

REVIEW

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Development tendencies and turning points of futures studies

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Abstract

In honor of its 50th anniversary, the World Futures Studies Federation (WFSF) held its XXV World Conference in Paris. The conference provided a venue for reviewing earlier developments and reevaluating prospective directions in the futures field. Scientific-based futures studies has a long history, drawing from a variety of fields including sociology, policy sciences, philosophy of science, economic prognostics, and environmental sustainability. Futures studies became widely acknowledged as an academic discipline in the 1960s when it became evident in the global scientific community. The 1970s saw a focus on global challenges and discussions about preferred futures. The synthesis of futures studies emerged in the 1980s and 1990s, with critical and evolutionary approaches contributing to the advancement of theoretical foundations. The twenty-first century focuses on anticipation and futures literacy, the development of post-normal, metamodern, and integral approaches, and the attainment of foresight in common practice. Future research is expected to focus on various aspects, including artificial general intelligence (AGI), socio-technical transitions, singularity, sustainability, societal collapses, entrepreneurial innovation, energy futures, decolonization, negation and post-prefix notions, systemic foresight, applied foresight, and on-site foresight. Future research activities are expected to also include research objects, policy challenges, and problems that do not yet exist.

Keywords Futures field, Futures studies, Foresight, Development history, WFSF

Introduction¹

The World Futures Studies Federation (WFSF), which is today the most significant professional association in the futures field globally, held its XXV World Conference in Paris on October 25–26, 2023, to commemorate its 50th anniversary. It was a chance to celebrate by going back to Paris, the birthplace of WFSF in 1973. The conference's events were planned to look back on the previous 50 years and talk about the coming 50 years in honor of WFSF's 50th anniversary. Living in liminalities was the

main idea behind this, since liminal spaces are frequently found in between pasts and futures. All things considered, the conference offered a solid platform for discussing past developments and reevaluating where and how to proceed in the futures field. This article, which was part of the conference presentations in Paris, offers an assessment of the futures field's development patterns and turning points as well as a summary of its future research directions.

Review articles that present the futures field as synthesized from multiple angles have been published, particularly since the 2010s. A paradigm-based evolutionary study was presented by Kuosa [70], and Son [125] offered an incredibly thorough historical review of futures studies. Fergnani [32] completed a bibliometric review article using a thematic approach based on the top ten selected journals. Saritas et al. [114] used a similar approach to study foresight via science mapping. Amini et al. [2] and Marinković et al. [81] published in-depth reviews of

¹ This article pays tribute to Theodore Jay Gordon, one of the most significant global think tanks in the history of the futures field, with the deepest sympathy.

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corporate and regional foresight, respectively. One could argue that all of these referred review articles succeeded in properly identifying research trends and clusters, periodizing the milestones, and formulating research directions for the futures field that take into account research gaps. This article, however, employs a different logic and expands upon the development tendencies and turning points that have been examined in futures studies.

The phrase ‘development tendency’ is used in this article as a synonym for ‘development trend’ which describes the general advancement or evolution of futures studies as a field across time [70]. On the other hand, a ‘turning point’ denotes a period of major change. Additionally, it marks the beginning of a significant shift in the circumstances [5]. The following research questions (RQ) about development tendencies and turning points have been developed to aid in the completion of this review article:

- RQ1: How have the dynamics and primary research trends of futures studies evolved over time in relation to other disciplines?
- RQ2: Over time, which theoretical schools made up the theoretical and epistemological foundations of futures studies?
- RQ3: Which institutions have had the greatest long-term influence on the futures studies community?
- RQ4: What were the most significant shifts and changes over time for futures studies?
- RQ5: What future research directions can be envisaged for the futures field?

Since futures studies has evolved over the course of almost a century, a thorough assessment of a few significant, selected scientific publications was part of the research methodology used to write this article. While the abundance of publications in the futures field is a positive development, it is challenging to conduct a thorough analysis of the development trends in the field due to the vast volume of sources available.

The development prior to the launch of the first major scientific journals in futures studies at the end of the 1960s could be presented via the findings of a few influential books and volumes that were available at the time. Subsequently, when assessing notable discoveries, trends, and changes in the ensuing times, the significance of journal articles in the processed sources has been rising decade by decade. Based on examined research gaps and trends, future research directions have been determined, for which recent scientific discourses in the WFSF have also been employed.

This research can be positioned in scholarly works as a review article that analyzes historical development milestones in a chronological manner. In light of this, the

article is divided into six sections, which are as follows: 1) foundations and preliminary work in the 1910s-1940s; 2) development as an academic discipline in the 1950s and 1960s; 3) globalization and transformation in the 1970s; 4) maturation as a discipline in the 1980s and 1990s; 5) foresight and anticipation in the twenty-first century; and 6) future research directions for the futures field.

Foundations and preliminary work in the 1910s-1940s

While the idea of the future has always been present in human history, scientifically grounded futures studies first appeared in the twentieth century. Drawing from the literature that is currently accessible, one could contend that the first scientific investigation into the future was carried out by American foregoer sociologists. Gillfillan [45] made the case for interdisciplinarity, described the need to develop alternative scenarios based on extensive historical information, and cautioned about extrapolations. Simultaneously, Ogburn [101] stressed the need for a society to consistently offer a quantitative image of itself that allows one to determine how it developed, when it started, and what decisions are required to reach a more advantageous stage from a longer-term viewpoint. The conceptual and methodological foundations of social and technological innovation analysis were also made possible by these pioneer sociologists. These are a reflection of the early, trailblazing work in the 1930s on planning, social policy, technology, social change, and technology assessment. Among these most significant contributions is the insistence that social scientists have a lot to offer in the way of helping to formulate social and technological policies [27]. Technology and social changes are still major issues in today’s world, but the amount of social science research on these vital subjects is surprisingly low.

American policy scientist Lasswell [74] is another person who invented futures studies by developing a groundbreaking futures thinking technique that became the widely used ‘developmental construct’ approach. It examined possible and probable futures under the assumption that current policies would be followed, and it made the case for the adoption, assessment, and choice of alternative policies in order to achieve desired futures for society.

Following World War I, national planning systems in developed nations were established to prepare for the future, adding value to the basis of futures studies [82]. It ensued in economic mobilization during World War II and the post-war planning efforts by looking forward several years [8]. Furthermore, system analysis and cybernetics significantly influenced futures studies, particularly in the United States (US) [117].

All things considered, one could claim that the primary trend in this era of development was the emergence of futures studies, while the introduction of systematic futures thinking was a revolutionary moment in the social sciences. Nevertheless, after protracted discussions, it is reasonable to draw the conclusion that futures studies was able to diverge from mainstream sociology for a variety of reasons and did not merge with the political sciences.

Development as an academic discipline in the 1950s and 1960s

The 1950s and 1960s saw the establishment of a professional knowledge base for futures studies as well as the rationalization of futures thinking by providing the scientific foundation for forecasting [19]. It was greatly impacted by Cold War military strategic thinking, which demanded effective processes to support intricate planning and forecasting operations. The US-based RAND Corporation emerged as the foremost organization in the 1950s for implementing systemic futures thinking and incorporating expert opinion-based techniques into forecasting. Kahn [68] presented the first application of scenarios in futures studies with major policy implications, exploring potential outcomes of nuclear conflict.

Theoretical and epistemological foundations of futures studies began in the 1950s-1960s. At that time, the positivist philosophy of science was prevailing worldwide, however, strengthening critiques already began to breach the foundations of the positivist approach. Popper [108] argued that historicism constituted the social sciences' methodology, with the ultimate goal being to predict history through an examination of the innate rhythms, patterns, rules, and tendencies that exist within it. Futures studies made an effort to focus on technology and economic forecasting [50], despite the fact that a few criticisms influenced mainstream scientific predictions even at that time. This was done in an effort to match the scientific requirements of the period. Looking back, it is clear that the primary issue was not meeting the strict criteria of positivist methodology and over-empiricism, but rather the widely accepted explanation theory that equated event prediction and explanation [1]. As a result, a lot of academics claimed that futures studies was the science of a predicted and controlled future [21].

Since then, futures studies has developed along different paths and in distinct historical contexts in several non-English speaking nations. It provided the field with a unique, worldwide perspective.

France served as the impetus for futures studies in this period across Europe. The theoretical foundation for futures studies in France was established by De Jouvenel's exploration and elaboration of the concepts of

'conjecture,' 'futuribles,' and possible futures [26]. Using conjecture as a mental construct in relation to the past and present allows us to view the future based on plausibility. It also implies that we should consider the future in terms of what is feasible rather than in terms of what is deterministic. Different future scenarios are envisioned, some of which are desirable, some of which are feasible, and some of which are likely [48]. De Jouvenel [26] repeatedly and unequivocally declared that the future cannot be known, rather, it can only be speculated upon in different words, and as such, it cannot be regarded as a science but rather as an art. According to Berger [11], building projects occur during operating time. This concept of building projects is closely related to the term 'prospective,' which indicates taking into account both the past and the present as well as the decision made in the present between multiple possible futures. By incorporating choice, action, and the suggestion of change, Berger's explanation of how the future is planned builds upon De Jouvenel's way of looking at alternative futures. Since then, prospective has become the most often used concept in the French- and Spanish-speaking nations.

The futures field in Eastern Europe initially adopted the characteristics of the Soviet model, in contrast to the evolution of futures studies in the West [125]. Traditional Marxism's deterministic idea served as the basis for it. Long-term forecasting and strategic planning were prioritized [99]. Futures studies served as a policy-making guide and component of centralized national development programs aimed at promoting economic growth [100].

Futures studies in Latin America was initiated with a linear conception of reality, with only minor temporal differences. As long as it has been nourished by the seeds of futures studies projects carried out in the US and Europe, futures studies has been sprouting throughout Latin America [92]. Futures studies has been successful in Latin America as well because it has stuck to the alternative reality vision when examining scenarios that were imaginative and inventive in both design.

The discipline's increasing influence on a global scale was shown in the formation of professional world federations. The World Future Society (WFS) was established in 1966, and the World Futures Studies Federation (WFSF) was subsequently founded in 1973. The WFSF's founders met for the first time in Oslo in 1967. A few decades later, in order to represent practitioners and emerging futurists, the Association of Professional Futurists (APF) was founded in 2002.

The two scientific journals that have been consistently the most influential since their founding were *Futures* (1968) and *Technological Forecasting and Social Change* (1969). Prestigious Scopus and Web

of Science (WOS) indices have been reached by both journals. A few decades later, the importance of the *Journal of Futures Studies* (founded in 1996), *Foresight* (published in 1999), and the *European Journal of Futures Research* (published since 2013) is then further highlighted. Each of these journals' establishments was driven by a distinct set of motivations. These journals have consistently documented the theoretical, methodological, practical, and advancement issues as well as the field's progress, resulting in a vast accumulation of futures know how. The following journals have published additional significant futures studies products: *On the Horizon*, *The Futurist*, *Policy Futures in Education*, *International Journal of Forecasting*, *Long Range Planning*, *Journal of Forecasting*, *World Futures Review*, *Futures Survey*, *International Journal of Foresight and Innovation Policy*, *Foresight and STI Governance*, and *Futures & Foresight Science*.

Beginning in the 1960s, futures studies was also incorporated into master's (MA) and doctoral programs in education. Toffler educated the first futures studies course at the New School for Social Research in 1966 under the title 'Social change and future', and the first doctoral program in the discipline began at the University of Massachusetts in 1969 [102]. The University of Houston-Clear Lake launched the first MA program in futures studies in 1975, which was renamed 'foresight' in 2007 [12]. In 1971, the Hawaii Research Center for Futures Studies was founded. It is one of the most well-known organizations in the world for futures research, consulting, and teaching, as well as for providing organizations, agencies, and companies worldwide with foresight and futures thinking [25]. A few decades later, in 2010 and 2012, respectively, the Free University of Berlin (Germany) and the University of Turku (Finland) launched the first MA futures program on the European continent.

The growth of full-time researchers and communities worldwide further demonstrated the institutionalization of the discipline [8]. Notably, there are many other professionals working in this field who do not consider themselves futurists, including social scientists, policy analysts, risk managers, consultants, and economic forecasters. It displayed the initial indications of fragmentation within the futures field [55].

Overall, the dominance of the positivist scientific method, which aimed to provide scientific predictions, was the primary development tendency of this age, while it was a turning point to put futures studies into the field of academic disciplines. The fundamental pillars of the discipline had been laid by the end of the 1960s, and institutionalization had started to have a lasting effect.

Globalization and transformation in the 1970s

Futures studies placed a strong focus on societal change, alternative world futures, and fast-paced globalization in the 1970s. Global futures, the creation of preferred futures, and the increased penetration of futures studies into the corporate domain were the main topics of future discourses. Futures studies underwent a conceptual makeover, moving from a West–East, technologically driven viewpoint to a global, human-centered one. In addition to being impacted by events of the 1970s, the futures field enhanced crisis perceptions and environmentalism, which in turn contributed to cultural and societal change [116]. The foundation for ideas of sustainable development was then established by futurists' emphasis on the relationship between the environment and development.

The focus of mainstream futures studies shifted to the emergence of the post-industrial economy and society as a result of the socioeconomic transformation to the information society. This shift was expressed in the highly regarded classic trio publications [6, 129, 130]. Futures studies adopted novel approaches to offer alternatives in the face of population growth, natural disasters, security, and disparities between the Northern and Southern hemispheres [10]. Kurzweil [72] later published one of the most revolutionary theories about how information technology (IT) is affecting society and humanity.

The best-selling *Limits to Growth*, which was first released by Meadows et al. [84] and then revised twenty and thirty-two years later [85, 86], was another example of a great trio in the futures field. The Club of Rome, which was established in 1968, used computer simulations to highlight the risks associated with status quo circumstances. The limits of the planet's sustainability as a result of unsustainable resource consumption, population increase, and environmental pollution were thus given priority. Peccei's notion of the problematic, according to which it is ineffective to consider human problems in isolation, served as the inspiration for the founding of the Club of Rome [30].

The Club of Rome overcame the shortcomings of its first world model in 1974, which divided the world into ten distinct regions instead of a single global magnitude. This increased the model's flexibility by enabling the investigation of potential future options. Moreover, it established itself as a tool for decision-making, inviting interaction from the observer [87]. Tinbergen [128] placed more emphasis on development, distribution, and higher welfare levels than earlier reports given to the Club of Rome, which required a manageable level of economic growth. Leontief [75] examined the environmental implications of the global economy, offering a range of alternative scenarios for the world's

population, economic growth, and environmental conditions in the ensuing decades. Growth does, in fact, have limits, but they are more influenced by social than by physical factors, claims Hirsch [60]. According to Botkin et al. [14], new approaches to education and learning are especially important for addressing global issues and bridging the gap between the risks and complexity of these issues and our inadequately developed capacity to address them. According to Pauli's [105] research, the blue economy study revealed that industrial processes could be modified to incorporate cleaner and simpler technologies.

During this time, futures thinking became more and more prevalent in the formulation of company strategies. According to Dror [29], futures studies has the potential to make a substantial contribution to corporate strategy management by fostering the formation of novel mindsets and offering crucial information for decision-making. The United Nations Industrial Development Organization (UNIDO) released a very comprehensive technology foresight handbook for businesses, building on research efforts that began in the 1970s and offering futures and strategies for strategic planning to help companies meet the challenges of an uncertain environment [133].

A significant oil crisis that struck in 1973, a year after the release of *Limits to Growth*, called into doubt the viability of conventional economic predictions for the future and drastically altered futures thinking [135]. Global modeling projects were therefore funded in the 1970s and 1980s by a number of national governments, UN agencies, academic institutions, and research centers, with the main goal being the development of future alternatives for population, resources, environmental pollution, poverty, industries, and emerging technologies [17].

By the 1970s, a number of academics claimed that positivism could no longer be considered a credible theory of knowledge creation in the context of futures-related theoretical research activities [137]. Postpositivist and post-modern perspectives began to spread. These schools showed promise at first because they tried to go beyond positivism's constraints and helped to acknowledge the alternative interpretation of futures and the agency and locality's role in shaping those futures. They did not, however, succeed in becoming the theoretical foundations of futures studies because they fostered skepticism, destructiveness, contradictions, and intellectual anarchy [111]. Moreover, while their strict representatives unquestionably lived in the present, even the softer postmodernists rejected the policy-oriented futures thinking [8]. As a result, philosophy of science started to go in new directions known as 'creative chaos' [98]. Post-postpositivist schools have arisen.

In conclusion, the establishment and global dissemination of global and social futures can be seen as the primary development tendency of this period, while the widespread adoption of scenario planning and the debunking of conventional scientific predictions marked a turning point. During this time, there was a scientific revolution with the goal of finding new paradigms for the futures field.

Maturation as a discipline in the 1980s and 1990s

Futures studies became the embodiment of a global institutional system by the 1980s. In a number of publications, futurists provided a thorough summary of the discipline's developmental history by defining the underlying presumptions, goals, principles, and points of view of futures studies [16, 80].

Naisbitt [95] highlighted the role that futures studies plays in monitoring. Ten distinct megatrends were elaborated to shape the US's future based on trends that were identified, investigated, and closely watched. Ten new megatrends were discovered after a similar research project was conducted again at the start of the 1990s [96].

Block security and homogenous Eastern and Western social structures were the cornerstones of visions that came to an end with the collapse of the bipolar, capitalist-communist world system in 1989–1990. Furthermore, the change has made voluntary integration and the investigation and articulation of alternative visions for the former socialist countries possible, as opposed to coerced and incompatible cooperation. While a deeper comprehension of the upcoming era was necessary for the renewal of futures studies during that time, new methodologies were required for the investigation of the global world. The 'transition paradox' is the name given to this problem [39].

Slaughter [118] developed a conceptual framework in recognition of the lack of social validation of futures studies and in order to support future research in the field of social capacity. It envisioned a desirable future that may be conceivably achievable if futures studies continued along this path from individual to social capacity. Moreover, Inayatullah [62] made an effort to connect alternative futures with macrohistory. Gidley [44] clarified that, in contrast to many other academic fields, futures studies not only permits but also actively encourages the discussion of ethical, moral, cultural, and other values.

Thoroughly developed theoretical conceptions, methods, empirical findings, ethics, and institutions are essential for any academic discipline. By the 1990s, all of these pillars were in place, so we can say that the field of futures studies was well-established. Many extensive publications from that era summarized the findings of earlier research and assessed the achievements resulting from initially

stated goals [71, 82, 119, 131]. These comprehensive, referred publications provide an in-depth overview of all major pillars. Therefore, one could argue that futurists had established globally shared and applicable characteristics by the 1990s, making it a mature discipline, which Bell [8] eventually assembled into an incredibly comprehensive publication.

Nonetheless, a discernible trend was observed in the enhanced fragmentation of the field. Marien [79] provided evidence of fragmentation and concluded, based on surveys conducted, that the majority of futurists are either secondary futurists or non-futurists who pass for futurists.

During this time, the critical realism and the evolutionary schools of thought were the two most significant theoretical movements for the futures field.

The culture of critical discourses that stresses the value of generating future knowledge based on assumptions while acknowledging the limitations of certainty-based knowledge is known as critical realism [94]. Critical realism acknowledged that all scientific fields involve some degree of presumptions and qualitative judgment, and plausibility is frequently the best outcome that can be obtained in scientific research through a variety of routes, utilizing a variety of techniques and methods [7]. In order to maintain epistemological cleanliness, Inayatullah [64] suggested that applied assumptions have to be disclosed within the context of foresight exercises. Slaughter [122] claims that as a result, the evident past, present, and non-evident future are to be handled cohesively. Futures literacy can be developed and communicated in a variety of social contexts in an ongoing, reflective manner. Therefore, it is possible to interpret the future as existing in the present in a contingent, unconscious, and emphatic way [58].

The evolutionary approach rejects the idea that there would be a single, cohesive theory and instead highlights the diversity of philosophical perspectives found in scientific schools [140]. Science is pluralistic because it embraces both the past and the future [42]. The holistic viewpoint and the concurrent use of qualitative and quantitative methods in futures studies follow from the evolutionary approach [77]. All knowledge of the future is reflective knowledge in the present that can only be partially falsified, but can be used as a subject for additional reflections [56]. As shared values in futures studies, participation, dialogues, and democratic processes make collective futures literacy feasible [25]. The social epistemology approach within the evolutionary framework can effectively contribute to alternative interpretations [49].

As a major global futures community, the Millennium Project (MP) started operations in 1996 with the goal of enhancing human potential for building a better future

[52]. Many of the global futures covered in MP's State of Future publication have been chosen as the best futures product of the particular year [46]. MP has updated this publication on a regular basis. The most comprehensive, peer-reviewed compilation of futures methods and tools has been published thus far by MP [47].

Scenario planning has been used for many years, wherein studies on strategic management had a major influence on its refinement in the 1990s. Schwartz [115] published a comprehensive methodological handbook on implementing scenario planning and futures thinking in corporate strategy formulation. Bishop et al. [13] carried out a comparative analysis of twenty-two scenario strategies ten years later, in seven categories. Every effective manager's toolkit now includes scenarios [31]. With the use of scenarios, we may change the way we relate to one another and ourselves, which in turn changes the systems we are a part of [67]. According to Neumann and Øverland [97], there has been a rise in the use of scenario processes in the areas of organizational development, competency and human resource development, major reform work, strategy formulation, and learning. Petersen [107] provided a thorough analysis of using 'wild cards' with several real-world examples that could have a major impact on future events worldwide.

Dator [22] conducted a systematic evaluation of educational experiences and challenges in the futures field. This study's findings suggest that the theoretical, methodological, and practical knowledge foundation of the discipline can also be found in internationally recognized curricula, adding to the body of academic literature for further research.

While novel road seeking at the turn of the millennium envisioned several turning points, the main development tendency in this era has been the synthesis of futures studies. The theoretical underpinnings of futures studies have advanced significantly thanks to the contributions of critical and evolutionary approaches.

Foresight and anticipation in the twenty-first century

Slaughter [121] argues that due to the excessive use and limited applicability of many futures methods, futures studies should prioritize strategic foresight. Slaughter (ibid) argued that futures studies should transition from a theoretical approach to a practical field. It encompasses the creation, upkeep, and efficient implementation of a proactive mindset. It provided a novel basis for the field of futures studies, enhancing its robustness, applicability, and durability beyond its previous widespread recognition. Subsequent years have demonstrated the prevalence of this perspective during the 2010s and 2020s. Foresight practitioners introduced a strategic planning dimension

to futures studies that was largely absent in traditional futures studies. The term 'strategia sapiens' refers to the need for strategy development to be focused on foresight and driven by direct values [38].

In their study, Gordon et al. [53] identified novel approaches to enhance the utility and value of futures studies. The strategies encompassed methods to reduce the scope of uncertainty, accommodate uncertainty in decision-making by improving comprehension of psychological factors that contribute to irrational choices, and explore the possibility of incorporating emerging technologies and social data into futures methodologies.

Programs and projects associated with foresight can be executed through various methods, encompassing a diverse array of objectives and scales, as elucidated subsequently. These methods have become widespread in publications and practice related to futures and foresight during this period.

- In order to enhance the quality of policy decisions, the concept of 'technology foresight' is widely recognized as a systematic approach that examines the future trajectory of science, technology, and innovation over an extended period of time [89].
- The concept of 'corporate foresight' refers to the utilization of foresight practices in order to facilitate the growth, mission achievement, and predetermined success of an organization [81].
- The objective of 'environmental foresight' is to provide a systematic framework for evaluating the potential future impacts of emerging environmental issues, thereby enhancing existing decision-making techniques [9].
- Portaleoni et al. [109] assert that the implementation of 'national foresight' programs functions as a mechanism for the coordination of science, technology, and innovation policies, while also enabling the nation to effectively address uncertain and dynamic circumstances.
- Amini et al. [2] consider 'regional foresight' to be a crucial strategy for regional planning, aimed at enhancing the ability to manage change and uncertainty.
- The objective of 'sectoral foresight' is to facilitate communication among actors within a specific sector and among innovation systems that are interconnected within that sector [37].
- Finally, as stated by Miemis et al. [88], the concept of 'open foresight' is utilized as a framework for collaborative web-based foresight initiatives.

Hines and Bishop [59] published a handbook that provides a comprehensive account of the experiences of various practitioners. The primary objective of this

publication was to enhance the efficiency of strategic foresight projects. The 'black swan' approach effectively illustrated the limited understanding among practitioners and theorists regarding the future they envision [126]. Weiner and Brown [138] conducted comprehensive examinations of prevalent methodological errors in the field of futures thinking.

The establishment of the Institute for Islamic World Futures Studies (IIWFS) in 2009 clearly demonstrated the increasing prominence and formalization of Islamic futures studies. The objective is to strengthen the trends and forces that are leading to a better future for the Islamic world by promoting unity and convergence among Islamic nations. This will be achieved within the undisputed power bloc of the global community [61].

During the 2010s and 2020s, there was a significant focus on the implementation of a wide range of foresight projects that were both diverse and valuable. The field of futures studies has experienced a notable shift in emphasis towards business, resulting in comparatively less attention being given to subjects such as humanity's future, social interests, shared values, and future generations [125]. The practical application of foresight has enhanced the efficacy of futures studies as a strategic management tool. The importance of adhering to research methodologies and establishing a strong framework for futures thinking is increasingly prominent in modern foresight activities [103]. Furthermore, a significant number of futurists direct their attention towards feasible and limited domains, thereby reinforcing the idea that the field is even more fragmented than it was in the past [70].

In the futures field, theoretical academic conversations have been primarily focused on post-normal, metamodernist, and integral futures approaches. Among these approaches, integral futures has produced the most extensive and well-documented scientific findings.

The post-normal stream adopts a heuristic methodology when confronted with scientific challenges that cannot be consistently addressed using conventional scientific methods [36] or when the problems cannot be resolved through experimental technical expertise [112]. Continual stakeholder conversations are necessary for post-normal research activities, and this approach can also generate solutions [110]. The theoretical and epistemological foundation of the post-normal approach has gained significant recognition in the futures field. This approach involves the examination of problem-solving strategies in a dynamic manner, necessitating flexibility throughout different stages of foresight [136]. According to Fergnani [33], the field of futures studies is well-suited for the post-normal approach due to its ability to provide compelling arguments for prioritizing interdisciplinary

research and fostering a more profound comprehension of uncertainty.

Metamodernism is an innovative approach within the realms of human and social sciences, employing post-modern skepticism to delineate a comprehensive hypothetical framework that facilitates the investigation of novel pathways for knowledge acquisition and advancement [3]. Fergnani and Cooper [34] introduced the concept of metamodernism as a collective framework of principles within the realm of futures studies. It promotes the cultivation of a metamodern approach to anticipating future events, which entails creating, evaluating, and comparing various normative futures of civilization, including those that are considered meta-modern. Freinacht [35] posits that in the normative metamodern future, humanity will be compelled to address existential crises by collaboratively resolving contradictions and modern-postmodern conflicts. Metamodern foresight, as defined by Fergnani and Cooper [34], involves the creation, evaluation, and comparison of different metamodern policy configurations with both non-metamodern and metamodern futures.

The integral futures paradigm has emerged as a prominent theoretical and methodological contribution within the field of futures studies during this period [57]. Since Slaughter's [120] groundbreaking publication, integral futures has demonstrated its suitability as theoretical and epistemological foundations for both theoretical and practical research, as well as for improving futures methods. The contemporary practice is informed by the application of Wilber's integral theory [123] and the four-quadrant model [139]. In order to accomplish this task, it is advisable to utilize the seven essential competencies outlined by Jakonen [66]. Integral theory prioritizes the incorporation of various perspectives, approaches, and methodologies when studying a subject [18]. Slaughter [124] made substantial endeavors to establish integral futures as an institutional framework. The positive results observed in the past twenty years suggest that incorporating integral futures should be a fundamental aspect of both foresight research and practical applications.

The anticipatory systems theory has emerged as a prominent endeavor over the last decade, with the objective of elucidating the utilization of futures [90]. It assumes that anticipation exists in the present, even though the future does not [91]. Its objective is to uncover concealed and unexplored possibilities and regards the incorporation of the future as the basis for linking theories and practices [132]. Futures literacy refers to the ability to effectively utilize the future in diverse manners and for a multitude of objectives [36]. In order to cultivate future literacy, individuals must engage in introspection regarding their interactions with

the future and the potential contributions that diverse perspectives can make towards future-oriented endeavors [78]. According to Andersson [4], the initial stages of developing futures literacy involve engaging in introspection regarding one's personal perspective on the future, comprehending the attitudes and power dynamics of others, and cultivating an awareness of alternative attitudes. According to Mangnus et al. [78], futures literacy reflexivity encompasses the ongoing examination of our interpretation, planning, and response to the future, as well as the manner in which it shapes and constructs the world, and how we ascribe significance to our present actions. Collectively, these factors contribute to a broader range of comprehensive future scenarios, the depictions of which can provide valuable insights for decision-making in the present moment.

Overall, it can be argued that the main development tendencies of this era are the elaboration and dissemination of post-normal, metamodern, and integral approaches, the realization of anticipation and futures literacy, and the attainment of foresight in widespread practice. The practical breakaway from the academy in the field can be seen as a turning point.

Future research directions for the futures field

The 21st-century life is being significantly influenced by artificial general intelligence (AGI), machine learning (ML), big data, and robotics [41]. The development of AGI and related futures will have a profound impact on the world [83]. Dator [24] argues that AGI holds a distinct position in futures studies due to its potential to propel the field forward and expand its knowledge base in unprecedented ways. It is imperative to acknowledge, however, that although current AGI techniques may demonstrate efficacy in generating short-term predictions, they often yield outcomes that are deceptive when contemplating a more extended temporal scope. There is a strong likelihood that futurists and researchers in the field of AGI will face substantial challenges in the future that necessitate attention, alongside the resolution of ethical considerations [28].

The concept of singularity is a significant matter raised by AGI. The term 'singularity' refers to a hypothetical future where AGI and related technologies exceed human understanding at an inevitable critical juncture, with significant consequences for society [51]. According to Kurzweil [73], the technological singularity is expected to happen prior to 2045.

Vähäkaria et al. [134] proposed the incorporation of futures studies into the field of sustainability by adopting a multi-level approach to socio-technical transitions. Although there is currently a lack of research on the integration of climate change and the transition to

sustainability, these subjects are highly significant in the field of social sciences as a whole, and particularly in the realm of futures studies. Consequently, it is expected that these research endeavors will garner increased attention in subsequent periods.

The study of social collapses has gained significance within the field of futures studies due to the potential implications of climate change on the potential collapse of human civilization [15]. It is expected that there will be a continued increase in interest regarding this trend in the future.

According to Øverland [104], it is recommended for futurists to avoid the dominance of environmental and climate policies, which are presently significant areas of research. To effectively influence research domains in the forthcoming half-century, the futures field necessitates the development of a novel conceptual framework encompassing negation and post-prefixes. According to Saritas et al. [114], it is anticipated that the domain of foresight will experience further expansion in the future. The potential for a new generation of foresight in the 2030s lies in the utilization of systemic, applied, and on-site approaches.

Recent studies in the field of energy futures have identified a multitude of challenges and incongruities. According to Krüger et al. [69], the energy transition is a significant change in society that can lead to various social conflicts. Therefore, it is anticipated that energy futures will emerge as a prominent subject of investigation in the foreseeable future.

In recent years, small and medium-sized enterprises have increasingly integrated the knowledge base of futures studies into their development and strategy formulation practices, in order to formalize the future-shaping activities of entrepreneurs [127]. It is expected that there will be a rise in future activity to facilitate entrepreneurial innovation, as the ability to anticipate entrepreneurial trends can enhance the exploration of business prospects [54].

While futures studies has been employed as a means of decolonization for a considerable period [23], futurists and foresight practitioners still have a considerable distance to cover in order to decolonize their work and facilitate authentic alternative futures. In order to explore alternative futures, it is imperative to engage in decolonized futures practice that exhibits methodological heterogeneity, fosters inclusivity among diverse collaborators, and embraces plurality and non-Western modes of thinking [65]. Inayatullah [63] argues that in order to achieve decolonized and authentic alternative futures, it is crucial to engage in decolonized futures studies and practice that can think beyond the existing institutionalized frameworks. This approach also embraces the viewpoints

and concepts of younger generations from non-dominant societies [40].

Post-normal, metamodern, and integral futures can complement and strengthen one another in the field of theoretical research. According to Fergnani and Cooper [34], these theories are meta-theories that strive to accomplish multiple integrations of internal and external, as well as individual and collective dimensions, in a balanced manner, with the goal of achieving policy changes. It should be mentioned that, in addition to the approaches that have been examined, a number of academic discussions are occurring in the area of other theoretical schools, also known as post-postmodern approaches. These have the potential to further influence the theoretical and epistemological frameworks of futures studies, but as of right now, their role and distribution are not very influential. These are grouped around the following ideas: cosmopolitanism [93], postformal thinking [43], altermodernism [106], automodernity [113], hypermodernism [76], and practice theory [20]. They are by no means exhaustive.

In a rapidly evolving world where urgent matters are influencing the present, the significance of futures literacy is anticipated to be heightened. Different projects, situations, and goals require unique approaches, methods, and perspectives on the future. Enhanced reflexive futures literacy can facilitate the formulation of appropriate inquiries at opportune moments, while also recognizing the significance of power and directing forthcoming representations towards democratic, environmentally sustainable, and empowering trajectories [78]. Furthermore, it acknowledges the impact of the future and urges us to exercise prudence in shaping our understanding and involvement with it.

Overall, it can be said that while development tendencies may go in a number of different directions in the future, there are still a number of uncertain turning points that lie ahead of us.

Conclusions

Based on the previous information provided in this article, it can be inferred that scientific-based futures studies has arisen in different areas and stages of development as a result of a century-long history of development. The futures field has been extensively documented to have received support from various academic sources, including philosophy of science, sociology, policy sciences, technological forecasting, economic prognostics, military and national security strategy formulation, national planning systems, system analysis, and environmental sustainability. The fragmentation of the futures field offers an additional rationale for the variety of fundamentals. The advancement of theoretical considerations is imperative

for the futures field to progress as an academic discipline, despite the prevalence of real-world foresight projects in contemporary publications within this domain. Furthermore, it would facilitate the broader recognition, comprehension, and validation of futures studies. The subsequent paragraphs provide a concise overview of the findings derived from addressing the research questions posed in this article.

To summarize the responses to RQ1 and RQ4, the following can be provided. RQ1 investigated the historical progression of futures studies and its predominant research patterns in relation to other scholarly domains. Conversely, RQ4 explored the notable shifts and turning points that have occurred over time in the field of futures studies. This article illustrates the significant progress made in the field of futures research between the 1910s and 1940s, marked by the development of systematic futures thinking and futures studies. This advancement signified a revolutionary change within the field of social sciences. The positivist scientific method, which sought to generate scientific predictions, emerged as a prominent trend in scientific development during the 1950s and 1960s. The incorporation of futures studies into the domain of academic fields marked a noteworthy achievement in the advancement of conventional academic domains. By the conclusion of the 1960s, the field of futures studies had solidified fundamental principles and commenced the process of institutionalization. The main developmental path of the 1970s can be seen as the creation and dissemination of worldwide and societal opportunities, along with transformations, characterized by the rejection of conventional scientific predictions and the widespread adoption of scenario planning, suggesting a crucial juncture. The attention was redirected towards the rise of the post-industrial economy and society due to the socioeconomic transition towards the information society. During the 1980s and 1990s, the synthesis of futures studies became the prevailing developmental trend, despite the expectation of several significant shifts in novel road seeking at the beginning of the new millennium. The adoption of anticipation and futures literacy, along with the attainment of foresight in daily life, are the key developmental trends observed in the twenty-first century. The transition from theoretical knowledge to practical application in the field can be regarded as a pivotal moment. The aforementioned narrative offers responses to Research Questions 1 and 4.

RQ2 was formulated with the aim of investigating the theoretical schools that have contributed to the theoretical and epistemological underpinnings of futures studies throughout history. The positivist philosophy of science was widely accepted globally during the 1950s-1960s. However, growing criticisms started to undermine the

fundamental principles of the positivist approach. In the 1970s, a scientific revolution was occurring with the objective of creating novel paradigms for the futures field. The era witnessed the gradual dissemination of postpositivist and post-modern perspectives, which achieved varying degrees of success. Between the 1980s and 1990s, critical and evolutionary approaches have greatly contributed to the development of the theoretical foundations of futures studies. The development and dissemination of post-normal, metamodern, and integral futures approaches have been primarily represented the theoretical advancements in the twenty-first century. Among these approaches, integral futures has produced the most comprehensive and well-documented scientific results thus far.

RQ3 sought to investigate the institutions that have had the most substantial and long-lasting influence on the community of futures studies. In the 1950s and 1960s, the RAND Corporation was the dominant organization in the field of futures studies, which primarily emphasized the application of systemic futures thinking. The institutionalization of futures studies was subsequently demonstrated through the establishment of professional world federations on a global scale. The WSF, the WFSF, and the APF are widely acknowledged as the three most influential global federations that have had a long-lasting impact on the field. The MP is additionally delineated as a prominent global community focused on futures. The University of Houston-Clear Lake was the first higher education institution to introduce an MA program in the field of futures education. Similarly, the University of Massachusetts was the first to establish a doctoral program in this area. The Australian Foresight Institute and the Hawaii Research Center for Futures Studies are widely recognized as prominent global institutions for futures research, consulting, and education. The scientific journals *Futures* and *Technological Forecasting and Social Change* have consistently demonstrated their significant influence within the futures field since their establishment. The aforementioned academic journals have consistently documented the theoretical, methodological, practical, and progression issues, along with the advancements in the field, resulting in a significant accumulation of futures knowledge. It is important to acknowledge that the aforementioned list is not comprehensive, and there are other influential institutions in the futures industry as well.

RQ5 investigated potential future research directions in the futures field. The conclusion of any historical development review often includes contemplative suggestions regarding the potential avenues for future research, driven by an inherent inquisitiveness. Futures studies has been established and developed through

diverse research channels, indicating that the field is expected to further grow in the future. It is anticipated that future research findings will be disseminated through a broader array of channels, including those that have not yet been established, at a higher frequency compared to the present. Based on current expectations and research trends, it is anticipated that the futures field will undergo various developments within the framework of the integral futures paradigm. Anticipated areas of focus for future research include AGI, socio-technical transitions, singularity, sustainability, societal collapses, entrepreneurial innovation, energy futures, decolonization, negation and post-prefix notions, systemic foresight, applied foresight, and on-site foresight. Future research activities are anticipated to encompass research objects, policy challenges, and problems that may not currently exist.

The historical progression of the field reveals a notable surge in the need for futures studies during periods characterized by heightened risk, uncertainty, and crises. Additionally, this demand is observed during unstable and intricate interconnections that shape the future of individuals, communities, societies, economies, regions, and the global community. Given the current circumstances, it is anticipated that the futures industry will experience sustained growth and expansion in the foreseeable future.

Abbreviations

AGI	Artificial general intelligence
APF	Association of Professional Futurists
IIFWS	Institute for Islamic World Futures Studies
IT	Information technology
MA	Master's degree
ML	Machine learning
MP	The Millennium Project
RQ	Research question
US	United States
WFS	World Future Society
WFSF	World Futures Studies Federation
WOS	Web-of-Science

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