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Exploring the future with PRO-SPECT: an evidence-based modular foresight approach

Explorando el futuro con PRO-SPECT: un enfoque modular de prospectiva basado en la evidencia

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Abstract: In the face of rapid technological advancements and unforeseen societal events, predicting the future of work proves challenging. Foresight, the exploration of potential futures, emerges as a valuable strategy to navigate labor market uncertainties. However, existing foresight methods often lack alignment with the goals prioritized by sectoral and organizational stakeholders. Addressing this gap, we introduce PRO-SPECT (PROfessional Sectoral perSPECTive), a modular foresight approach crafted through literature review, expert interviews, and workshops. Tailored to meet the needs of policymakers, organizations, and communities, PRO-SPECT consists of four key steps: Scope, Scan, Impact, and Perspective. This evidence-based approach aims to equip stakeholders with actionable insights for the future of work and beyond. This article provides a comprehensive overview of PRO-SPECT, encouraging further adoption and knowledge development in foresight practices.

Keywords: foresight; future; scenario development; work; labor market.

Resumen: Ante los rápidos avances tecnológicos y los imprevistos sociales, predecir el futuro del trabajo resulta todo un reto. La prospectiva, la exploración de futuros potenciales, se perfila como una valiosa estrategia para sortear las incertidumbres del mercado laboral. Sin embargo, los métodos de prospectiva existentes no suelen estar en consonancia con los objetivos prioritarios de los agentes sectoriales y organizativos. Para colmar esta laguna, presentamos PRO-SPECT (PROfessional Sectoral perSPECTive), un enfoque de prospectiva modular elaborado mediante revisión bibliográfica, entrevistas a expertos y talleres. Adaptado a las necesidades de los responsables políticos, las organizaciones y las comunidades, PRO-SPECT consta de cuatro pasos fundamentales: Alcance, Exploración, Impacto y Perspectiva. Este enfoque basado en pruebas tiene por objeto dotar a las partes interesadas de ideas prácticas para el futuro del trabajo y más allá. Este artículo ofrece una visión general de PRO-SPECT y anima a su adopción y al desarrollo del conocimiento en las prácticas de prospectiva.

Palabras clave: prospectiva; futuro; desarrollo de escenarios; trabajo; mercado laboral.

1. Introduction

The labor market and the way we work are subject to constant change, influenced by rapid technological advancements and unexpected societal events like COVID-19. These factors

contribute to a significant level of uncertainty about the future of work (TNO/RIVM, 2023; WRR, 2020; McKay et al., 2019; SER, 2016). Yet, anticipating and preparing for what lies ahead is essential. What might be coming our way and how do we prepare for it? How can we proactively respond to these developments and be resilient in an ever-changing labor market and world? Which skills do employees need to remain relevant? Which jobs will disappear, and which jobs will arise? Answering these questions is difficult. The labor market's inherent uncertainty and dynamic nature, coupled with the multitude of influencing variables, render conventional predictive methods susceptible to errors (Bakule, Czesane & Havlickova, 2016; Khanna et al., 2022). Traditional forecasting approaches, for example, rely on incomplete and/or historical data and on conventional (macroeconomic) assumptions, rendering the extrapolation of such data for future predictions inherently unreliable.

A promising alternative for delving into the future of work and the labor market is found in foresight —an approach that permits the exploration and validation of assumptions in the face of unpredictability. In contrast to conventional forecasting methodologies, foresight offers a methodical means of envisioning multiple potential futures, rather than a singular trajectory, thereby enriching the decision-making process. Foresight specifically supports decisions in areas involving relatively long lead times, such as long-term labor market planning (Di Bartolomeo et al., 2001). Consequently, foresight emerges as an optimal approach for unraveling the complexities inherent to work and labor market, thereby enhancing our readiness for diverse potential scenarios in the evolving landscape of work (Khanna et al., 2022).

In the context of work and labor market, foresight has predominantly been applied to support policy and decision-makers in strategic planning purposes. This application has typically been confined exploring a spectrum of probable, preferable, and plausible futures, with an emphasis on broad and long-term horizons (e.g., how technological breakthroughs or the green and energy transitions may transform the labor market (WEF, 2023); how digital technologies will impact skills, jobs, and the wider economy by 2030 and beyond (Brown, Sadik & Souto-Otero, 2021). While undeniably valuable for informing global-, European-, and/or national-level considerations, such an approach may not seamlessly address the needs of sectorial and (smaller) organizational stakeholders, who often prioritize short-term or more actionable goals when preparing for the future. For instance, employing foresight methods can provide governments with insights into the future skills required to cultivate a resilient, flexible, and adaptable workforce on a national scale, but these approaches fall short in guiding organizations regarding the specific skills essential within their sector or organization. More tangibly, it does not elucidate how to develop these skills among their employees. To fulfill the latter requirements, a more adaptable foresight approach is necessary − one capable of offering potential futures at the sectorial or (smaller) organizational levels, and pragmatic and adaptable enough to translate these potential futures into concrete, achievable action steps tailored to the specific needs of the sector or organization in question.

This paper serves as the foundation and scientific rationale for AUTHOR's sectoral foresight approach, a modular approach specifically aimed at systematically exploring the future of work and labor market on a regional, sectoral, and/or organizational level. This evidence-based approach goes beyond existing foresight approaches employed in strategy and policy development by utilizing a clear rationale for data gathering and method selection based on existing literature, domain knowledge and action research. The developed approach, called PRO-SPECT (PROfessional Sectoral perSPECTive), combines quantitative and qualitative data, and involves collaboration with partners and experts from the start. This bottom-up active engagement of various stakeholders not only constitutes a critical component of the foresight process (Geurts et al., 2022; WRR, 2010), but also ensures that action steps can be tailored to specific needs. As such, this approach can support sectors and organizations, including small and medium-sized enterprises, with short-, medium-, and long-term strategic planning, ensuring −for example− that they are equipped with the right talent to meet the needs of the future.

In the following, we first discuss the benefits of foresight for exploring the future of work and the labor market in more detail. Then, we outline the development and evolution of the PRO-SPECT approach, designed to provide organizations, public or private entities, and policymakers with a structured and comprehensive approach to address their foresight inquiries. The primary time frame considered for this specific foresight approach is 5-15 years. Note, however, that the methodology can be adapted to address other themes, and can accommodate shorter and longer time frames, due to its modular structure and flexibility in methods.

2. Exploring the Future of Work and Labor Market with Foresight

As discussed above, anticipating the future of work and the labor market is a complex undertaking. The application of systematic future exploration provides a valuable means of identifying emerging labor market trends and assessing the implications of potential strategies (Bakule et al., 2016). Policy makers and decision-makers often utilize future exploration to assess future prospects, address information deficits, and mitigate potential imbalances and mismatches. The most suitable approach varies depending on the level of uncertainties involved. Two methods commonly employed in future exploration are forecasting and foresight.

Forecasting entails providing a single and definitive representation of the future, often relying on quantitative techniques. This approach emphasizes the most likely future and leaves little room for uncertainties, making it well-suited for relatively stable environments with minimal unknowns. For instance, forecasting can be used for sales planning, in which organizations forecast how many products they need to create or how much money they might earn in a certain period, to decide whether to hire more employees or build more factories. Forecasting can also be used for workforce prospects, in which forecasting offers countries or regions a probability-based picture of future developments in terms of (un-)employment rates and the expected number of jobs, to achieve goals such as full employment and higher wages. Forecasting, however, can only provide so-called 'business-as-usual' outlooks that assume continuity of today's trends (Wilkinson, 2016). It relies on the availability of adequate labor market data, and, even when based on established principles and macroeconomic models, is relatively error prone (Bakule et al., 2016; Khanna et al., 2022).

Foresight, as defined by the Scientific Council for Government Policy, is a systematic study that examines potential future scenarios using scientific knowledge (WRR, 2010). It requires less formalized data than forecasting and depends on key experts and stakeholders, making it a highly interactive tool of social dialogue with relevant representatives (Bakule et al., 2016). Foresight concentrates on "exploring the unknown future, or in other words, exploring multiple possible futures" (WRR, 2010). Unlike forecasting, foresight relies predominantly on qualitative methods and deliberately incorporates uncertainties, recognizing the likelihood of change. Its primary purpose is to comprehend emerging external developments, assess their potential impact, and explore alternative futures. Put differently, its primary objective is to prepare for, rather than predict, future developments (Wilkinson, 2016). This proactive stance enables the provision of early warnings, for example regarding evolving skills mismatches in the world of work, allowing ample time for the vocational education and training sector to prepare for the skill demand in 10 years. Alternatively, foresight can unpack the different ways in which computerization advances may affect the demand for low-skills and low-wage jobs (cf. Barbosa et al., 2022). In contrast to forecasting, foresight also enables the incorporation of disruptive events or 'wildcards' such as pandemics or other crises and can therefore move beyond the business-as-usual outlooks (Di Bartolomeo et al., 2001).

In the PRO-SPECT approach, we deliberately adopt foresight as the method for future exploration. This decision stems from the belief that, in many cases, it is prudent to acknowledge the substantial uncertainty surrounding the future of work, rendering a singular vision inadequate. After all, in the face of the profound uncertainty characterizing the contemporary and future landscape of work, it is imprudent, at best, to rely on the historical stability of cause-

and-effect relationships assumed by traditional forecasting models. In fact, traditional forms of forecasting, which are heavily based on historical and familiar raw data, have often failed in the face of strategic discontinuities in the environment (Adegbile et al., 2017). The COVID-19 pandemic serves as a stark illustration, disrupting the precision of economic models and forecasts crafted by economists for metrics such as GDP growth, unemployment rates, and sectoral expansion (Khanna et al., 2022). By placing uncertainty and the potential for change at the core, as the foresight method does, sectors and organizations −including small and medium-sized enterprises− can strengthen their preparedness for what lies ahead when it comes to work and labor market.

One caveat with foresight studies is that they tend to follow no specific methodology: each study tailors the methodology according to its goals (Barbosa et al., 2022). Therefore, we synthesized the literature on foresight methods to arrive at a structured and comprehensive approach that can guide sectors and organizations in their foresight inquiries related to the future of work and labor market. We designed this approach in a modular way because the literature indicates that Foresight becomes more reliable when different and complementary methods are combined, as it reduces the probability of a biased result. Note that these methods most often comprise the creation of various future scenarios, although other methods like horizon scanning (identifying opportunities and threats that may arise in the future) or detecting weak signals (indicators of potential future changes) can also be employed. To also align with the goals of sectors and (smaller) organizations, we specifically designed our approach to allow for relatively short-term outlooks and to enable concrete actions.

3. Methods

The development of the PRO-SPECT approach involved a comprehensive process that encompassed a literature scan, interviews with experts, and interactive workshops.

The literature scan was conducted in a structured manner. The objective was to identify existing foresight methods from the scientific literature. Utilizing multiple electronic databases such as Scopus, Google Scholar, and PsychInfo, we searched for articles using relevant terms like "foresight," "review," and "method." To ensure thoroughness, we also examined recent volumes (published within the last five years) of scholarly journals such as Foresight, Futures & Foresight Science, and Journal of Future Studies. Additionally, we explored (grey) literature and referred to interview references to gather examples and practical insights into methods employed in the field.

The collected articles underwent a systematic review process. We assessed them based on methodological quality and practical applicability. A team of three researchers deliberated on the selected articles, and when consensus was reached, the chosen articles were read and analyzed in their entirety. From these, five articles were eventually chosen as the foundational basis for the PRO-SPECT approach (Fergnani, 2019; Geurts et al., 2022; Popper, 2008; Smith & Saritas, 2011; Voros, 2003). The remaining articles were employed to analyze and select the methods that form part of PRO-SPECT. These methods are detailed in Chapter 5. The process of synthesis involved considering the advantages, disadvantages, and criteria for choosing each foresight method, along with their suitability for sectoral foresight.

In addition to the literature review, we conducted interviews with nine experts, both within and outside of Koen et al. (2023). During these interviews, we discussed various foresight studies, scientific explanations, and practical lessons learned. The experts shared their experiences and examples of foresight methods, which displayed a wide range of approaches. Some experts focused on systematic monitoring of technological developments and presented them to potential users through a portal to assess their impact and value. Others employed standardized scenarios for product development, while some emphasized action research and contributing to transitional initiatives.

Lastly, two workshops were organized, engaging a total of eleven senior AUTHOR experts involved in foresight activities. We presented the initial version of PRO-SPECT and gathered feedback and advice from the participants. Their valuable input led to the incorporation of several optional methods into the approach with a specific focus on translating scenarios into concrete actions for sectors and organizations.

4. Development of the PRO-SPECT approach

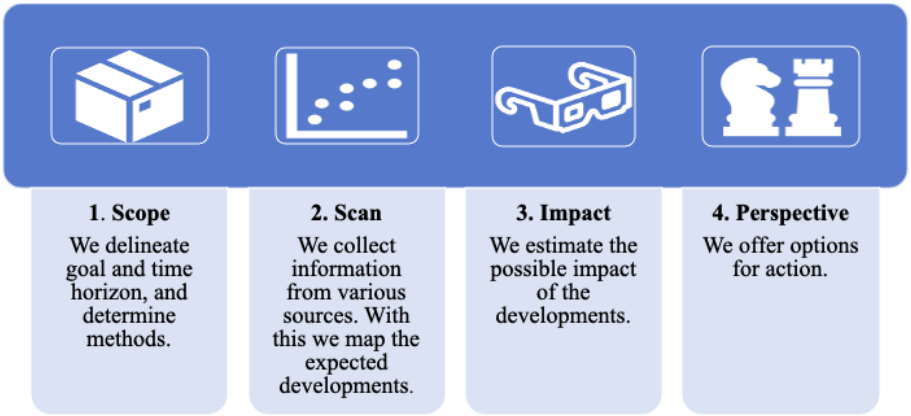
The development of the PRO-SPECT approach involved a thorough analysis of foresight processes from selected literature sources. The foresight process, as described in the literature, generally comprises several sequential steps, starting with information gathering and concluding with outcomes aimed at supporting strategy and policy development (Fergnani, 2019; Geurts et al., 2022; Popper, 2008; Smith & Saritas, 2011; Voros, 2003). While there may be slight variations in the precise scope and definition of these steps, the fundamental essence remains consistent across most sources.

Voros (2003) provides a comprehensive foresight framework that encompasses the following stages: 1) Input (what is currently going on?), 2) Analysis (what seems to be happening?), 3) Interpretation (what is really happening?), and 4) Prospecting (what might be happening?). These steps are then followed by 5) Outputs (what should we do?) and 6) Strategy (what will we do and how will we do it?). The process commences with the collection of data from various sources, including individuals and relevant reports or scientific literature (Input). Subsequently, the gathered data undergoes qualitative and/or quantitative analysis to derive meaningful insights (Analysis). In the Interpretation phase, the data is processed and tailored to align with the organization's objectives, often contributing to strategic planning. The knowledge derived from this analysis forms the basis for future explorations, termed Prospecting.

The literature also presents other foresight frameworks, each encompassing distinct steps, though with considerable overlap in objectives. Popper (2008) introduces five stages: Pre-foresight, Recruitment, Generation, Action, and Renewal, while Smith and Saritas (2011) outline Understanding, Synthesis & Modelling, Analysis & Selection, Transformation, and Action. Moreover, Geurts and colleagues (2022) present a hybrid AI expert approach with the steps: Scoping, Scanning, Trend Analysis, Impact Assessment, and Strategizing.

To develop the PRO-SPECT approach, we integrated and aligned these overlapping steps, disregarding minor definitional discrepancies. Consequently, the synthesis resulted in four distinct steps: 1) Scope, 2) Scan, 3) Impact, and 4) Perspective. Together, these steps should allow sectors and organizations to explore multiple potential futures and formulate strategies with concrete actions steps. Figure 1 provides an illustrative representation of the PRO-SPECT foresight framework.

Figure 1. The PRO-SPECT foresight framework.



Source: Authors' elaboration.

1. *Scope:* The initial step in the PRO-SPECT approach involves defining the foresight question and establishing a shared vision of the problem. This stage aligns with the systematic understanding (Smith & Saritas, 2011), scoping (Geurts et al., 2022), and pre-foresight (Popper, 2008) steps from the literature. Scoping is pivotal in setting the trajectory for subsequent stages and entails determining research questions, target audiences, methodologies, criteria for data source selection, and relevant experts. This clear scope guides the choice of foresight methods in subsequent steps and ensures alignment of goals and expectations, particularly in client-driven future studies.
2. *Scan:* In the second phase, a diverse array of methods is employed to gather data essential for future estimation. This extensive process encompasses both quantitative and qualitative data collection, culminating in an overview of critical external developments that hold influence over the focal issue, albeit with varying degrees of influence. Examples of such developments encompass technological advancements, ecological changes, and social transformations. This step corresponds to elements of analysis and interpretation (Voros, 2003), recruitment (Popper, 2008), synthesis & modelling, analysis & selection (Smith & Saritas, 2011), and scanning and trend analysis (Geurts et al., 2022). Scanning involves selecting potential sources, analyzing them to extract relevant developments, and generating a longlist of pertinent signals, external developments, and factors. Subsequently, expert interviews contribute to shortlisting key external developments deemed relevant to the issue at hand.
3. *Impact:* The third stage delves into assessing the potential impact of the selected external developments on the predefined outcome measure. If significant uncertainties surround the direction and pace of these developments, multiple scenarios are explored and analyzed. This stage shares similarities with prospecting (Voros, 2003), generation (Popper, 2008), transformation (Smith & Saritas, 2011), and impact assessment (Geurts et al., 2022). The impact analysis scrutinizes how the external developments identified in Step 2 might affect various dimensions of the problem statement. Acknowledging the non-linear and complex nature of impacts, this analysis considers interactions between developments, events, ecological and social conditions, and the actions of societal actors over time. The insights derived from this analysis facilitate a comprehensive understanding of reality and a range of alternative futures.
4. *Perspective:* The final stage of the PRO-SPECT approach aims to present action perspectives that support policymakers in making informed choices and developing strategies to prepare for the future. The ultimate goal of the PRO-SPECT approach, and foresight in general, is to enable users to proactively prepare for the future. This step aligns with strategy (Voros, 2003), action and renewal (Popper, 2008), action (Smith & Saritas, 2011), and strategizing (Geurts et al., 2022). During this phase, the focus shifts from exploring possible futures to determining how the insights gained can guide policy development and decision-making. The impact analysis findings are translated into practical applications that aid decision-makers in formulating and guiding strategic actions for implementation. These applications may involve assessing current policies' impacts and choices, providing early warnings about potential challenges or new opportunities, facilitating future-oriented planning, exploring disruptive developments, and proposing targeted focus areas. The involvement of stakeholders and experts in this phase fosters a shared understanding of change dynamics and allows exploration of future decisions and compromises, yielding a deeper insight into opportunities and threats across various scenarios. In the case of a client-driven future study, engagement of the client in this step is vital, as they must actively contribute and be open to questioning strategy and policy.

In certain foresight processes described in the scientific literature, strategy development and implementation follow the development of the action perspectives (Voros, 2003; Waverly

Consultants, 2017; Geurts et al., 2022). In the PRO-SPECT approach determining, shaping and discussing action options is the last step of the foresighting process, considering implementation of the strategy as a separate process to be conducted by a client, to adjust policies based on the findings.

Ideally, foresight should integrate into a cyclical process of strategy and policy development, wherein outcomes of actions are continuously monitored. By incorporating foresight results and advancing data and insights into subsequent scanning phases, the overall process embraces continuous assessment, adjustment, and refinement of strategies over time.

5. Implementation methods within the PRO-SPECT approach

To determine the methods within the PRO-SPECT approach, we amalgamated Popper's (2008) overview with Smith and Saritas' (2011) comprehensive assessment. The latter provided a clear delineation of each method's advantages and disadvantages, aiding us in selecting methods suitable for sectoral futures exploration. Additionally, we refer to The Futures Toolkit by Waverly Consultants (2017), which offers a detailed description of various tools applicable in the foresight process. The final selection of methods was the outcome of internal working sessions, supplemented where necessary based on relevant literature. Emphasizing replicability and manageability, we deliberately opted for clear methodologies, as these aspects are often missing or inadequately described in practice.

The methods used in the foresight process can be both quantitative and qualitative. Quantitative methods involve, for example, questionnaire surveys and extrapolation of existing data, while qualitative methods involve interviews with experts and scenario development e.g., using working sessions. In his overview of commonly used methods in scientific studies of foresight, Popper (2008) showed that literature review, expert consultation, and scenario development are fundamental research methods frequently used in every discipline (Popper, 2008). It is also notable that 10 of the 14 methods are qualitatively oriented. The top three methods (literature review, expert panels and scenarios) consisted of purely qualitative methods. This suggests that qualitative methods are more "popular" than quantitative and semi-quantitative methods. The popularity of qualitative methods within the foresight process is not surprising: after all, the foresight process is exploratory in nature and is informed by subjective judgments and interpretations of the expected changes (or lack thereof) that shape the future. Forecasting is more quantitative in nature, but it often requires many assumptions to be made regarding future developments, which, while creating a specific and unambiguous picture of the future, also risks creating a false security and false accuracy for the client if the future is (to a large extent) uncertain (WRR, 2020).

Within the PRO-SPECT approach, we identified 20 methods in total, most of them are more qualitative in nature. We have selected four or more possible methods per step, each answering a specific leading question. Table 1 provides a concise description of the "what" and "how" of each method and a suggestion of appropriate participants. For an in-depth practical elaboration of these methods, Koen et al. (2023) offers more detailed insights. Each step of the approach permits a range of methods, with the selection based on the problem statement, organizational context, and the foresight expert's tradition. The approach is inherently multi-method and iterative, meaning several methods may be utilized per step, and the selection of methods in a given step depends on the outcome of the preceding step.

The availability of resources such as time, budget, and expertise also influences the selection and tailoring of methods. Generally, a more thorough foresight process yields more valuable results. However, striking the right balance between time investment and maintaining momentum is crucial. A reasonable time for the process could range from two to four months, allowing for both thorough analysis and an efficient process (WRR, 2010).

1. *Scope:* This step involves establishing the foresight question, target group, time frame, and methodology. Methods for scoping include exploratory discussions with

policymakers, stakeholder analysis, baseline situation analysis based on existing data, and concept and definition delineation (EU, n.d.; Alder, 2021; Popper, 2008) (Table 1). For instance, stakeholder analysis workshops may be conducted to identify and involve relevant experts for consultation during the foresight study. Upon completion of the scoping step, a clearly defined goal, problem statement, and a shared understanding of the context are established. A conceptual model and time frame for the foresight study serve as guiding principles for the subsequent steps.

2. *Scan:* The second step entails identifying external developments (e.g., technological advancements, demographic shifts) potentially impacting the problem. The scanning phase involves data gathering through methods such as DESTEP analysis, literature review, quantitative research, expert interviews, Delphi technique, Horizon scanning workshops, or web scraping (Rastogi & Triverdi, 2016; TNO/RIVM, 2023; Popper, 2008; EU, 2020; Opeyemi, 2021) (Table 1). For example, DESTEP analysis involves consulting experts in interviews and workshops to compile a list of the most relevant external developments across six domains: demographic, economic, socio-cultural, technological, ecological, and political-legal. The outcome of the scanning process includes a shortlist of key external developments, an overall estimate of their impact on the problem, and an assessment of their uncertainty (e.g., regarding direction or pace). The selected external developments will be used in the following steps.
3. *Impact:* This step explores how external developments may affect the outcome measure and considers other relevant factors. The impact analysis utilizes methods such as expert consultation, driver mapping, extrapolating external developments from quantitative data, and developing future scenarios (Waverly Consultants, 2017; Popper, 2008; WRR, 2010; Smith & Saritas, 2011) (Table 1). For instance, driver mapping involves group discussions or workshops to determine the most impactful developments and their level of uncertainty. Impactful developments, the drivers, are mapped onto two axis "certain" and "important". For further scenario development, the two most important drivers can then be used to create a matrix of four alternative futures. Upon completion of the impact analysis, insights into the (potential) future impact of external developments on the outcome measure are obtained, and a set of possible future scenarios emerges.
4. *Perspective:* In the fourth and final step, action perspectives are provided through various follow-up methods to assist policymakers in making informed decisions and formulating strategies for future preparation. Possible methods include the 7 questions expert consultation, SWOT analysis, option planning using a Boston matrix, roadmapping, and wind tunnel test (Waverly Consultants, 2017; Linde, 2021; Smith & Saritas, 2011; Ruijter & Janssen, 1996; Van Asselt et al., 2014; Voros, 2003) (Table 1). For example, to develop action perspectives stakeholders and experts engage in sessions to collectively comprehend change dynamics. When conducting SWOT analysis, opportunities and threats across the different selected futures are identified, as well as potential areas requiring further attention.

Upon completing the impact analysis, action options in the form of strategic or policy options, elaborate roadmaps, or knowledge and innovation agendas are made available to the policymaker or client with the future question. Active involvement of the policymaker or client in this step is vital, as they play a central role in shaping the approach and fostering a joint learning process with stakeholders and experts (De Geus, 1988).

Table 1. Schematic overview of the methods used in each step of PRO-SPECT.

Step	Method	Brief description: what?	Brief description: how?
1. Scope	Exploratory discussion about a foresight question	Go over a fixed set of discussion points to scope the assignment with policymaker or client	Set of discussion points are at least: 1) Stakes (why the foresight study, what is at stake?); 2) Clarity (clearly scoped e.g. objectives, activities, time horizon); 3) Ownership (who takes ownership for the results?); 4) PEople (who works on the foresight study, which experts need to be brought in?)
	Stakeholder analysis	Identify and analyze stakeholders of an organization or project together with experts and the client	Identifying stakeholders for example in a group workshop: 1) brainstorming 2) mapping the stakeholders onto "influence" and "important" axis
	Analysis of baseline situation	Make a draft of the current situation with the input of experts, stakeholders, and the client	Analyzing existing data, literature, and initial exploratory interviews to identify the baseline situation
	Delineation of concepts and definitions	Define the most important concepts and making the links between them visible in a framework	Creating a supporting conceptual framework in which the most important concepts are presented in relation to each other
2. Scan	DESTEP	Overview of possible external developments categorized into six domains: demographic, economic, socio-cultural, technological, ecological, and political-legal	Creating a shortlist of the most relevant external developments based on interviews with experts
	Literature review	Literature review of various documents: scientific literature, gray literature and documents from the sector or organization itself	Gaining insight into the future that a sector or organization may face by analyzing literature
	Quantitative research	Analyses of existing data, such as from Eurostat, Statline (CBS)	Identifying developments over the past few years and reveal the relationship between various external developments
	Consult experts – Interview	Confidential conversation with one or two individuals from an organization	Obtaining views, opinions, and perspectives on future developments
	Consult experts – Delphi technique	Semi-quantitative technique to gather and synthesize expert opinions on a specific topic	Gathering and synthesizing expert opinions through questionnaires in multiple rounds, aiming to reach consensus among experts

	Consult experts – Horizon scanning workshop	Cluster and rank information about possible external developments	Gathering information about developments in the field from a group of experts in a short period of time
	Web scraping	Identify developments and discover weak signals from the web	Collecting large amounts of data automatically from web sources
3. Impact	Consult experts	Using various methods, submit developments to experts and collect the expected impact	Gathering expert opinion on the impact of external developments on outcome measures in various forms
	Driver mapping	Determine the most impactful external developments and the extent to which they are (un)certain with the input of experts, stakeholders, and the client	Group discussion/workshop to determine and analyze the most impactful developments: 1) brainstorm; 2) mapping the drivers onto "certain" and "important" axis
	Extrapolate developments from quantitative data	Using quantitative data to gain insight into the anticipated development and impact of external factors	Identifying trends and make projections for the future from historical data, if desired with upper and lower limit taking the uncertainty of the future into account
	Developing future scenarios	Formulate alternative futures based on the selected external developments with the input of experts, stakeholders, and the client	Combining the two (most uncertain and impactful) developments creates a matrix of four alternative futures as a basis for further scenario development
4. Perspective	Consult experts- 7 Questions	An interview technique for collecting desired futures and policy options (*adjusted to foresight purposes*)	Identifying different perspectives on a desired picture of the future, threats, opportunities and (strategic) next steps
	SWOT analysis	Provide insight into how prepared the client (sector, target group or organization) is and into the factors that should be considered when developing policy or strategy	Identifying the Strengths, Weaknesses, Opportunities and Threats per future scenario with the input of experts, stakeholders, and the client
	Option planning	Assess different policy options in the context of different scenarios with the input of experts, stakeholders, and the client	Scoring how positive policy option will be in scenarios using a Boston matrix, expressed from - (bad idea) to ++ (very good idea in a crosstab
	Roadmapping	Create a holistic picture of all developments with links and relationships between different elements on a timeline with the input of experts, stakeholders, and the client	Plotting all the input from scanning and impact together with experts in workshops to see how it influences a policy area

	Wind tunnel test	Test whether current policies are robust with different scenarios with the input of experts, stakeholders, and the client	Running multiple policies through different future scenarios also with wildcards: (low-probability events with very high impact, e.g., pandemic)

Source: Authors' elaboration.

Note. More detailed descriptions can be found in Koen et al. (2023).

6. Discussion and conclusions

This article highlights foresight as a valuable method to explore multiple possible futures, acknowledging the substantial uncertainty that surrounds the future of work and the labor market. We have developed and discussed the modular PRO-SPECT (PROfessional Sectoral perSPECTive) approach, a systematic and evidence-based method to explore future possibilities related to work and the labor market at various levels, specifically aimed to align with the goals of sectors and (smaller) organizations. Although PRO-SPECT is aimed to equip stakeholders with actionable insights for the future of work, it may also be useful for other domains. The PRO-SPECT approach comprises four main steps: Scope, Scan, Impact, and Perspective. Each step involves specific methods to respectively define the problem, gather data, assess potential impacts, and present action steps and perspectives to policymakers and organizations.

While the development of the PRO-SPECT approach is founded on a comprehensive analysis of existing foresight methods aimed at ensuring replicability and manageability, it is essential to acknowledge that the four-step framework is not exhaustive. One notable limitation is the challenge of capturing the full complexity of dynamic systems in foresighting, partly due to gaps in available data and ever-changing circumstances, leading to potential inaccuracies in foresight outcomes. Moreover, foresight heavily relies on assumptions and subjective judgments made by researchers and decision-makers, which can significantly impact the validity and reliability of the findings. To mitigate this, it is crucial to carefully select highly qualified experts who can think creatively and unconventionally, as their imaginations play a critical role in constructing future scenarios (Voros, 2003). Additionally, decision-makers must be able to effectively interpret and utilize the foresight research outcomes to translate them into actionable insights and decisions in practical settings. Foresight outcomes should not be used as a given future truth, but rather as insights that support the exploration of possible futures and future scenarios.

Furthermore, it is important to note that our literature review, although conducted with diligence, was limited in scope, and may have potentially overlooked certain information sources.

The PRO-SPECT approach can be used by several actors, such as research institutes and (smaller) companies. For instance, our approach could be employed to explore how future scenarios entailing collaborative styles such as human–machine cooperation and smart virtual learning may impact skill demand (also see Ahmad, 2000). This, in turn, can be used by policymakers, local authorities, employers, academics, and researchers to set up future-oriented education and training policies to bridge the gap between skills demand and supply (Touahmia et al., 2020). Yet, given our specific choice of methods underlying each step in the PRO-SPECT approach, its primary application lies at the sectoral and organizational level.

Moving forward, our next steps involve refining and expanding the approach through practical testing. Already, the PRO-SPECT approach has been employed in the study conducted by Preenen et al. (2023) within the EU Horizon 2020 GI-NI project (Growing Inequality: a Novel Integration of transformations research) to develop future scenarios. In this project, the PRO-SPECT approach provides a method of preparing for the uncertain future of skill demand in Europe and worldwide, by examining the combined effect of technological change, globalization, and migration. In one such scenario, for example, globalization and digital transformation both accelerate by 2030, resulting in an increasing flow of goods, services, and investment across

borders as well as a vast technological growth that reshapes all sectors. Following the PRO-SPECT approach, the impact of each (combined) drivers on future of skill demand within the four scenarios will be explored next.

It is important to note that the PRO-SPECT approach has value once (and only if) the policy within an organization or sector can actually be adjusted based on the findings. We have therefore designed this foresight approach in such a way that decision-makers can actively participate from the start. However, their participation in the process is just as important as it is in the results: clients and other stakeholders should also view the foresight process as a joint learning process, in which active participation is required to gain insight into external developments and their impact (De Geus, 1988).

Our overarching goal was to create a first accessible approach that organizations can utilize with minimal or no guidance from foresight experts. To advance this, we aim to develop a decision tree in the near future that facilitates the selection of appropriate methods based on specific questions. Additionally, we will explore the possibility of establishing a 'minimum viable approach' for certain issues, allowing for scalability depending on the time and budget constraints of clients.

It is important to emphasize that while the future cannot be predicted with certainty, our approach endeavors to contribute to proactive preparedness for potential future scenarios. For instance, in the context of our example, we seek to contribute to a healthy future labor market in the future. Ultimately, our aspiration is to foster the advancement of action research in future preparation by establishing PRO-SPECT as a valuable and adaptable methodology. We hope that this article will inspire others to embrace, explore, and build upon PRO-SPECT, thereby enriching the collective knowledge and driving meaningful progress in the field of foresight.

Overall, the PRO-SPECT approach is a valuable contribution to the field of foresight and can help organizations and policymakers navigate the complex and dynamic landscape of the labor market with greater resilience and preparedness. By embracing foresight and engaging in future exploration, society can better anticipate and respond to the challenges and opportunities that lie ahead in an ever-changing world.

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