethics, with many young workers beginning to prioritize these aspects over material benefits (Kuzior et al., 2022). Other factors, such as insufficient training, lack of career planning, and lack of opportunities for professional empowerment, lead to a sense of stagnation (Queiri, Dwaikat, 2016). Many young workers indicate that insufficient remuneration is the main reason for leaving their positions. They also emphasize that remuneration affects job satisfaction and employee retention (Bartczak, Szymankowska, 2019; Szymankowska, Bartczak, 2020). High turnover among young scientists may also be caused by factors such as burnout, lack of work-life balance, mental health problems, job dissatisfaction and the attractiveness of remote work (Yavuz et al., 2023). Understanding these causes is crucial to retain talented young employees in the competitive labor market (Bartczak, Szymankowska, 2019; Szymankowska, Bartczak, 2020).

Rational work organization, including workload management and a supportive environment, is crucial. This can reduce work-related stress and promote work-life balance (Petrova, 2023). Implementing practices such as team mindfulness, promoting physical health and self-esteem through well-being programs can increase emotional resilience, enable young professionals to better cope with stress, and reduce the feeling of isolation among young employees (Nash, 2023; Petrova, 2023). The organizational culture of the company should value relaxation and teach employees that personal time is essential to maintaining emotional capacities, especially in demanding positions (Wigdortz, 2022). To prevent burnout among young scientists, companies should focus on personal aspects such as psychological support, physical well-being, self-esteem, and stress management, as well as on optimizing work organization to achieve a balanced approach (Petrova et al., 2024).

5. Summary

This study investigates the departure of early-career researchers (ECRs) from marine science, a pressing issue given the pivotal role these individuals play in advancing marine conservation and fulfilling the goals of the UN Ocean Decade (UNOD). Drawing on Herzberg's Two-Factor Theory of Motivation, the research identifies and categorizes the factors contributing to this trend, aiming to better understand and address the systemic barriers that threaten the retention of young talent in marine academia.

The analysis reveals a complex interplay of interrelated challenges driving ECRs away from marine science. These include limited and unstable funding opportunities, job insecurity, and the long-term impact of the 2008 global recession and the COVID-19 pandemic. Additionally, the burden of heavy workloads, inadequate compensation, and the inability to maintain a healthy work-life balance were found to be key contributors. Mental health concerns, lack of career advancement opportunities, and experiences of workplace discrimination—often shaped by gender, race, and geography—further exacerbate the issue.

This research also places the marine ECR crisis within a broader socio-economic context, noting that youth unemployment remains high globally despite the recognized potential of young workers to drive innovation in sustainability-related sectors. The study underscores the urgent need for targeted support mechanisms and systemic reforms that ensure equitable, stable, and inclusive career pathways for young marine scientists. Only by addressing these economic, structural, and social barriers can we create a sustainable and resilient research environment that fully harnesses the potential of the next generation of marine professionals.

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