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Exploring occupational safety and health in future workscapes

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ABSTRACT

Aims: The aim of this manuscript is to address the evolving dynamics of work, which are placing increasing demands on current occupational safety and health (OSH) protocols. It emphasizes the need for a more adaptable approach to ensure safe and efficient work environments. The primary objective is to introduce new frameworks capable of handling the uncertainties of the future in OSH.

Methods: To tackle the challenges posed by the changing landscape of work, the U.S. National Institute for Occupational Safety and Health (NIOSH) has adopted a strategic foresight approach. This approach is rooted in future studies and strategic planning, allowing NIOSH to anticipate future challenges in OSH. It involves creating well-structured and informed scenarios of potential futures, enabling organizations to prepare effectively for upcoming challenges and capitalize on emerging opportunities.

Results: This manuscript represents NIOSH's inaugural foray into strategic foresight. The results showcase the integration of strategic foresight methods to enhance institutional readiness in the realm of OSH. The study delves deep into the anticipated trajectories of OSH research and protocols, offering valuable insights into the future of OSH.

Conclusion: In conclusion, the evolving nature of work necessitates a more adaptable approach to occupational safety and health. NIOSH's strategic foresight venture marks a significant step towards achieving this goal. By proactively preparing for future challenges and opportunities, organizations can ensure safer and more efficient work environments. This manuscript provides a foundation for enhancing institutional readiness and navigating the evolving landscape of OSH research and protocols.

Keywords: Future of work, strategic foresight, occupational safety and health, envisioned futures, changing dynamics, data protection, mental wellness, collaboration, remote work

INTRODUCTION

Swift transformations in social, technological, environmental, economic, and political domains, often denoted by the STEEP framework, are reshaping the landscape of work, influencing both the workforce and the workspace in profound ways.[1-5] This evolution is distinctly evident in its effects on occupational safety and health (OSH) practices, with prevailing trends suggesting a continuous evolution in the foreseeable future.[6-9] Scholars and practitioners have posited that a broader perspective on OSH will be imperative to adeptly navigate and adapt to these unfolding changes.[10.] This encompasses a widened understanding of the determinants impacting worker well-being and the recalibration of outcomes pertinent to the OSH spectrum.[9,10] The urgency to redefine OSH frameworks to stay ahead of these evolving dynamics, with emphasis on transitioning from the OSH 4.0 model to the more advanced OSH 5.0, is gaining momentum.[11] Moreover, earlier studies underscore the instrumental role of predictive scenarios in flagging emerging threats or compounding risks in the work environment.[12]

As we rethink OSH concepts, innovative research and proactive strategies become vital to ensure the long-term safety, health, and wellness of workers. In our past discourse, we championed the role of strategic foresight as a holistic, system-centric methodology uniquely suited for the burgeoning OSH framework.[13] Grounded in the principles of futures studies and strategic management, strategic foresight employs a repertoire of proven methods to draft comprehensive anticipatory scenarios, enabling organizations to preempt challenges and leverage upcoming prospects.[13,14] These scenarios are not just conjectures but are anchored in evidence,

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offering insights in a more relatable narrative format as opposed to conventional charts or policy summaries.[15-17] They serve as a lens to visualize nascent trends, offering a glimpse into the interplay of various determinants shaping the future work ecosystem. Notably, the primary objective of these foresight scenarios is not to provide a precise projection of the future but to canvas a spectrum of plausible futures, each brimming with its set of opportunities and challenges.[18,19]

Though foresight doesn't offer a crystal ball into the future, its integration into strategic planning can be instrumental in sidestepping unforeseen adversities and sculpting desired future trajectories.[13,19-21] Many global corporate giants, including the likes of Shell, General Electric, Siemens, and Daimler AG, have harnessed strategic foresight to bolster resilience during tumultuous phases and market upheavals.[22,23] Additionally, the U.S. federal administration, with agencies such as NIOSH at the forefront, is increasingly leaning towards foresight-driven strategies to future-proof their research and operational frameworks.[24,25]

In this manuscript, we delve into NIOSH's maiden strategic foresight initiative, a venture aimed at bolstering institutional acumen in strategic foresight and honing readiness to the impending shifts influencing OSH research and service paradigms. The discourse presented is the cumulative effort of a cross-functional team from NIOSH, representing a broad spectrum of its divisions, under the stewardship of authors SF, JS, and NE.

METHODS

The study was carried out with the permission of Ethics Committee of Faculty of İstinye University (Date:16.07.2023, Decision No: 2023-07). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Foresight Paradigm for Occupational Safety and Health

We employed a modified version of the scenario-centric Foresight Framework, originally conceived at the Kent University, to envision diverse futures pertinent to occupational safety and health.[13,26] This model, illustrated in Figure 1, delineates a systematic procession of tasks leading to the conception of congruent and credible future scenarios. These scenarios, derived from research findings, are then critically assessed to unearth their strategic ramifications, subsequently informing proactive strategy formulation and futuristic decision-making.

While this structure suggests a step-by-step progression, it's crucial to note that the journey isn't strictly linear. After completing each phase, revisiting previous stages to ascertain if further refinement or elaboration is warranted can be essential. At every juncture of our current endeavor, we meticulously assessed the prior phase's deliverables to decide if more efforts were required before advancing, thus shaping an iterative cycle akin to a feedback mechanism often seen in logical frameworks. Detailed elaboration of our methodological application, forming the crux of this paper, has set the stage for the comprehensive strategic foresight procedure.

Establishing the Framework

The inception of the foresight structure hinges upon the delineation of the domain, often synonymous with the focal subject (as shown in Figure 1. Phase 1). This initial framing demarcates the project's breadth, elucidates the core parameters affiliated with the topic, and scrutinizes the prevailing domain circumstances to differentiate the prospective future from the extant present.

Territorial Blueprint

Our endeavor aimed to untangle the intricate question: In what ways will forthcoming developments shape NIOSH's research and service endeavors? The project's epicenter revolved around the imminent landscape of occupational safety and health in the U.S. An illustrative domain blueprint, directed our pursuit of both overt and subtle harbingers that could potentially redefine OSH's future trajectory, bifurcated into primary and ancillary domain themes. The chief domain areas were demarcated as: Infrastructure, Regulatory Frameworks, OSH Talent Pool, Assets, OSH Endeavors, and the STEEP framework. Each pivotal domain was further broken down into auxiliary topics to sharpen our information scouring precision. Infrastructure entailed an examination of

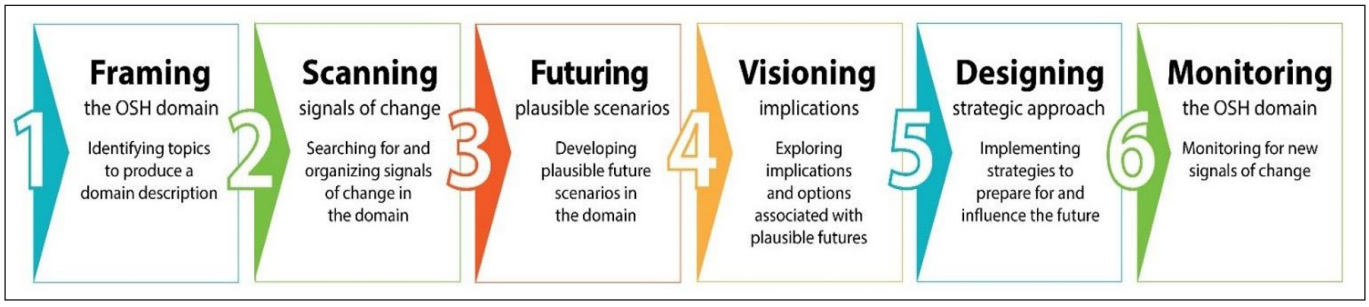

Figure 1. The OSH Foresight Structure, first introduced by Streit et al.[13]

labs, administrative hubs, and apparatus. Regulatory Frameworks delved into tech policies, human capital management, and scientific regulations. The OSH Talent Pool spotlighted aspects like talent equilibrium, segregation of research-centric and non-research staff, and talent cultivation. Assets emphasized datasets, research milieu accessibility, participant demographics, and collaboration. OSH Endeavors comprised both research and service facets. The STEEP domain encapsulated socio-cultural, technological, economic, ecological, and political dimensions. Given NIOSH stood as this initiative's epicenter, the narrative was predominantly sculpted by the U.S. context.

Temporal Perspectives

The Three Horizons Framework (as illustrated in Figure 2) serves as a bridge, seamlessly linking our current realities with potential futures. This structure allows us to deeply reflect on prevailing assumptions, nascent shifts, and envision possible preferred futures.[27,28] The Three Horizons model equips OSH with an analytical lens, facilitating a comprehensive understanding of how transformations materialize. This is achieved by acknowledging the simultaneous existence of three distinct future perspectives within our current context.[13,28]

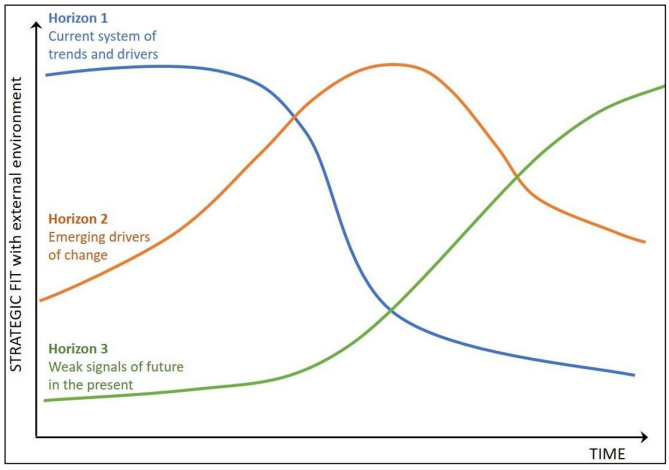

Figure 2. The visual diagram of the Three-Horizon Foresight

Horizon 1 (H1) represents the contemporary modus operandi. As time progresses and various shifts come into play, it's natural for H1's practices to be deemed obsolete or inefficient, thereby losing their strategic alignment with evolving external environments. In stark contrast, what may currently be perceived as 'peripheral' or 'alternative' solutions and practices gradually gain prominence, forging the path for the distant future, termed Horizon 3 (H3). Interspersed between these two extremes lies Horizon 2 (H2). This intermediate phase is emblematic of tumultuous times, marked by significant upheavals and transformations. This period witnesses a gradual phasing out of H1's principles, simultaneously laying down the foundational stones for H3's emergence.

Time Scales in Planning

The visual diagram of the Three-Horizon Foresight, as depicted in Figure 3, offers an insightful perspective on planning for change over time 28, as articulated in Streit et al.[13]

		Driver Y								
		Advanced Technology	Virtual Workplace	Data Security	Knowledge Generation	Social Credit	Climate and Energy	Workforce	Work Arrangements	Total Reinforcing Score
Driver X	Advanced Technology	-----	5	5	5	4	5	4	5	33
	Virtual Workplace	5	-----	5	4	5	5	4	5	33
	Data Security	5	3	-----	5	4	4	3	4	28
	Knowledge Generation	5	3	5	-----	4	4	4	3	28
	Social Credit	3	5	5	2	-----	5	4	4	28
	Climate and Energy	5	4	3	4	5	-----	3	3	27
	Workforce	4	5	2	4	4	3	-----	5	27
	Work Arrangements	4	5	1	4	3	3	5	-----	25

Figure 3. Cross-impact matrix for drivers of change

In the realm of strategic foresight, time horizons are frequently correlated with an organization's standard operational and business cycles.[28,29] In our project's context, we meticulously synchronized the time horizons with the strategic planning intervals of NIOSH. The immediate future, represented by H1, spanned from 2021 to 2026. H2, symbolizing the medium-term future, encompassed the timeframe between 2027 to 2036. Lastly, H3, depicting the distant future, extended to 2037 and subsequent years. This delineation offers a structured template for envisaging the immediate, medium, and distant futures of OSH in the American context.

Evaluating the Present Landscape

Prior to embarking on our investigative journey into the future, it was imperative to delineate the contemporary influential factors within the domain. An in-depth analysis of the prevailing conditions, pivotal stakeholders, and the recent chronology was conducted to set the stage for our exploration into the forthcoming times. This wasn't a quest to create an exhaustive account of the present OSH landscape. Instead, our evaluation is a distillation of insights furnished by the team and veteran NIOSH leadership, with their expertise spanning the realm of OSH right from NIOSH's foundational days in 1970. This evaluation, detailed in Tables 1-3, has been structured around the principal categories delineated in the domain map (refer to Figure 2). Concise interpretations of our discoveries are bolstered by references offering in-depth insights. The appended segment incorporates a comprehensive list of abbreviations employed in these tabulations and across the manuscript (refer to Supplement Table S1).

Current Landscape of Occupational Safety and Health (OSH)

Present Conditions

Activities: The NIOSH Strategic Plan, together with the Burden, Need, and Impact (BNI) framework, predominantly drives OSH research.[30,31] This is complemented by service-oriented endeavors that hinge on essential partnerships addressing myriad mandates and the requirements of stakeholders. Emphasizing the role of employee well-being, it is deemed pivotal not only to OSH but also to the economic health of organizations.[6]

Facilities: With its research centers scattered geographically, NIOSH has recently amplified its capabilities, notably in places like Cincinnati, OH.[32] However, the COVID-19 pandemic posed challenges, restricting access to these centers due to safety measures.[33] In response, both CDC and NIOSH championed the inception and realization of wholesome remote working paradigms.[34]

Policies: A contemporary shift towards heightened privacy and security has redefined how data usage and interpretation occur in OSH.[35-38] Additionally, there's a growing emphasis on inclusivity, touching upon aspects like diversity, equity, and evolving employment dynamics, coupled with a surging focus on mental health and holistic well-being.[39-41]

Resources: With technological evolution, data management and linkages are undergoing transformations, albeit with amplified security apprehensions. The pandemic-induced restrictions affected human subject research projects and access to U.S. worksites. Collaboration with key stakeholders, although indispensable for NIOSH, often presents establishment and maintenance challenges.[42]

STEEP: The dynamic flux within Social, Technological, Economic, Environmental, and Political domains casts direct ramifications on OSH research, service facets, stakeholder dynamics, and funding allocations.

Workforce: NIOSH currently grapples with an aging workforce, with significant retirement projections looming.43 Addressing this multigenerational work milieu demands unwavering adaptability, underscored by collaborative endeavors, rigorous training, and a drive for enhanced productivity.

Crucial Stakeholders

Academia: NIOSH finds support from university-centric bodies, both funded and otherwise, that bolster current research trajectories while spotting opportunities for seamless integration and practical implementation.

Employer organizations: These comprise both individual employers and conglomerate trade associations that partake in research, translating findings into actionable workplace transformations.

Federal entities: Advisory committees, and partner agencies like EPA, OSHA, NIH, and DOT, play pivotal roles, offering guidance, recommendations, and partnering in research, services, and information dissemination.

International collaborators: World-renowned bodies like WHO, ILO, and WTO collaborate with NIOSH, turning to it as a reliable beacon for OSH-centric research, services, data, and advisories.

The domain also witnesses active involvement from insurance organizations, labor bodies, lobbyists, media (notably during the COVID-19 crisis), national academies, OSH professional associations, standardization committees, state and local health departments, and the U.S. Congress.

Historical Milestones

From its inception in 1970 through the Occupational Safety and Health Act[44] to the significant strides in the following decades, OSH has witnessed notable milestones. The relocation of NIOSH's headquarters in 1994 aimed to bolster partnerships.[44,45] The 1990s were characterized by regulatory shifts, evolving workforce demographics, and declining union memberships. The post-9/11 era marked an emphasis on security, both physical and cyber.[46,47] With the dawn of the 2000s, technological revolutions like AI began redefining work.[48,49] The 2010s heralded changes in employment dynamics, with the gig economy's resurgence.[50] Recently, concerns regarding data security became prominent, with significant cyberattacks targeting sensitive research data.[51-52]

RESEARCH

Recognizing the importance of foreseeing and preparing for the future, our research endeavors embarked on the exploration of potential change signals. The scanning process, as depicted in **Figure 1**. Stage 2, draws from a wide array of information sources to identify deviations from the established norms, focusing on emerging trends and signals.[20,53,54] Both conventional and unconventional sources, such as blogs, social media, and publicly available reports, were tapped into to discern these weak signals.[55,56]

Scanning

In our scanning phase, we curated a substantial list of 240 hits, providing valuable insights across all established timeframes and categorized according to the domain

map, as illustrated in Figure 2. This library of scanning hits was pivotal for our research.

A thorough synthesis of the scanning hits was performed. Each hit was classified based on various criteria, such as trends, issues, plans, and projections, to understand how the future may diverge from the present. This framework, known as TIPPS, is instrumental in shaping strategic foresight research.[26] To streamline the data and maintain a manageable dataset, overlaps were condensed. As an instance, all trends indicating a shift towards a holistic approach to OSH were compiled into a singular trend statement.[6,57]

Drivers of Change

Our subsequent step involved pinpointing the drivers of change. Synthesized from thematic clusters of the scanning results, these drivers highlight evidence-backed developments projected to mold the future.[26.] Eight principal drivers were identified, as depicted in Table 1.

Cross-Impact Matrix

After defining the drivers, we ventured into developing a cross-impact matrix, a proven foresight tool used to explore the interplay of drivers in the future.[26] This matrix helps distinguish neutral drivers, which may be considered for exclusion in the scenario development stage.[56,57]

In Figure 2, the matrix illustrates the influence of one driver over another. The matrix should be understood as, "Given the occurrence of Driver X, the impact on Driver Y will be either reinforcing, neutral, or contradictory." We adopted a 5-point scoring mechanism to represent the relationships, with 5 indicating a strong reinforcement and 1 symbolizing a strong contradiction.

Our evaluation failed to identify any neutral drivers. Each of the eight drivers was impactful enough to be integrated into the scenario-building process. Particularly noteworthy was the interplay between Advanced Technologies and the Virtual Workplace, which displayed a reinforcing score of 33, indicating their significant role in future scenario development.

RESULTS

For the current study, we employed four generic future archetypes, serving as foundational frameworks for our scenarios. This research discerned that globally prevalent future visions can be grouped into four predominant categories. Figure 2 provides detailed descriptions and essential developmental questions related to each archetype.

As part of the next phase in scenario development (refer to Figure 1. Stage 3), our comprehensive project team was segmented into four groups. Each group was tasked with drafting a preliminary 400-600 word future scenario aligned with their designated archetype. To ensure a holistic exploration of the future scenario, teams were encouraged to thoroughly analyze all eight drivers during the draft phase, highlighting those deemed most influential for their assigned scenario. Each driver unfolded a unique narrative across the four futures, playing a vital role in at least one scenario. After drafting, the narratives were cross-examined for uniqueness and cohesiveness, with the authors of this paper harmonizing the writing styles for a unified presentation. Section 4.1 lists the title, abstract, and chief drivers for the finalized four scenarios.

Table 1. Key drivers and descriptions

Driver	Description	Keywords from TIPPS	Supporting TIPPS
Advanced Technology	Evolution in technology, notably AI, augments work productivity and customization, though introduces challenges related to worker retraining and hazard management.	Advanced tech, Robots, AI, Cybernetics	Numerous
Climate and Energy	Rising awareness of climate change prompts a shift to cleaner energy sources, affecting the OSH sector by introducing new workplace risks.	Carbon neutral, Sustainable energy	5
Data Security	The proliferation of digital data collection amplifies the need for robust cybersecurity measures, while promoting data connectivity for improved health and safety.	Big data, Encryption, Privacy rights	16
Knowledge Generation	Skepticism towards government information sources mandates effective communication strategies to combat misinformation.	International competition, Research priorities	10
Social Credit	Algorithms determining trustworthiness based on social standing can have repercussions at both the individual and organizational levels.	Corporate Social Responsibility, Trust systems	Varied
Virtual Workplace	Workplaces are no longer confined to physical locations but are redefined by the nature of tasks.	Telework, Workplace evolution	5
Work Arrangements	Flexible work arrangements are becoming commonplace, reshaping hiring practices and introducing new industries, each with its challenges and opportunities.	Gig economy, Work-life transformation	8
Workforce	Demographic shifts in the U.S. and economic trends are influencing labor markets. Employers now emphasize overall employee health in addition to physical safety.	Aging workforce, Total worker health, Workforce demographics	Numerous

Future of OSH Scenarios

Table 2 presents a summarization of the four OSH future scenarios, segmented by their archetype, and accompanied by brief characteristic descriptions.

The scenarios were constructed to serve as valuable tools for prospective planning and decision-making. The driver map facilitated the distinction of each scenario. The Continuation scenario offers a straightforward trajectory for OSH's future. Conversely, the Collapse scenario, despite its dystopian tone, provides insights into potential challenges to circumvent, while the New Equilibrium scenario delineates a potential trajectory from our present state. The Transformation scenario illustrates a visionary target for OSH's future.

Key Strategic Issues

In the concluding phase of our analysis, we pinpointed pivotal strategic challenges inherent in the scenarios (as illustrated in Figure 1. Stage 4). We meticulously examined the potential ramifications of these challenges on the OSH system for the periods H1 (2021-2026), H2 (2027-2036), and H3 (2037 and onwards). A thematic evaluation was orchestrated by the foresight team leads (JS and SF), unearthing the core strategic challenges. These challenges were then corroborated by the foresight team and systematically categorized into five primary strategic focus areas, delineated in Table 3: data security, mental health, partnerships, research, and virtual work.

To understand how these strategic issues can be turned into actionable steps, we segmented our recommendations using a time-oriented approach.

DISCUSSION

The research at hand paints a comprehensive picture of four potential futures for OSH, emphasizing the pivotal trends and challenges that could potentially redirect its course. As we move ahead, it is crucial for OSH institutions not to perceive the future merely as a linear extension of the past. Instead, they should embrace

Table 2. Overview of the four OSH future scenarios

Scenario Archetype	Scenario Title	Brief Description
Continuation	Boundaries Continue to Blur	The delineations pertaining to work locations, employment modalities, work durations, the confluence of professional and personal spheres, and the interplay between humans and machines are progressively obfuscated.
Collapse	The Perfect Storm	An inability to adapt, amplified by trust deficits and resource scarcity, compels individuals and entities to become self-reliant, often to the detriment of workers' health and safety.
New Equilibrium	Remote Controlled	The pressing need for novel research on worker-centric models, remote work paradigms, and human-machine synergy predominantly shapes the allocation of OSH resources. In this technologically advanced milieu, emphasis on mental health and data security takes precedence.
Transformation	One World Health	In this futuristic setting characterized by advanced technology, mental well-being and data protection emerge as pillars of an evolved OSH framework. Research initiatives are tailored to address population-centric needs, and industries coalesce to foster a global workforce well-being paradigm.

Table 3. Strategic focus areas for the future of OSH

Strategic Focus Areas	H1 (2021-2026)	H2 (2027-2036)	H3 (2037 and beyond)
Data Security	Bolstering advanced data protection systems. Addressing concerns regarding data breaches and unauthorized surveillance.	Integration of biometrics with robust encryption methodologies. Implementation of universally accepted data protection regulations.	Seamless and secure integration of individual data identities in the global OSH framework. Maintaining data sovereignty in decentralized work environments.
Mental Health	Initiating mental health assessments for remote workers. Offering resources to combat work-from-home fatigue and burnout.	Mental health becoming a mainstream topic in OSH policies. Integration of AI tools to monitor and suggest mental health interventions.	Holistic wellbeing, encompassing both physical and mental health, becoming a foundational principle of OSH. Global partnerships to address emerging psychological challenges of a highly virtualized workforce.
Partnerships	Fostering collaboration between industries for knowledge sharing. Establishing global OSH standards through multi-stakeholder engagements.	Nurturing cross-border partnerships to address shared OSH challenges. Leveraging public-private partnerships for OSH innovation.	Seamless international cooperation and data sharing in real-time to ensure worker safety. - Development of universal OSH protocols benefiting the global workforce.
Research	Studying emerging risks in rapidly changing work environments. Quantifying the impacts of nonstandard work arrangements on health.	In-depth research on the synergies between humans and AI in the workplace. Evolution of OSH research methodologies to be more inclusive and diverse.	Anticipating challenges and opportunities of a transhuman workforce. Continuous real-time monitoring and analysis of global workforce dynamics.
Virtual Work	Addressing challenges of work-life balance in remote work settings. Ensuring ergonomic standards in home offices.	Global normalization of virtual workplaces with set universal standards. Advancing technologies to aid in the virtual collaboration of teams.	Almost complete dissolution of traditional physical workspaces. Evolving the role of humans in a largely automated virtual work ecosystem.

Table 4. Strategic options and actions

Focus Area	Near-term	Mid-term	Far-term
Data Security	Improve communication between data security and science personnel.	Nurture relationships with longstanding partners and key interest groups.	Develop new data security paradigms for OSH research.
Mental Health	Acquire human capital resources. Increase occupational mental health surveillance efforts.	Establish workgroups for mental health literature.	Integrate mental health priorities into OSH research portfolios.
Partnerships	-	Embed OSH staff into different industries.	Strengthen relationships with partners and stakeholders.
Research	Acquire human capital resources. Identify high-priority industry sectors.	Collaborate with early adopters in high-priority sectors.	Enhance systems that track traditional hazards.
Virtual Work	Modernize HR policies related to remote work.	-	-

a versatile vision, accounting for the myriad possible futures that could be crafted by systemic disruptions, ground-breaking innovations, and unforeseen variables.

CONCLUSION

Strategic foresight stands as an indispensable tool that needs to be interwoven with organizational planning. This synthesis demands an unwavering commitment from institutions and a keen focus on the horizon. While models from the corporate world offer some insights, the responsibility falls upon agencies like NIOSH to discern approaches that resonate with the unique contours of a federal environment. Here are some recommendations based on our findings:

Adaptive learning: OSH organizations should prioritize continuous learning and adaptation, making them more resilient to potential future disruptions.

Collaborative endeavors: Engage in inter-agency and cross-sectoral collaborations to benefit from diverse perspectives and resources. This could foster more holistic strategies for OSH's future.

Stakeholder engagement: Regular dialogues with stakeholders can offer valuable feedback and insights, helping tailor strategies more effectively.

Methodological mix: It might be advantageous for NIOSH to blend various methods, allowing for a broader and more adaptable foresight framework.

Scalability: Given the dynamic and ever-evolving landscape of OSH, methods adopted should be scalable, accommodating both micro and macro perspectives.

Global perspective: While the focus of this study zeroes in on the U.S., its foundational methodology can serve as a benchmark for OSH initiatives worldwide. Efforts should be made to contextualize and adapt this framework to cater to diverse geographical needs.

Signal monitoring: As the Foresight Framework for OSH suggests, vigilant and proactive monitoring for signs of change is paramount. Institutions should invest in sophisticated monitoring tools and technologies to stay ahead of the curve.

In sum, the future of OSH is not set in stone, but is malleable, shaped by the decisions we make today. By integrating a forward-looking approach, informed by a blend of methodologies and underpinned by collaboration and adaptability, OSH organizations can navigate the uncertainties of tomorrow with confidence.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Ethical Committe of Faculty of İstinye University (Date:16.07.2023, Decision No: 2023-07).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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