Societal collapse: A literature review

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ABSTRACT

Because of concerns that ongoing climate change could lead to a possible collapse of human civilization, the topic of societal (civilization) collapse has emerged as especially relevant, not least for the futures-oriented studies. While this has led to extensive research on societal collapse, there is a lack of consolidation and synthesis of the research. The purpose of this article is thus to systematize the extant research on societal collapse and suggest future research directions. This article offers a systematic multidisciplinary review of the existing literature (361 articles and 73 books) and identifies five scholarly conversations: past collapses, general explanations of collapse, alternatives to collapse, fictional collapses, and future climate change and societal collapse. The review builds the foundation for a critical discussion of each line of inquiry by focusing on theoretical tensions and themes within each scholarly conversation, ending with a discussion of how these conversations inform futures research.

1. Introduction

The debate about societal (civilization) collapse as a plausible trajectory for the world’s future has lately arisen as being especially relevant (Paterson, 2020). It has been speculated that such a trajectory could present an existential threat to humanity and the planet (Sardar, 2021; Young et al., 2006). In light of this debate, the topic of societal collapse itself has received significant research attention. This intensification of collapse research because of climate change has led some to propose that a certain level of ecological and societal collapse over the next few decades will occur (Kenkel, 2020), requiring adaptation and/or mitigations to the challenges and threats posed by global environmental change (Richards et al., 2021). It has also prompted discussions about limits to economic and societal growth (e.g., Meadows, Meadows, Randers, & Behrens, 1972; Turner, 2008; Herrington, 2021), attempts to identify causes of the potential collapse of contemporary global civilization (e.g., Motesharrei et al., 2014), and discussions about possible solutions (e.g., Odum & Odum, 2001; Gowdy, 2020). More pessimistic views include existential repercussions of a possible future collapse (e.g., Scranton, 2015) and dismal portrayals of a possible future society affected by global warming (e.g., Wallace-Wells, 2019; Figueres & Rivett-Carnac, 2020), emphasizing the need to adapt to this kind of future (Bendel & Read, 2021).

Societal collapse as a phenomenon has been studied extensively across various scientific disciplines (Middleton, 2017a), primarily history (e.g., Diaz & Trouet, 2014), archeology (e.g., Mulrooney, 2013; Fattahi, 2015; Weiss, 2017), and anthropology (e.g., Tainter, 1988; Diamond, 2005), but also in public health (Butler, 2016; McMichael, 1993), futurism (Dunagan, 2010), mathematics (Hadlock, 2012), ecological economics (Motesharrei et al., 2014), philosophy (Scranton, 2015), environmental research (Olsson et al., 2017), literature studies (Hanssen, 2018), astrobiology (Frank, Carroll-Nellenback, Alberti, & Kleidon, 2018), systems research (Bardi, 2020), and policymaking (Cotton-Barratt et al., 2020). Despite this interest in societal collapse, integrative overviews and summaries of extant research have appeared only recently. Their relatively late appearance is probably caused by the complexity of the field (Tainter,
2. Background: disciplinary approaches to the study of collapse

The intention of this section is to account for the history of the most prominent ideas of collapse, chronologically and across the range of scientific disciplines where they originated, thus sketching a frame inside which studies of collapse were traditionally undertaken. The section relies mostly on the Western literature interested in collapse, the development of which was sketched in, for example, Butzer (2012), Bainbridge (2016), and Faulseit (2016). As noted in the introduction, societal collapse has been studied across scientific disciplines and with different purposes, resulting in complex research of the phenomenon (Tainter, 2016). This complexity is even more pronounced because of both the academic and popular interest in the subject (Faulseit, 2016). Initially, collapse primarily intrigued historians, with Tainter (2016) pointing out a long tradition of collapse studies in history and archaeology. Both he, Butzer (2012), Bainbridge (2016), and Faulseit (2016) referred to Gibbon (1776) historical account of the decline and fall of the Roman Empire as one of the fundamental early studies of collapse. Highly influential in its suggestion that the Western Roman Empire fell due to its own decadence and barbarian invasions, Gibbon (1776) portrayed the Roman Empire as an unlikely and difficult social construction beyond what humans could normally sustain (see Bainbridge, 2016). However, Peters (2021) problematized Gibbon (1776) by setting the work in its historical context, describing it as a product of the 18th century, the Enlightenment’s perception of modernity, and how history was presented in the imperialistic fashion of the contemporary Western writings. Gibbon, as such, had a significant impact on the formation of theories of decline during the late 19th and early 20th centuries (Rogers & Hingley, 2010).

This influence was amplified in the aftermath of the First World War. For example, most of the overviews of collapse research anchored in history (e.g., Robertson, 2012) pointed out the significance of Oswald Spengler’s (1926) The Decline of the West and Arnold Toynbee’s (1946, 1957) A Study of History. The former work offered a historical-philosophical account of world history, explaining that cultures evolve just as organisms and that they also decline, with the Western World reaching its final stage. The latter is a comparative analysis of past civilizations, explaining their genesis and, eventually, their breakdown and disintegration. Toynbee (1946, 1957) also likened civilizations to organisms and postulated that societies confront various challenges or pressures that require them to respond so that civilizations can grow and expand (Sanderson, 1995). Their contemporaries tended to critique Spengler (1926) for his deterministic, fatalistic, and atomistic view of history, as well as for his methodology (Tabrea, 2011), and Toynbee (1946, 1957) for oversimplification, relatively free interpretations, and that his religious views occasionally distorted his scholarship (Coulborn, 1956). Today is evident that, although both analyzed a variety of cultures, this analysis was simplistic and stereotypical, and their essential focus and point were the decline of the Western civilization (Mottahehdeh, 2003). Spengler’s (1926) ideas of the decline of the West are today sometimes associated with, for example, far-right’s ideas of “the de-Christianizing of Europe,” the so-called “rights-culture,” and mass migration threatening Europe (for such examples, see Buchanan, 2002, 2011; Scruton, 2015). Locher (2013) also shows a long historical tradition of linking migratory issues with environmental ones, in terms of overpopulation and collapse. Yet another critical view on the whole concept of societies changing and evolving is provided by Darwin (2008). In his treatise of how different empires contributed to the advancement of the modern globalized world, Darwin (2008) noted that the Western concept of time, with societies “evolving” and thus existing on different levels of historical progress, developed during the European exploration of America, in meetings with Native Americans. With such a perspective, categorizations of other cultures as “lower” also appeared. In this sense, it was especially Spengler (1926) that tended to Westernize the East (Yurdusev, 2005).
One contemporary critique of Spengler (1926) and Toynbee (1946, 1957) was Russian sociologist Pitirim Sorokin, who formulated his theory of cultural change in Social and Cultural Dynamics (1937). Sorokin was arrested by the Bolsheviks, and he later emigrated to the United States, where he founded the sociology department at Harvard University (Bainbridge, 2016). For him, civilizations were “cultural supersystems,” and he theorized that societies are organized around specific principles and that they pass through them in a cyclical fashion, rhythmically changing and experiencing regular downfalls, when one set of principles replaces the former one (Sanderson, 1995). His work also experienced controversy, partly because it was considered “unscientific” and partly because of his assertions that European and American cultures were in decline and in the midst of an extraordinary crisis, and that they would eventually be transformed in a religious direction (Spengler, 1989).

Spengler (1926), Toynbee (1946, 1957), and Sorokin (1937) were described to encapsulate the sense of crisis in the 20th century (Joll, 1985; Sanderson, 1995). This sense was caused by the world wars in the first part of the century, whereas after the Second World War and the economic expansion in the West, it was fueled by the environmental movement emerging in the USA in the 1960s and the 1970s’ fossil fuels crisis (Robertson, 2012). Environmental ideas related to societal collapse were at that time strongly Malthusian (Locher, 2013). Malthus’s (1798) treatise suggested that an increasing population pressured social structures, resulting in poverty and famine. The ideas of overpopulation coincided with the rise of the environmental movement (Robertson, 2012). Similar to Gibbon, Malthus was also a product of his time, particularly as he considered poor people to be a different kind of human being (Robertson, 2012). He considered overpopulation a result of their “passions” and unrestraint (Locher, 2013), and he did not believe that technology or international commerce could alleviate the lack of resources in the face of rising population numbers (Robertson, 2012). His main idea about a growing population pressing against scarce resources influenced thinkers in the 19th and 20th centuries and resonated well in the America of the 1960s, dependent on abundant resources (Robertson, 2012).

The Malthusian overpopulation argument largely contributed to the foundation of the Club of Rome (Locher, 2013) and influenced Limits to Growth (Meadows et al., 1972, revisited in Meadows et al., 2004), a simulation study concluding that extensive changes in terms of resource usage and socioeconomic regulations have to be made to achieve a sustainable global society and avoid societal collapse. This is perhaps the most recognized work linking societal collapse, resource usage, and global environmental change. Limits to Growth (henceforth: LtG) experienced harsh criticism in the time of its publication, and LtG continued to be reassessed on a regular basis (Gómez-Baggethun, 2020), not least in the light of neo-Malthusianism (Locher, 2013; Robertson, 2012). For example, relevant research frequently considered carrying capacity, that is, the maximum population a given environment can support indefinitely (Catton, 1982). On the other hand, current demographic trends indicate that the global human population will peak in the next 50–80 years (Lutz et al., 2018; Vollset et al., 2020), thus questioning overshoot. Indeed, Homer-Dixon (2006), for example, was more concerned with a differential population growth, the imbalance in population growth in two neighboring regions or countries, creating stress in terms of risks of conflict and political radicalization as a consequence. Other interesting examples related to the population question are Turner’s (2008, 2012) updates of LtG with real-time data and conclusion that “[r]egrettably, the alignment of data trends with the LtG dynamics indicates that the early stages of collapse could occur within a decade, or might even be underway” (Turner, 2014, p. 16). Similar conclusions were drawn by the most recent LtG update as well (Herrington, 2021). On the other hand, there is research exhibiting compelling evidence that green growth is possible, or that economic growth may go along with progress and regress, depending on the period, context, and developing stage of a society (van den Bergh, 2017). Charbonnier (2021) summarized these opposing views when stating that we live in the best and the worst of the worlds, with the ideas of progress and ecological deterioration going hand in hand, inciting the idea of collapse perceived via ecological vulnerability.

The ideas and models of LtG continued to be developed by Bardi (2011, 2013) and colleagues (Bardi et al., 2019), who approached them from the systems science perspective. This discipline studied societal collapse conceptualizing societies as complex systems, both as only social systems and as socioecological systems. One more prominent example of the former conceptualization in relation to societal collapse is the work of Peter Turchin (e.g., Turchin, 2003, 2006) and colleagues (e.g., Turchin & Nefedov, 2009; Currie et al., 2018; Turchin et al., 2018; Turchin et al., 2022; Turchin et al., 2023; Turchin et al., 2022). His approach is the so-called historical dynamics or cliodynamics, essentially a mathematical modeling of social processes applied to historical events, in a manner echoing the cyclical theories of Toynbee (1946, 1957) and Sorokin (1937), especially considering how they both presented cultures as systems (von Bertalanffy, 1974) and wrote universal histories (Joll, 1985). Turchin (2003, 2006) suggests that collapse occurs when a society cannot deal with the strains caused by population growth, leading to inequality and conflicts, with the dissolution of the society as a consequence (Spinney, 2020). His statistical approach to history by means of analyzing big data was frequently compared to fictional psychohistory (Asimov, 1951), and it also caused debates. For example, his work was critiqued for neglecting society’s connection to the physical world (Maini, 2020), as well as for methodological issues. One discussion arose around Turchin et al. (2018), with Tosh et al. (2018) pointing out some analytical challenges in the former article, and Currie et al. (2018) clarifying the original article’s approach. Another controversy that emerged around methodological issues resulted in a retracted article in Nature. Such critiques made the authors acknowledge that performing studies with such data magnitudes stresses the need to keep their databases updated to minimize inconsistencies and disagreements in the results (Currie et al., 2018).

The latter conceptualization of socioecological systems posits that resources used by humans are embedded in more complex systems, characterized by interactions between multiple social and natural subsystems (Ostrom, 2009). Collapse is here understood as a governance problem because actors in sustainable socioecological systems have developed effective governance mechanisms of resource usage (Ostrom et al., 1994). Thus, socioecological systems are comprised of social, economic, and political settings embedded

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1 See the retraction note from Whitehouse et al. (2021), explaining the reasons for the retraction.
in related ecosystems, where all of these components interact. However, studying collapse from socioecological systems perspectives entails certain challenges because of the independent development of ecological and social sciences, preventing them from combining easily (Norgaard, 2008). Another common critique in studying socioecological systems concerns the undertheorization of social entities in such systems; a systems-based conceptualization tends to limit the kinds of social science research involved, favoring quantitative analyses and downplaying interpretive traditions (Stojanovic et al., 2016).

Another set of challenges may arise from the very nature of the systems perspective. As works of Turchin (2003, 2006), Ostrom (2009), and Bardi et al. (2019) exemplify, systems theory can be applied differently, which can be attributed to the heterogeneity of the systems’ theoretical views (Voigt, 2011). According to Voigt (2011), systems theoretical views emerged from the interaction of different disciplines during the 1940s, differing in aims, problem focus, and institutional background. They encompassed cybernetics, information theory, game theory, action theory, and general systems theory. Voigt (2011) traced how these different systems’ views distilled into ecosystems theory.

More recent developments concerning societal collapse came from Tainter (1988) and Diamond (2005). Historian and anthropologist Joseph Tainter’s book The Collapse of Complex Societies introduced the so-called complexity theory to collapse research, explaining that societies collapse due to increases in their internal complexity, investments in which after a while become unsustainable. Complexity theory has emerged as one of the most compact general theories of collapse, which will be shown later in this text. Jared Diamond’s more popular treatise Collapse: How Societies Choose to Fail or Survive studied several past collapses, resulting in an overall framework of collapse factors, with the emphasis on how they might affect contemporary global society. Although criticized, particularly by academia, the study popularized the concept of societal collapse and linked it to climate and environmental change. Diamond (2005) will be referred to in more detail in the Results section of this article. Table 1 presents a summary of the overview of these important works on societal collapse, following a development sketched in the previous literature.

The heterogenic development of studies dealing with societal collapse presented heretofore in this section represents an obstacle in defining collapse studies as a separate field of research. Some researchers, for example, Tainter (2016), did refer to such a field, although one could argue that such understandings of collapse studies as a separate field remain contained within its primary scientific

**Table 1**

Overview of some important works on societal collapse.

<table>
<thead>
<tr>
<th>Reference</th>
<th>The essence</th>
<th>Implications</th>
<th>Critique</th>
</tr>
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<tbody>
<tr>
<td>Gibbon (1776)</td>
<td>Historical account of the decline and fall of the Roman Empire</td>
<td>Influential in its suggestion that the Western Roman Empire fell due to its own decadence and barbarian invasions</td>
<td>Presentation of history in the imperialistic fashion of the contemporary Western writings</td>
</tr>
<tr>
<td>Malthus (1798)</td>
<td>Treatise suggesting that increasing population pressures societal structures, resulting in poverty and famine</td>
<td>The Malthusian Law of Population and the treatise itself are frequently invoked in discussions on societal decline and collapse</td>
<td>Believed that overpopulation is a result of the unrestraint of poor people, a lower kind of human being, according to him</td>
</tr>
<tr>
<td>Spengler (1926)</td>
<td>Historical–philosophical account of world history, explaining that cultures evolve just as organisms do, and that they also decline, with the Western World reaching its final stage</td>
<td>Prominent in its time, the study influenced a number of thinkers and historians</td>
<td>Deterministic, fatalistic, atomistic view of history, critique of methodology, with some of the ideas today associated with the far right</td>
</tr>
<tr>
<td>Sorokin (1937)</td>
<td>Conceptualized societies and civilizations as cultural supersystems cyclically changing and experiencing downfalls, when one set of governing principles replaces the former</td>
<td>Magnum opus of an influential sociologist at the time, embedded in the rest of his work on societies, civilizations, and altruism</td>
<td>Considered “unscientific”, claims that Western cultures were in crisis and that they would be transformed in a religious direction</td>
</tr>
<tr>
<td>Toynbee (1946, 1957)</td>
<td>Comparative study of past civilizations, explaining their genesis, growth, and eventually their breakdown and disintegration</td>
<td>Although relatively neglected, together with Spengler (1926) helped to raise the level of analysis to whole societies and civilizations</td>
<td>Oversimplified view on history with relatively free interpretations and author's religious views occasionally distorting the scholarship in the work</td>
</tr>
<tr>
<td>Meadows et al. (1972), revisited in Meadows et al. (2004)</td>
<td>Limits to Growth (LtG) is a simulation study concluding that extensive changes in terms of resource usage have to be made to achieve sustainable global society</td>
<td>Experiencing harsh critique in the time of its publications, the LtG insights have been reassessed in the light of contemporary developments and updates of LtG with real-time data, indicating that the global society might not transform to reach sustainability</td>
<td>Compelling research provides nuance to the issue of resource and population overshoot, emphasizing the positive role of green growth and the effects of population imbalance</td>
</tr>
<tr>
<td>Tainter (1988)</td>
<td>Introducing the complexity theory to collapse research, explaining that societies collapse due to increases in their internal complexity, investments in which after a while become unsustainable</td>
<td>Complexity theory has emerged as one of the most compact general theories of collapse</td>
<td>Some critique of the methodology as “too qualitative”, although further research from the systems perspective solidified the theory, with additional voices questioning its universality</td>
</tr>
<tr>
<td>Diamond (2005)</td>
<td>Studied several past collapses, resulting in an overall framework of collapse factors, with the emphasis on how they might affect contemporary global society</td>
<td>Popularized the concept of societal collapse and linked it to climate and environmental change</td>
<td>Some critique of the methodology and the interpretations leading to the development of the framework, as well as the work’s “environmental revisionism” Neglects society’s connection to the physical world, some concerns regarding the methodology</td>
</tr>
<tr>
<td>Turchin (2006), Turchin and Nefedov (2009), etc.</td>
<td>Examinations of collapse as a function of specific societal factors that emerge as the level of complexity in a society increases</td>
<td>The application of mathematical modelling of social processes by examining big data from historical events</td>
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disciplines. For example, Middleton (2017a) referred to the collapse field as strictly situated in history and archaeology. There also seems to be a division between the lines of research focusing on past collapses and research interested in future collapse related to climate change. Tracing what “collapse” means in different disciplines with the help of associated definitions might help in sketching a possible field of collapse studies.

Generally, societal collapse has been described as a “slippery concept that defies a strict definition” (Lawler, 2010, p. 907). Also, Tainter (1988) pointed out the broadness of the term “collapse,” emphasizing that it can mean different things to different people. For some, he wrote, collapse is economic disintegration, whereas others question the utility of the concept because some aspects of past societies frequently survive political decentralization. His understanding of collapse is viewing it as a political process, and he defines it as follows: “A society has collapsed when it displays a rapid, significant loss of an established level of sociopolitical complexity” (Tainter, 1988, p. 4). He emphasized the term “established level” because the complexity has to develop for longer than a generation or two. He sees collapse as rapid, taking no more than a few decades, entailing a substantial loss of sociopolitical structure. Otherwise, the discussion should revolve around societal weakness or decline.

However, the speed of collapse was also discussed. For example, Bardi (2020) described collapse as a “rapid, uncontrolled, unexpected, and ruinous decline of something that had been going well before.” A different conceptualization of collapse understands it rather as a process of decline (Carter, 2013; Kurin, 2016), described as “slow” (Storey & Storey, 2017). According to Johnson (2016), the Classic Maya collapse was a misnomer because the changes that occurred were not rapid. On the other hand, Diamond (2005) noted that different societies collapsed in different degrees and in somewhat different ways, while many societies did not collapse at all. He defined collapse as a drastic decrease in human population size and/or political/economic/social complexity over a considerable area for an extended time. For him, collapse is an extreme form of other milder types of decline, and it becomes arbitrary to decide how drastic the decline of a society must be before it qualifies to be labeled a collapse.

However, although difficult to define, there are indications of what a collapse is or can be (Bardi, 2020). Consequently, Lawler (2010) designated the loss of central administration, disappearance of an elite, decline in settlements, and a loss of social and political complexity as defining traits of societal collapse. Similarly, societal collapse was understood as a transformation on a large social or spatial scale, with long-term impact on combinations of interdependent variables: environmental change and resilience, demography or settlement, socioeconomic patterns, political or societal structures, and ideology or cultural memory (Butzer & Endfield, 2012). Faulseit (2016) presented the relationship between collapse, societal transformation, and resilience, which are not necessarily disassociated. He explained that collapse is the fragmentation or disarticulation of a particular political apparatus and transformation is a broad concept engulfling different sorts of societal changes, whereas resilience considers the ability to maintain or quickly restore highly desirable societal conditions. Indeed, Middleton (2017a; 2017b), showed that, from an archeological perspective, collapse as a phenomenon is more complex than previously believed by focusing on the resilience of the Roman Empire, the Maya, and Rapa Nui (Middleton, 2018).

To conclude, against the background portrayed in this section, studies of collapse may be considered a research platform reaching into, inspiring and drawing inspiration from, merging, and cross-pollinating different scientific disciplines and methodological approaches. Some common denominators across the disciplines, as well as challenges of studying collapse, have been presented, asserting that studying societal collapse is a complex feat indeed.

3. Research design

This study is based on a systematic literature review approach (Dresch, Lacerda, & Antunes, 2015), characterized by rigorous ways to gather data and show patterns within a set of literature (Owen, 2020; Shackelford et al., 2020). A structured set of steps was devised for the purposes of this review. The first step included the search of publications to be included in the review, in which Web of Science and Scopus databases were searched, using the search words and phrases societal collapse, civilization collapse, society AND collapse, and civilization AND collapse in the publication title, abstract, and/or author-supplied keywords. The search strategy followed was saturation, i.e., finding sufficient studies to offer a coherent configuration of the topic (Dresch et al., 2015). In later steps, this strategy was complemented with reviewing the reference lists to identify further relevant literature (see the third step below) and with recommendations from the article reviewers.

The second step was the selection and initial quality assessment of identified publications, to eliminate duplicates and articles not dealing specifically with societal collapse. This step was conducted by reading the abstracts of initially identified publications (Dresch et al., 2015). More specifically, the inclusion criteria in this stage were as follows: 1) societal or civilization collapse is either the main topic of the article or significantly linked to the main topic of the article (studies that only briefly mentioned societal collapse, for instance, were discarded), 2) the article is a peer-reviewed journal publication, and 3) the article was written in English. An additional criterion concerned the particular scientific discipline within which an identified study was conducted. Hence, articles from a variety of scientific disciplines concerned with issues of societal collapse were included, including both natural and social sciences and humanities.

Such broad inclusivity criteria represent the potential to direct research in unexpected ways (Snyder, 2019), but simultaneously pose certain challenges, particularly in integrating the identified literature (Breslin & Gatrell, 2020). The introduction and the background sections already discussed this issue, especially in presenting the variety of scientific disciplines interested in societal collapse and discussing the position of collapse in various literature streams, respectively. Moreover, the societal collapse literature frequently overlaps with the state failure literature, the sustainability and societal transition literature, and the growing body of literature on catastrophic and existential risks.

One strategy to address this challenge of how overlaps and positions of collapse in different literature streams could affect the
results of the review was the researcher’s reflexivity concerning the main topic. Specifically, the researcher did not presume that societal collapse is a cemented concept, but understood it rather as a framed range, with the literature review circulating within the scope of the frame. Although such questions inevitably represent challenges when performing multidisciplinary reviews (Barnes et al., 2013), when treated properly and reflexively, challenges can simultaneously offer valuable insights to direct research (Renn, 2021).

Fig. 1. Illustration of the hierarchy of the identified scholarly conversations (rectangles) with associated tensions (ovals) and themes (hexagons).
This line of reasoning in dealing with this challenge is in line with Light and Pillemer’s (1984) flexibility principle in conducting reviews, with the authors advising that the dataset be approached open-mindedly and reflexively, yet always with the focus on the main issue that is being reviewed.

Following Webster J (2002), the third step included reviewing the citations of the identified studies to find relevant publications. The initial search might have missed and to determine seminal works representing the conceptual foundation of the field. Torraco (2005) advises that other relevant literature be included by reviewing the citations from the articles in the main dataset. This step revealed that books represented a significant portion of scholarly discussions concerning societal collapse and added additional articles to the main dataset. In the end, the dataset included 361 journal articles and book chapters (listed in Web Appendix 1a) and 73 books (listed in Web Appendix 1b).

Deciding upon a review strategy was next, as this would guide and shape the outcome of the review (Breslin & Gatrell, 2020; Dresch et al., 2015). As broad inclusivity was one of the inclusion criteria, the main dataset exhibited a high level of heterogeneity of studies, which rendered the choice of the configurative review strategy (Dresch et al., 2015) as suitable. This strategy involved approaching the dataset more openly, with the objective of arranging the research around the main concept of societal collapse into a more coherent structure. Combining this strategy with a multidisciplinary exploration allowed for the blending and merging of literature across disciplines, potentially revealing novel narratives and overlooked research questions (Breslin & Gatrell, 2020; Torraco, 2005).

3.1. Coding and data analysis

In line with the configurative review strategy, a preliminary analysis of the 434 publications was conducted, with the aim of identifying the main research discourses (Dresch et al., 2015; Webster J, 2002). The researcher carefully read and interpreted the abstracts of identified publications to grasp existing discourses, simultaneously allowing the main categories to emerge during this process of reading and interpretation (Dresch et al., 2015). The researcher also noticed that these discourses contained some disagreements and additional discussions, which were carefully noted within the associated main discourses. Ultimately, this iterative process of reading and interpreting the abstracts led to the inductive development of coding categories (Breslin & Gatrell, 2020; Dresch et al., 2015; Torraco, 2005), where the discourses essentially developed into five main scholarly conversations. Consequently, the disagreements developed to tensions, and additional discussions to themes. Scholarly conversations, tensions, and themes functioned as overarching coding categories in the next step of the analysis.

Thus, as recommended by Breslin and Gatrell (2020), the identified publications were then analyzed in greater depth by categorizing them with respect to scholarly conversations and charting the main theoretical tensions and themes within each scholarly conversation. In this article, theoretical tensions are defined as dialogues around specific topics with apparent competing perspectives, whereas themes are topics revolving around one distinct concern. Hierarchically, this review allowed tensions and themes to exist on the same level of attention or to be subordinate to one another, meaning that a tension can sprout from a theme or vice versa, in accordance with the reviewing flexibility principle (Light & Pillemer, 1984). Fig. 1 represents an illustration of the hierarchy of the identified scholarly conversations with associated tensions and themes.

This flexibility in categorization also allowed for the potential emergence of new, or adaptations of existing, scholarly conversations, as well as tensions and themes within the conversations (Light & Pillemer, 1984). One example of a flexible adaptation in this particular review is the scholarly conversation on fictional collapses, which was preliminarily coded as a theme within the conversation on past collapses, since some publications dealing with fictional collapses referred to past collapses (e.g., Bainbridge, 2016). However, when a discourse clearly separating fictional collapses from past collapses emerged, the author decided to adapt this theme to a scholarly conversation.

Furthermore, the flexibility approach allowed for identified publications to be categorized within more than one scholarly conversation, theoretical tension, or theme. For example, Diamond (2005) explored past collapses (Conversation 1), simultaneously offering an explanatory framework of collapse (Conversation 3), expanding it with new factors that linked the ongoing climate change to societal collapse (Conversation 5). In addition, his book started an intriguing debate within Conversation 4 (alternatives to collapse). Web Appendix 2 presents a list of identified publications, including short summaries and how they were classified in scholarly conversations.

Not necessarily limiting a particular publication to an exclusive category led to a certain fluidity between the conversations, with the potential to enrich the findings (Breslin & Gatrell, 2020). However, classifying publications in more than one conversation inevitably led to overlaps in tensions and themes across the conversations; for example, the tension considering the cause(s) of a particular past society in the first conversation (past collapses) overlaps with the tension concerning different frameworks and causes of collapse in the third conversation (general explanations of collapse). The key strategy to handling these overlaps was keeping the specific focus of the main conversation during the analysis and the interpretation.

To supplement the review, an additional bibliometric analysis of the identified publications was conducted. The process and the main results of the supplemental bibliometric study are presented in the Web Appendix 3. They are incorporated in the next section, which presents the findings of the study.

4. Results

The analysis revealed five scholarly conversations in the field of societal collapse: past collapses, general explanations of collapse, alternatives to collapse, fictional collapses, and future climate change and societal collapse. Within each conversation, the main theoretical tensions and themes were noted accordingly. The supplemental bibliometric analysis in Appendix 3 largely supports the...
presence of these conversations, with the exception of Conversation 4 (fictional collapses). This is probably because of the low citation numbers of publications classified in this conversation and their subsequent low visibility in the bibliometric analysis. Table 2 summarizes the results of the review in terms of conversations and associated tensions and themes, and briefly describes each tension and theme, together with the examples and representative references for each.

The classification offered in Appendix 2 reveals that Conversation 1 contains 213 publications, Conversation 2 consists of 73 publications, Conversation 3 has 69 publications, Conversation 4 has 26 publications, and Conversation 5 has 134 publications (a publication may have been classified in only one or in several conversations). The classification, together with the supplemental bibliometric analysis in Appendix 3, shows a demarcation between past collapses (the first three conversations, mostly) and future climate change and societal collapse (mostly in Conversation 4 and particularly in the associated Conversation 5), with some exceptions (e.g., Costanza et al., 2007).

Table 2
Summary of the review results.

<table>
<thead>
<tr>
<th>Scholarly conversations</th>
<th>Theoretical tensions and themes</th>
<th>Description of tension/theme</th>
<th>Examples and representative publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past collapses (1)</td>
<td>Tension</td>
<td>Attempts to determine a cause or a combination of causes of a collapse of a particular past society</td>
<td>The Classic Maya collapse – the crucial role of drought (Gill, 2000; deMenocal 2001; Haug et al., 2003) versus more complex explanations (Tainter, 2008)</td>
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<td>Cause(s) of the collapse of a particular past society</td>
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<td>Tension</td>
<td>Scientific dialogue concerning whether a particular past collapse can be considered as such, or if the society in question resiliently transformed itself</td>
<td>Rapa Nui – collapse (Dalton, Coats, &amp; Lucassen, 2015; Diamond 2005; Roman et al., 2017) versus continuity (Mulrooney 2013; DiNapoli et al., 2020)</td>
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<td>Perception of a particular past collapse – collapse or reinvention?</td>
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<td>Tension</td>
<td>Revolves around the role of climate change in past collapses, whether it was a primary cause of past societal collapses or not</td>
<td>Climate change as the primary reason for past collapses in China (Feng et al., 2019; Li et al., 2016; Zheng et al., 2019)</td>
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<td>Environmental determinism</td>
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<td>General explanations of collapse (2)</td>
<td>Tension</td>
<td>Attempts to identify more comprehensive explanations and lists of different causes of societal collapse</td>
<td>Diamond’s (2005) framework of 5 factors possibly contributing to collapse, Cumming and Peterson’s (2017) 14 mechanisms of collapse in socioecological systems, Rubiños and Andéris’s (2020) 12 major causes of collapse</td>
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<td>Different frameworks and causes of collapse</td>
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<td>The inevitability of collapse</td>
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<td>Tension</td>
<td>Discusses whether societal collapse is inevitable or if it can be postponed</td>
<td>Some studies claim that societal collapse can be postponed or mitigated by continuously increasing complexity with the help of new energy, resources, and technological advances (Bardi, 2020; Dasgupta et al., 2015; Livin, 2019; Tainter, 1995)</td>
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<td>Collapse or resilience?</td>
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<td>Fictional collapses (4)</td>
<td>Theme</td>
<td>Fictional collapses can be used to influence readers about real-world developments in both a positive and negative direction</td>
<td>A stream of research proposing societal resilience instead of societal collapse (Butzer &amp; Endfield, 2012; Lawler, 2010; McNamay &amp; Yoffee, 2009)</td>
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<td>Narrative in fictional collapses as a means of influencing readers’ feelings about real-world developments</td>
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<td>Tension</td>
<td>Discusses whether societal collapse is inevitable or if it can be postponed</td>
<td>Postapocalyptic narratives featuring heroes prevailing in dystopias may serve as inspiration (Jones, 2020), yet such narratives can also act as self- prophecies (Schneider-Mayerson, 2018)</td>
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<td>The conflict between the utopian and dystopian views</td>
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<td>Theme</td>
<td>Fictional collapse texts may present and lead to utopian or dystopian societies</td>
<td>Optimistic and pessimistic ideologies competing in works of fiction (Bainbridge, 2016; Dasilva, 2019)</td>
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<td>Using fiction as warning</td>
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<td>Tension</td>
<td>Scientific publications use fiction as a tool to warn about negative possible future</td>
<td>Writing fictional history from a post-apocalyptic future or using works of fiction as negative examples of possible futures (Frise, 2016; Oreskes &amp; Conway, 2013, 2014)</td>
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<td>Future climate change and societal collapse (5)</td>
<td>Tension</td>
<td>Whereas the pessimistic view of the future treats the collapse of the global society as inevitable, the optimists claim that the society can achieve a successful transformation to sustainability</td>
<td>Global collapse should be embraced and humanity should prepare for extinction on one side (Scranton, 2015; Turner, 2008; Bologna and Acquino 2020); global society can sustainably transform on the other side (Hayward et al., 2020; Paterson, 2020)</td>
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<td>Dissonance between the pessimistic and optimistic views of the future</td>
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<td>Theme</td>
<td>Presents and discusses difficulties of transforming global society, in terms of institutions, politics, and policies</td>
<td>A prosperous way down, planetary boundaries, key challenges of transforming the agricultural system, and phasing out fossil fuels (Odum &amp; Odum, 2001; Rockstrom et al. 2009; Ehrlich &amp; Ehrlich, 2013)</td>
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<td></td>
<td>The need to transform global society to meet the challenges of ongoing climate change</td>
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<td></td>
<td>Theme</td>
<td>Presents and discusses various emotional responses to the possibility of future climate change and societal collapse</td>
<td>Ecopsychology (Baker, 2009; Roszak et al., 1995)</td>
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The scholarly conversation concerning past collapses is by far the most extensive conversation found by this review, and it is interested in understanding the collapse dynamics of a particular past civilization. History and archeology represent the dominant scientific disciplines (with subdisciplines such as osteoarcheology and archeobotany), followed by anthropology, geology, and economics. Furthermore, the analysis revealed interest in a number of past societies as research subjects: collapses of Mesopotamian and Eastern Mediterranean civilizations, the Maya civilization, the Western Roman Empire, the Byzantine Empire, Rapa Nui (Easter Islands), Andean civilizations, and Chinese past societies, as well as Mississippian, Southwest US, and Mexican cultures were studied.

Consequently, discussions within this conversation occurred on two levels: on the level of a particular scientific discipline and on the level of the subject of study. More often than not, these levels intertwined, offering insights across disciplines and linking the relevance of the study to ongoing climate change. Finally, the methodological approaches here varied and depended on the scientific discipline. For example, whereas Mulrooney (2013) assessed the spatial and temporal distribution of radiocarbon determinations collected from archeological and landscape contexts in her study of Rapa Nui, Wei, Fang, and Su (2015) based their study on 1091 records extracted from 25 books on Chinese history and economic history written by leading contemporary scholars, and Tisdell and Svizzero (2019) applied economic modeling to analyze the collapse of the European Bronze Age Únetice cultures. In this aspect, Middleton (2017a) indicated the lack of a comparative approach in studies of past collapses, emphasizing Storey and Storey (2017) as a positive exception, with a comparative analysis of the collapses of the Maya and Roman Empires.

Three main tensions were identified in this conversation. The first tension considered the cause(s) of the collapse of a particular past society, attributing a higher or lesser degree of importance to a certain cause and/or a combination of causes. The Maya collapse is a representative example of this tension. Referring to Webster (2002), Tainter (2008) illustrated that there might be over 100 explanations for the Maya collapse, including climate change, soil exhaustion, disease, earthquakes, war, decadence, and religious and superstitious causes. Although some studies emphasized climate deterioration (Hodell et al., 1995) and extreme droughts (Gill, 2000; Haug et al., 2003; Douglas et al., 2015), concluding that they represented up to a 40% reduction in annual precipitation (Medina-Elizalde & Rohling, 2012), others found that the role of droughts in explaining the Maya collapse may have been overestimated (Roman et al., 2018; Wu et al., 2017). According to Aimers & Hodell (2011, p. 44), “drought as an explanation for the Maya collapse flattens the complexity of the archaeological record and ignores the ability of the Maya to react and adapt.” Indeed, the Maya collapse probably resulted from multiple drivers, including anthropogenic and climate-driven environmental change (Kennett and Beach, 2013; Kennett et al., 2012). Similar dynamics were noted in the literature concerning other past collapses, such as Rapa Nui. One exception in regard to this tension is the cause of the collapse of past Chinese societies; a vast majority of articles emphasized the influence of climate change, nevertheless explaining that climate and nonclimate factors were linked, but that the former contributed to the deterioration of the latter (e.g., An et al., 2004; Kidder & Liu, 2017; Feng et al., 2019; He et al., 2020).

The second tension considered the perception of a particular past collapse. Whereas one stream claimed that a past society collapsed, others viewed this collapse as a reinvention. To clarify this theoretical tension, Rapa Nui is offered as a representative illustration. On one hand, the Rapa Nui collapse is generally acknowledged as a prime example of collapse (e.g., Diamond, 2005). For example, Brander and Taylor (1998) underlined that institutional changes might have averted Rapa Nui’s collapse based on natural resource degradation, whereas Roman et al. (2017) postulated that Rapa Nui could have continued if it were not isolated. Similarly, Dalton et al. (2015) concluded that the Rapa Nui palm forest was treated as an open-access resource, leading to overharvesting and eventual societal collapse. On the other hand, the idea of the Rapa Nui collapse has been challenged. DiNapoli et al. (2020) quantified the onset, rate, and end of monument construction to test the collapse hypothesis and found strong support for a new emerging model of resilient communities. Mulrooney (2013) studied land use in Rapa Nui and found continuity rather than punctuated, detrimental changes during the late pre-European contact period. Thus, the Rapa Nui collapse has been questioned because of emerging integrative interdisciplinary research (Rull et al., 2013). Indeed, Nicoll and Zerboni (2020) concluded that a critical examination of diverse archeological records reveals how civilizations and societies have reorganized, relocated, revitalized, and changed over time. In addition, Smith et al. (2021) argued that the lack of interdisciplinary research on settlement system persistence may have prohibited the development of knowledge regarding how human settlements endured, adapted to, or generated environmental, institutional, and technological changes.

The third tension in this conversation concerned the role of climate change as the primary reason for societal collapse, invoking

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2 Nunn and Carson (2015) noted that past island societies are particularly vulnerable to collapses, but that they simultaneously represent a convenient study focus, not least regarding insights about the effects on the ongoing climate change, as in, for example, Bunce et al. (2009).
environmental determinism. Environmental determinism can be defined as “a belief that the observed cultural transitions [in a society] can be causally related to the magnitude of climate change” (Coombes & Barber, 2005, p. 303). Well-cited articles in this tension (see Appendix 3) explored the Holocene climate variability, either providing a more general context for how this variability might have affected Earth in general (e.g., Bond et al., 2001; Mayewski et al., 2004) or drawing more direct conclusions about the effect of climate on collapse (e.g., Büntgen et al., 2011). As noted, many studies dealing with past collapses of Chinese societies indicated climate change factors as principal reasons for collapse. Along these lines, Zheng et al. (2014) postulated climate change’s contribution to the Ming dynasty collapse, Li et al. (2016) found that drought ended oasis civilizations along the Silk Road, and Feng et al. (2019) identified a domino effect resulting from society’s failure to respond to climate change, based on data from China’s Hexi Corridor. Similarly, Buckley et al. (2010) identified a decades-long drought interspersed with intense monsoons to have contributed to Angkor’s demise in Cambodia, and Zhang et al. (2011) found that climate change was the ultimate cause and a climate-driven economic downturn was the direct cause of large-scale human crises in pre-industrial Europe. Finally, Kaniewski et al. (2015) found suggestions for a possible causal link between adverse climate pressures and societal crises. On the other hand, Mensing et al. (2013) saw a gap in understanding how past societies responded to climate change, with environmental determinism being too simplistic an explanation that neglects sociopolitical decisions. They emphasized that studies of societal vulnerability within a human-environment system must include an analysis of complex social structures. Coombes and Barber (2005) offered a critique of environmental determinism, pointing out that climate is an important external driver, but that societal responses to climate change differ. Indeed, Butzer (2012) concluded that past collapses occurred because of poor leadership, administrative dysfunction, and ideological ambivalence, with climatic perturbations serving as triggering mechanisms only. Additionally, Lawrence et al. (2021) argued that the collapse of the Akkadian Empire occurred during a period of unprecedented urban and rural growth, which may have been unsustainable even without an exogenous climate change. The crucial determinant of how past societies responded to climate challenges lay in institutions, politics, and policies (Brander & Taylor, 1998). Consequently, past collapses can offer valuable insights into this aspect of societal transformation. For example, Cookson et al. (2019) emphasized that the political units in different communities in the Akkadian Empire might have restrained or enabled their responses to climate changes. In their study of the ancient Chinese Hexi corridor, for example, Feng et al. (2019, pp. 960–961) pointed out that “[t]he climatic perturbations and environmental degradation… did not contribute to the triggering of every societal crisis; in some cases, the most prominent driver at an early stage was an institutional failure that resulted from the inability of societal institutions to address collective problems.”

Besides these tensions, the analysis identified only a few studies on modern collapses. Exceptions included Dingli’s (2013) study of Yemen, Wendland et al. (2011) exploration of timber harvesting in Russia after the fall of the USSR, and Foa et al. (2018) investigating the USSR and whether a society’s overall level of happiness can change in collapse circumstances. Modern collapses were most frequently discussed within the discourses of “failed states” (Dingli, 2013) or crises (Diamond, 2019), which is why this review might not have completely captured them. On the other hand, Tainter (1988) also explained that collapses in an integrated global economy are different and perhaps less likely. As the world today is globally integrated, modern collapses can be understood as collapses of “subsystems” within the larger global system (Coombes & Barber, 2005), where this integration occasionally does not allow the system to completely collapse (Tainter, 1988). An interesting exploration in this aspect is a study by Daniels et al. (2021), who were exploring the impacts of flooding in Houston on health, poverty, and equity out to 2050, with a scenario of system collapse.

Moreover, the analysis revealed some understudied cases, such as the European Bronze Age beyond the Mediterranean (e.g., Tisdell & Svizzero, 2019). One reason for the lack of studies on these cases may be that they did not achieve a sufficient level of complexity to produce written records (Motesharrei et al., 2014). However, new archeological discoveries offer potential research possibilities. For example, the discovery of the Nebra sky disk, one of the oldest concrete depictions of the cosmos, suggested that the European continent might have hosted a more advanced civilization than previously believed (Meller & Michel, 2018). Although this civilization was able to produce such a delicate artifact, it did not have a written language, which is why it has remained unknown, although it existed simultaneously with Mesopotamian civilizations. Continued archeological explorations could thus add investigations of this and other similar cases to the field, while also being relevant additions to ongoing climate change discussions (Riede, 2018).

4.2. General explanations of collapse

The second scholarly conversation identified in the analysis considered general explanations of the causes of societal collapse. These general explanations and theories of collapse are mainly based on past collapses, but the conversation itself differs from the previous conversation because the focus of studies involved the development of explanatory theories and frameworks of collapse based on the analysis of several past collapses. For example, Tainter (1988) evaluated his theory based on the examples of the Western Roman Empire, the Maya, and the Chaco, and Diamond (2005) discussed four past collapses. Two main theoretical tensions were identified: one was concerned with different frameworks and causes of collapse, and the other with developing general theories of collapse.

Overall, the discussion within the first tension involved identifying different natural and social phenomena that explain societal collapse, pointing out the lack of a more conclusive general explanation (Motesharrei et al., 2014). Monocausal explanations were largely dismissed (Butzer & Endfield, 2012), especially in studies of past collapses (Middleton, 2017b). Indeed, Costanza et al. (2007) emphasized that the interplay between the factors in frameworks of collapse causes is almost always more critical than any single factor. This is in line with Homer-Dixon (2006), who posed that a society is more likely to break down when multiple, so-called “tectonic stresses,” affect it simultaneously. Consequently, most of the publications discussed combinations of economic, political, social, and environmental factors (Richards et al., 2021; Storey & Storey, 2017). For example, Gowdy (2005) emphasized the interplay between social institutions, dominant cultural myths, and responses to environmental stress. Other authors emphasized the primacy of environmental factors as causes of collapse (e.g., Weiss & Bradley, 2001; Gao et al., 2017), even while acknowledging that climate
Several authors offered more exhaustive frameworks of factors contributing to collapse, with Diamond (2005) developing an authoritative framework consisting of 5 such factors: environmental damage, climate change, hostile neighbors, friendly trade partners, and, the most significant, society’s responses to its environmental problems. (Note that these factors also help explain how some societies avoided collapse.) In addition, he also identified 12 environmental problems for contemporary societies, 8 of which are also contributed to the collapses of ancient civilizations. The 8 environmental threats are soil problems, water management problems, effects of introduced species on native species, human population growth, deforestation and habitat destruction, overhunting, overfishing, and increased per capita impact of people. The additional four problems that our contemporary society faces are anthropogenic climate change, buildup of toxins in the environment, energy problems, and full human use of Earth’s photosynthetic capacity. Later, Carter (2013) used a sociological lens to reinterpret Diamond’s (2005) model and produced a predictive model of societal collapse, whereas Dasgupta et al. (2019) developed an economic model based on the 8 problems. Despite complaints of “environmental revisionism” (Peiser, 2005) and some critique of the methodology involved in developing the original framework (Tainter, 2008), Diamond’s (2005) model was later invoked in other integrative frameworks of societal collapse. For example, Butzer’s (2012) framework approached collapse as a process unfolding over a longer period, starting with economic decline and its associated causes, in turn leading to an economic crisis. After this, how society responds is crucial; if it is resilient enough, it stabilizes and reconstructs, but if not, economic crisis leads to instability and eventual collapse. Similarly, Leroy (2013) observed that, although certain disasters apparently caused civilizations to collapse, in other cases, they spawned innovations and led to more resilient societies.

Other frameworks of collapse were offered by Cumming and Peterson (2017), for instance, who analyzed 17 historical cases, identifying 14 mechanisms that could lead to collapse in socioecological systems. Their main finding associated collapse mechanisms with the system structures of particular societies. In their review of risk literature in futures studies, Shackelford et al. (2020) classified existential and global catastrophic risks, defining collapse not only as anthropogenically induced—in a wider sense, such risks also include artificial intelligence (AI)—but also nonanthropogenically, including cosmic (asteroid impacts), biological (pandemic), and geological disasters, as well as alien invasion. Another integrative framework was more recently offered by Rubíños and Anderies (2020), who identified 12 major causes of collapse based on an extensive literature review. Their so-called robustness framework can be summarized as an interplay between natural resource infrastructure, hard and soft humanmade public infrastructure, resource users, and public infrastructure providers, within which different perturbations may occur. However, the authors pointed out that the complexity of socioecological systems makes it impossible to formulate key steps of collapse.

This notion leads to the second theoretical tension within this scholarly conversation, revolving around the development of new general theories of collapse. Although Rubíños and Anderies (2020) relativized this notion, the analysis showed that the most frequently invoked theory of collapse is Tainter’s (1988) theory of diminishing returns on investments in social complexity. According to Tainter & Taylor (2014); Tainter (1988, 1995, 2006), human societies are primarily organized around solving problems, and they do this by increasing their levels of complexity. Increasing complexity in relation to solving societal problems is, according to him, an economic function, which is why complexity can become ineffective. This continuous increase in complexity eventually reaches a barrier because of diminishing returns, leading the society to collapse. However, new inputs, such as technological innovation, can increase levels of complexity and postpone collapse.

Critiquing Tainter’s (1988) complexity theory in the case of the former Yugoslavia, Corning (2002) explained the Yugoslavian collapse as a devolution of the political system determined by the underlying functional processes to which it was related, rather than a matter of diminishing returns. On the other hand, other research has solidified complexity theory; using classical stability theory from physics and biology, Livni (2019) confirmed that collapse is associated with growing complexity and that economic growth may impede or avoid collapse. Similarly, Bardi et al. (2019) critiqued Tainter’s (1988) ideas for being too qualitative, but their reproduction using a model developed from biophysical systems dynamics largely confirmed its basic concepts. The findings, however, noted that it is not just an increase in size that reduces the efficiency of social structures, but the combined effect of the higher cost of natural resources and fighting pollution.

Several collapse theorists favored Tainter’s (1988) complexity theory, including Brunk (2002), who based his theory of collapse on self-organized criticality (SOC). He explained that human systems are self-organizing and societies tend to evolve toward the maximum level of complexity possible under current technological constraints. Approaching this limit, they experience increased rigidities and suffer various problems, leading to the so-called complexity cascades, of which collapse is the most spectacular. Similar to Tainter (1988), Brunk (2002) explained that societies can control the negative effects of these cascades through innovation or progress, but that this control cannot perpetuate, and societies eventually collapse. He also emphasized that with multiple interconnections and specialized subsystems, modern societies could be inherently unstable and more prone to complexity cascades. Coombes and Barber (2005) also used complexity theory and SOC to explain how societies react to environmental changes.

Furthermore, Janssen and Scheffer (2004) leaned on Tainter (1988) in developing their sunk-cost effects theory of collapse. They explained that human decision-making is frequently based on past investments rather than future returns, leading to an unwillingness...
to abandon something, for example, a settlement or the current global economy, if a great deal has been invested in it, even if future prospects are dim (Elsner, 2021 also used sunk costs in his conceptualization). Additionally, Schunck et al. (2021) offered a dynamic network model of societal complexity and resilience, inspired by Tainter (1988). They showed that collapse becomes increasingly likely if society’s complexity continuously increased, in response to external stresses that emulated Tainter’s (1988) abstract notion of problems that societies need to solve.

Societal complexity was also the focus of interest for Turchin (2003, 2006) and colleagues (Turchin & Nefedov, 2009; Turchin et al., 2013). Their statistical, big-data approach to the historical development of past societies provided intriguing results to the scientific community, simultaneously arousing debates around their methodology. Their more cited works indicated in Appendix 3 include Turchin et al. (2013) and Turchin et al. (2018a). The former article developed a model using cultural evolution mechanisms to predict where and when the largest-scale complex societies should have arisen in human history, with the central premise that costly institutions that enabled large human groups to function without splitting up evolved as a result of intense competition between societies, primarily warfare. The article emphasized the role of institutions in state-building. The latter article provided additional insights in the factors behind the rise in societal complexity of past societies. The researchers systematically coded data on 414 societies from 30 regions around the world, spanning the last 10,000 years, revealing that 9 characteristics of human societies (hierarchy, government, money, infrastructure, information systems, “texts,” capital population, polity territory, and polity population) showed strong relationships in the development of societal complexity. These key aspects of social organization were functionally related and evolved in predictable ways.

Other alternative theories of collapse include Pugesek (2014), who explored the seemingly random occurrence of societal collapses and other catastrophic events, such as wars, natural disasters, and pandemics, and observed a peculiar pattern. Namely, he found that the disasters were “irregularly regular,” as if occurring by chance. However, he also emphasized the relevance of social factors in response to these events. Furthermore, Johnson (2016) claimed that societal collapse can be explained through social hubris, that is, excessive pride or arrogance, causing people to ignore evidence and prevent proactive action. According to Middleton (2017b), the social hubris theory is similar to the sunk-cost-effects theory, because both explain collapse through deliberate and rational conservatism and past investments in the status quo. However, Johnson (2016) agreed with Tainter (1988) that collapses are probably kick-started by a precipitating factor.

Overall, most explanations resulting in different frameworks and theories of collapse emphasized the interrelation of factors external and internal to society, where one particular set of factors outweighed the other in specific cases. How society reacts is crucial, which is why studies of political and social institutions in times of collapse are relevant, especially when some authors posit that modern global society is experiencing disintegration (Galtung, 1996). An interesting finding in this conversation concerns the role of randomness and luck in societal collapse (Hadlock, 2012; Kemp, 2019; Pugesek, 2014). As societies are complex chaotic systems, more research about the role of chance in societal collapse is an interesting research avenue. Nevertheless, according to the frequently invoked theory of collapse, Tainter’s (1988) complexity theory, societal collapse is increasingly likely and almost inherent in any complex society. In light of this notion, one neglected research avenue involves exploring why this template repeats and why societies do not learn from past mistakes. The inevitability of collapse leads to the next scholarly conversation and one of its tensions.

4.3. Alternatives to collapse

The third scholarly discussion in the corpus of collapse literature treated societal collapse as one possible scenario of how societies and civilization may culminate, and it questioned what the possible alternatives could be. The conversation is simultaneously permeated by its main tension, revolving around the inevitability of societal collapse. More concretely, the main question is whether societal augmentations such as technological innovations and societal transformations would lead to a more sustainable society or merely postpone the inevitable collapse. The second tension concerns whether societies do indeed collapse or merely transform by virtue of their resilience and continue to exist (Nicol & Zerboni, 2020). It should be noted that the discussion in this latter tension depends on how the reviewed studies understood collapse.

An example of the former is Tainter’s (1988) reasoning that societies can continue to exist by increasing energy inputs and stimulating complexity through technological innovation, scientific development, and political transformation. However, this increase in complexity cannot continue indefinitely, because constant inputs and some luck are needed for a society to survive. Eventually, high costs limit society, leading to collapse. Similarly, Livni (2019) concluded that, when complexity increases, sufficient economic growth may keep collapse away and even delay it for centuries. Understanding systemic risks and tipping points emerges as crucial (Brondizio et al., 2016). In addition, Dasgupta et al. (2019) suggested that societal collapse can be mitigated by looking for resources elsewhere, such as in colonies. For modern global society, the exploitation of space resources has been suggested as an alternative (Bardi, 2020; Smith, 2019), although simultaneously highly questioned (Gunderson et al., 2021). Interestingly, in addition to his framework, Diamond (2005) also looked into highly resilient societies that have never experienced collapse.

Furthermore, Meadows et al., (1972, 2004) developed three scenarios in LtG: business as usual leading to collapse; alleviating the pressures of resource scarcity by employing technological or economic fixes, which merely prolong the collapse; and the final sustainability scenario. As already discussed, recent updates of LtG with actual data have shown that the current development follows the business-as-usual scenario (Turner, 2008, 2012, 2014) and that the window of opportunity to change to the sustainability scenario is disappearing (Herrington, 2021). These insights resonate with Sears (2020), who claimed that the longer humans take to reduce their ecological footprint and move toward sustainability, the lower the population and material standards that will be ultimately supportable.

Moreover, in their astrobiological exploration, Frank et al. (2018) depicted several possible scenarios with bleak conclusions. They
assumed that climate and related environmental changes are most likely universal phenomena for every technological civilization in the universe. Using dynamical systems modeling, the authors extrapolated three trajectories: a die-off, where the population overshoots the carrying capacity of its planet and dwindles; collapse, similar to the former, but where the decline is rapid; and a sustainable state. In addition, they also found a scenario of collapse in which civilization switched to low-impact energy sources and limited its population, but collapsed anyway. Consequently, Kipping (2021) speculated that the Milky Way galaxy is viewed as a frothing landscape of civilization birth and collapse and that the search for extraterrestrial intelligence should focus on extinct rather than extant civilizations. Other authors have also related collapse to astronomy (Bologna and Aquino, 2020; Miller and Felton, 2017).

Alternative scenarios to collapse are also prominent in futures-related studies. For example, Dator (1979) speculated that there are four futures for any society: continuation, characterized by constant economic growth and institutional improvement; collapse, which should not be understood negatively because it could lead to more simplicity; discipline, corresponding to what is today labeled as sustainability; and transformation, radically changing human society with the help of advanced technologies, leading to space colonization. Costanza (1999) also speculated about four visions of the future, the most prominent being the Star Trek future, the default optimistic technological vision of unlimited resources and energy sources, and the Mad Max future, essentially a world that collapsed. Similarly, Frase (2016) portrayed four futures, framing them around automation, politics, climate change, and the current energy crisis. He imagined one scenario of abundance and one of scarcity, overlaying them with political regimes of either hierarchy or egalitarianism. Bai et al. (2016) added more nuance to the research by indicating that such futures depended on societal goals, major trends and dynamics that might favor or hinder them, and factors that might propel or impede transformations toward desirable futures.

Notably, research on societal resilience portrayed in the first scholarly discussion can be related here. More concretely, the proponents of societal resilience opposed the idea of collapse, claiming that societies and civilizations are cyclical and resilient, and collapses rare (Lawler, 2010). For them, societies transform and adapt to new circumstances, delaying or preventing collapse (Kemp, 2019). Therefore, resilience should be developed to mitigate societal collapse (Baum, 2015; Garrido, 2016). Indeed, Scheffer et al. (2021) found that the loss of internal societal resilience preceded the transformation of pre-Hispanic Pueblo societies. Similarly, Degroot et al. (2021) identified five factors increasing the resilience of past societies facing climate changes in their extensive review: exploiting new opportunities, resilient energy systems, resources of trade and empire, political and institutional adaptations, and migration and transformation.

Modifying the resilience view, meanwhile, Tainter and Taylor (2014) noted that, within complexity theory, resilience requires a reserve problem-solving capacity. However, when complexity increases, resilience is ultimately compromised because more resources are required. Thus, sustainability becomes endangered. Moreover, in the dialogue between Butzer (2012) and Pearson and Pearson (2012), the former wrote that resilience is inward-directed and that our societies are resilient and self-reinforcing, but not sustainable; what is needed is societal transformation, shifting to a low-carbon economy. Similarly, Diamond (2010) criticized McAnany and Yoffee (2009), claiming that their optimistic interpretation of collapse as resilience is questionable and may impede necessary historical lessons to mitigate the current crisis.

In any case, Nicoll and Zerboni (2020) emphasized that, despite collapses, past societies exhibited considerable continuity, social resilience, and transformation and that many scholars now view culture as a continuum, persisting through disasters and cycling through collapse and reorganization. However, they noted that less is known about the aftermath of collapse, how cultures and civilizations transform, and how its people respond to stress. Exceptions include the research of Kolata (2006), linking institutions existing in the society before the collapse and faster regeneration of the society after the collapse, and Bunce et al. (2009), who found that social-ecological systems may get stuck in a post-collapse recovery without any new structure emerging. Consequently, research in collapse aftermath appears to be the most promising future research direction within this conversation. Also, continuing Diamond’s (2005) inquiry into past societies that never experienced collapse could provide valuable insights for collapse and futures studies. In addition, collapse research in astronomy and astrobiology is interesting from the futures studies perspective.

### 4.4. Fictional collapses

The fourth scholarly conversation focused on fictional collapses, most frequently post-apocalyptic and/or dystopian portrayals of imagined collapse afterwards in the future, with some exceptions. Considering the number of articles, this was the most modest conversation, which is slightly surprising, given the popularity of apocalyptic and post-apocalyptic fiction (Hicks, 2016; Tate, 2017). The majority of studies within this conversation were performed in literature studies, such as Hanssen (2018), focusing on dystopian youth-adult (YA) novels. Other studies explored fictional collapses in virtual gaming environments (Bainbridge, 2016) and films (Fergnani & Song, 2020). Overall, most studies were primarily interested in issues dominant in their particular domain. Methodologically, the identified studies are almost exclusively interpretations of their source materials (novels, graphic novels, and films).

The key theoretical theme revealed by the analysis is the importance of the narrative permeating the source material. For example, exploring apocalyptic ecology in graphic novels, Jones (2020) concluded that many of them used themes of dystopian hopefulness, that is, the enjoyment that audiences experienced from watching human society prevail in times of apocalypse. According to the author, such narratives served as inspiration and enhanced the belief in an indomitable human spirit. Similarly, while dystopian YA novels presented bleak expressions of political and social hopelessness, Hanssen (2018) asserted that they simultaneously applauded the ingenuity and resourcefulness of its protagonists in problem solving. The author’s interpretation of the novels as optimistic statements on the need for environmental and social sustainability is in line with Dasilha (2019), although he presented it as two competing ideologies. Whereas both ideologies are firmly immersed in the context of real-world sustainability transformation, one is more techno-optimistic, and the other more dystopian and post-apocalyptic. This conflict between utopian and dystopian, optimistic
and pessimistic, is also the main theoretical tension within this scholarly conversation. Interestingly, this tension was acknowledged in a rare scrutinization of climate nonfiction from an ideological point of view (Randall, 2016), as well as in Bainbridge’s (2016) three purposes of post-apocalyptic science fiction (SF). Thus, such works may speculate about the actual future, they may simulate a reality in which conflicting philosophies can be compared, and they can also represent what many people wish would happen.

Some authors have used fictional collapses as warnings. For example, Oreskes & Conway (2013, 2014) wrote imaginary warning accounts of the Great Collapse of Western civilization in 2074 from the position of a historian living in a fictional future. Historical events up to 2014 are presented factually, after which the authors described a possible history leading to societal collapse caused primarily by denial and self-deception. Another interesting example in this vein is Satoh and Stahle (2022), who wrote a short fiction story exploring human settlement after the collapse, leaning on research by Bendel and Read (2021). Other authors used works of fiction to exemplify possible dystopian futures, including the movies Mad Max in Costanza (1999) and Elysium in Frase (2016). Only a few publications analyzed works of classical literature concerning collapses, such as Pope’s (2016) analysis of Lucretius’s De rerum natura, or Zhang’s (2020) exploration of T. S. Eliot’s The Waste Land.

Regarding fictional narratives of collapse, it is interesting to note how such narratives can serve as inspiration and warning, but also impact public opinion and shape perceptions and behaviors in a more negative direction. For example, Schneider-Mayerson (2013a) focused on disaster movies of the 1990s and 2000s and argued that the prevalence of such apocalyptic popular culture influenced apocalyptic beliefs in the United States. He subsequently developed this notion as the concept of “ecocriticism,” (Schneider-Mayerson et al., 2020), premised on the assumption that the texts it studies have a significant impact on readers and the world at large. He also explored the peak-oil movement and how it may impact American environmental policies (Schneider-Mayerson, 2013b) and suggested that climate fiction (“cli-fi”) reminds concerned readers of the severity of climate change while impelling them to imagine environmental futures and consider the impact of climate change on human and nonhuman life (Schneider-Mayerson, 2018).

Consequently, several possibilities for future research emerge. First and foremost, the insight about the importance of the narrative can guide researchers to study how narratives, in general, and those related to fictional collapses, in particular, can be used to stimulate certain behaviors in times of climate change adaptations. For example, according to certain research (Hanssen, 2018; Jones, 2020), fictional works may promote certain types of behavior that would be advantageous in times of collapse.

Furthermore, exploring apocalyptic, post-apocalyptic, dystopian, and utopian fiction in more detail may generate insights about navigating possible global collapse. Climate fiction arises as a particularly interesting stream of literature in this respect (Tate, 2017). Testing different collapse theories and scenarios under virtual conditions is an intriguing research topic. Finally, studying ancient literature to extrapolate insights into the collapses of past societies represents a compelling methodological avenue (see Wei et al., 2015).

4.5. Future climate change and societal collapse

The final scholarly conversation linked societal collapse to issues of sustainability, global warming, and ongoing climate change. The conversation intensified in the last decade or so, and it is rich in insights and methodological approaches. The latter includes analyses based on focus groups (Threadgold, 2012), conceptual pieces substantiated with abundant data about the state of the environment (Ehrlich & Ehrlich, 2013), and causal loop modeling (Richards et al., 2021). The conversation also showed one main theoretical tension, with two associated themes.

The overarching theoretical tension in this conversation concerned the dissonance between the pessimistic and optimistic views of our future. For example, de Vries (2006) discussed utopias and dystopias. Both views discussed the overshoot of natural resources and extensive usage of fossil fuels, as well as consequences of global warming and ongoing climate change, yet they differed in their vision of the future. The pessimistic view treated global societal collapse as inevitable: global society is not transforming fast enough, and instead of attempting to avoid the collapse, we should embrace it, discuss how to mitigate its negative effects, and eventually, ensure the survival of the human race. This view was frequently fueled by the Intergovernmental Panel on Climate Change’s (IPCC) recent reports, stating, for example, that humanity had only 12 years left to limit climate change catastrophe (Watts, 2018). A notable example of this view is Scran ton (2015), who presented humanity’s current situation as a catch-22: humanity has to radically and rapidly transform the economic system, yet such a shift would cause major societal turbulence exemplified in unprecedented levels of unemployment and decreased global well-being. For this reason, humanity continues to feed the system that burns fossil fuels at increasing rates and threatens its existence. Consequently, he argued that we should focus our efforts on the preservation of the capital works of our culture for posterity and proposed the creation of a vault that would preserve humanity’s cultural achievements for future civilizations. De Kosnik (2020) also raised the issue of data preservation in the aftermath of a collapse.

Similarly, Bologna and Aquino (2020) developed a model considering the current rates of deforestation, population growth, resource consumption, and technological growth, which indicated a less than 10% probability rate of survival without facing a catastrophic collapse. They also linked their findings to astrobiology, explaining that advanced civilizations commit “suicide” because of the irrational destruction of their habitats, which human civilization should soon exemplify. This explanation is not unlike Toynbee’s (1926–1928) conclusion that great civilizations are not murdered, but take their own lives, as well as Diamond’s (2005) notion of “ecocide,” when he described the Rapa Nui collapse because of environmental degradation. Other pessimist voices included Turner’s (2008, 2014) updates of LtG and Lovelock (2014), who wrote that the best course of action in relation to future climate change may not be sustainable development, but sustainable retreat. Furthermore, Downey et al. (2016) found that our global society exhibits early warning signs of collapse in the form of reduced resilience in the socioecological systems, Gunn et al. (2019) concluded that a transition toward sustainability for the current energy-dense globalized industrial society will be very difficult, and Cotton-Barratt et al. (2020) predicted a high risk of human extinction by 2100, preceded by irreversible civilization collapse. Indeed, Kemp et al. (2022) outlined
current knowledge about the likelihood of catastrophic climate change and put forward a corresponding research agenda, emphasizing the necessity of understanding bad-to-worst case scenarios.

In contrast, other authors insist that claims of inevitable societal collapse must be challenged, because narratives of despair would lead to social distancing and inaction (Hayward et al., 2020). Instead of bleak dystopian visions of the future, we should instead discuss initiatives improving social, ecological, or economic dynamics within a particular setting (Bennett et al., 2016). If today’s big threats are caused by human choice rather than natural causes, we also have the possibility of not repeating past mistakes (Lawler, 2010). Moreover, past societies were generally geographically limited, whereas our current modern society is global, requiring large-scale actions. Consequently, in developing transformative futures, some authors acknowledged the important roles of narratives (Coulter et al., 2019; Wuellner, 2011), imagination (Dunagan, 2010; Wyborn et al., 2020), and vision (McPhearson et al., 2016). Middleton (2018) emphasized that the environmental and climatic determinism behind the megadrought-collapse narrative of past societies neglected to account for specific historical circumstances, as certain societies, including Egypt, thrived, whereas some disappeared or transformed, such as the Maya. In the words of Costanza et al. (2007), we can learn from history by scrutinizing interactions between humans and their environment, with the goal of creating sustainable and desirable futures for our species. Other publications also opposed the mainstream-dominant narrative of our civilization racing toward collapse. For example, Randall (2016) critiqued some of the literature within this theme, advancing the idea that it promoted Marxist ideology determined to terminate capitalism, and Mann (2021) disregarded the belief that it is too late because he considered it to be co-opted by fossil fuel interests to continue with business-as-usual practices. He sees the youngest generation as game-changers who are working hard to change the world.

Consequently, an associated theme sprouting from the main tension in this conversation emerged, namely, strategies needed to transform society to meet the challenges posed by ongoing climate change. Thus, the optimists acknowledged that the pursuit of the transformative pathway is a crucial challenge for global society (Paterson, 2020). Indeed, changing the system requires systemic change (Mann, 2021). Bardi (2020) stated that collapses can be avoided if society acts early enough on the elements stressing the system, and if a collapse cannot be avoided, its damaging effects can be reduced. Indeed, waiting for the collapse to happen to initiate such transformations invites folly (Ruhl & Ruhl, 2022). Bai et al. (2016) pointed out that dramatic social and technological changes are required to achieve a sustainable future and that transitions that are central to increased sustainability are interlinked and engulfl demographic, technological, social, institutional, informational, and ideological transitions. Some more concrete strategies that they suggested were replacing the GDP with a new measure of progress, a broader use of scenarios of possible futures in public deliberations and collective decision-making to explore multiple relations with the situated knowledge of multiple stakeholders, and creating new relationships between science and practice, where solution-oriented research questions are asked.

Ehrlich and Ehrlich (2013) reflected these measures in identifying two key challenges to a transition toward sustainability: avoiding climate-related mass famines and phasing out fossil fuels. However, they simultaneously stated that these transitions will be extremely problematic to implement because of economic and political interests and reality. They called for rapid social and political change, with a big challenge: convincing people of the necessity of such measures, especially politicians and economists. They stated that both natural and social scientists should put more effort into finding the best ways of accomplishing the necessary remodeling of the energy and water infrastructure. Moreover, cultural and institutional barriers to implementing transformational policies have to be overcome, educational systems have to be transformed to teach about how the world really works, and we will have to deal with economic and racial inequalities.

Other, more concrete, measures for transformation were suggested by Bennett et al. (2016). They focused on a more local level and how transformational initiatives can emerge from there. Such initiatives improve social, ecological, or economic dynamics within a particular setting can grow. Some examples they named are agroecology, green urbanism, fostering new knowledge and education that can be used to transform societies, and urban transformation creating urban socioecological spaces. For Homer-Dixon (2006), building resilience in the technological, economic, political, and social systems is of utmost importance. He proposed solutions that are the infrastructure-equivalent to open-source technology, large-scale, voluntarist, collaborative, and nonegocentric problem solving.

Other strategies concerning social innovation aimed at positive transformation include Odum and Odum’s (2001) measures for “a prosperous way down,” that is, degrowth strategies that would contribute to general well-being (see also Cattaneo et al., 2012). Also, Barry (2014) warned that at least 60% of terrestrial ecosystems must remain intact to avert collapse, whereas Meadows et al. (2004) proposed a set of measures necessary to achieve a more sustainable society within the limits to growth. Finally, Gowdy (2020) emphasized aggressive policies to reduce the long-run extremes of climate change, aggressively population reduction policies, rewriting, and protecting the world’s remaining indigenous cultures.

Simultaneously, the authors warned that such a societal transformation will be difficult for various reasons, such as because societal transformation is frequently used as a buzzword applied to everything and anything (Feola, 2015), because the current debate on social innovation for sustainability disregards human-environmental interactions and related feedback (Olsson et al., 2017), and because we built an increasingly complex system with interdependencies that we do not fully understand (Lechner et al., 2016). Moreover, the survival of humanity in the face of climate change would affect civil liberties and well-being (Sears et al., 2020). The crucial determinant of our response lies in institutions, politics, and policies echoing one of the conclusions of the previous scholarly conversation 2 on past collapses. Furthermore, past collapses offer valuable insights into this aspect of societal transformation.

The role of technology in assisting the transformation was also discussed within this theme. On the one hand, technological solutions are seen as necessary and occasionally central in this transition (e.g., Garrido, 2016; Robbins, 2020). One view emphasizing this centrality is ecomodernism, distilled in An Ecomodernist Manifesto (2015). Essentially, ecomodernists are market-friendly techno-optimists who perceive technology as a means of reconciling growth and ecological protection (Grunwald, 2018). As such, they were critiqued for relying too much on belief in technological solutions to solve climate crisis (Grunwald, 2018). This belief is also inherent in the notion of technological promises, assumptions that technology will help humanity to overcome the crisis and transition
to sustainability (McLaren & Markusson, 2020). Ultimately, technological solutions are optimistically seen as proactive, self-preserving methods that might in the long run be used to take humanity from Earth to other solar system habitats (Smith, 2017). On the other hand, scholars warned against “cornucopian enchantment”—the idea that technological innovation is sufficient to overcome limits to growth (Butler, 2016). Furthermore, they emphasized that the technological utopia of modernism reinforced the status quo and offered false solutions to the environmental challenges we are facing (Gómez-Baggethun, 2020), arguing that technology and innovation would not help humanity solve the global warming problem in the long run (Huesemann and Huesemann, 2011). Perhaps the most fitting conclusion concerning technology as a transformation strategy was offered by Bardi (2020), who stated that technology and innovation have potential and that we could use the remaining fossil fuels to jump-start a renewable-based infrastructure, yet we have to act fast. This strategy is expensive, however, and has to be accelerated to avoid collapse.

Another theme sprouting from the overarching pessimistic-optimistic tension within this scholarly conversation concerned emotional responses to ongoing climate change and possible societal collapse. For example, Bellamy and Hulme (2011) found that egalitarian individuals were more concerned with the effects of climate change, Aarssen (2013) and Andrews and Smirnov (2020) dealt with empathy, Sandberg (2020) discussed fear of collapse, and Bardi (2020) mentioned “doom fatigue.” Threadgold (2012) examined young people’s attitudes toward the future, summarizing the findings in an article titled “I reckon my life will be easy, but my kids will be buggered.” A broader spectrum of emotional responses to climate change was charted by Moser (2020), including climate grief, solastalgia (emotional distress related to climate change), climate anxiety, guilt, fear, and profound grappling with the meaning of what scientists are saying. In addition, Crutchfield (2022) concluded that people who will have matured in pre-collapse society, experience collapse, and then continue to live in the post-collapse world will suffer more and feel much worse than subsequent generations.

One interesting discipline in this context is the so-called ecopsychology (Roszak et al., 1995), an environmental take on psychology, offering a planetary view on mental health and recognizing that the capacity to live in balance with nature is essential to human emotional and spiritual well-being. Arising from the more pessimist view, Scranton (2015) claimed that humanity should come to terms with its demise, whereas Baker (2009) wrote that collapse is occurring, human consciousness should transform accordingly, and we should discover our purpose in the collapse process. She also offered some practical meditation, similar to practical workshops in the deep ecology of Macy and Brown (1998).

It must be noted that a few articles relating the COVID-19 pandemic to collapse have emerged (Butler, 2020; Smith & Thomas, 2021; Weis & Magnin, 2021), with Smith and Thomas (2021) also considering doomsday prepping (see also Wallace, 2020; Parkkinen, 2021). Educating youth in survival skills because of climate change and potential collapse has been suggested (Besley and Peters, 2020). Furthermore, one article related fake news and collapse (Brooks, 2021). More research on these themes is expected, but currently, they cannot be considered separate streams or conversations.

Overall, while the fifth scholarly conversation revealed rich discussions and tensions between pessimistic and optimistic views on the future, the debate has in the last few years slowly tipped toward the former, reflecting a general “climate alarmism” point of view. This shifting of the debate resulted in several works describing future society affected by global warming (e.g., Wallace-Wells, 2019; Figueres & Rivett-Carnac, 2020; Bendel and Read, 2021), in line with Bardi’s (2020) statement that scientists might have previously dampened their discourse to avoid being termed prophets of doom. However, as shown through in this conversation, there are opposing views as well. Rees (2003) is interesting in the light of this conversation’s main tension because he straddles the line between the pessimistic and the optimistic perspectives: he estimates humanity’s chances to survive the 21st century as 50–50. Provided that we do not self-destruct because of new technology, terrorism, and climate change, we will expand throughout space. Another potentially interesting future research direction is systematic modeling combining climate change with the sociopolitical processes thought to drive collapse; not much research has been performed in this aspect.

Table 3
Future research suggestions associated with the findings.

<table>
<thead>
<tr>
<th>Scholarly conversations</th>
<th>Future research suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past collapses</td>
<td>Investigating less-studied past collapses (e.g., European Bronze Age beyond the Mediterranean)</td>
</tr>
<tr>
<td></td>
<td>Studying modern collapses and failed states (e.g., USSR, Yugoslavia, Yemen) using tools, methods, and frameworks of past collapses</td>
</tr>
<tr>
<td>General explanations of collapse</td>
<td>Comparative studies of past collapses</td>
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<td></td>
<td>Research focusing on how societies react to collapse</td>
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<tr>
<td></td>
<td>Investigating the role of chance in societal collapse</td>
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<tr>
<td>Alternatives to collapse</td>
<td>Understanding why the collapse template repeats and why societies do not seem to learn from past mistakes</td>
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<tr>
<td></td>
<td>Research on societies in the immediate aftermath of collapse</td>
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<tr>
<td></td>
<td>Studying highly resilient societies that have never experienced collapse</td>
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<tr>
<td>Fictional collapses</td>
<td>Research linking collapse studies to astronomy and astrobiology</td>
</tr>
<tr>
<td></td>
<td>Studying how fictional collapse narratives can be used to stimulate certain behaviors in times of climate change adaptations</td>
</tr>
<tr>
<td></td>
<td>Exploring dystopian and utopian climate fiction to navigate possible global collapse</td>
</tr>
<tr>
<td>Future climate change and societal collapse</td>
<td>Creating virtual societies and studying collapses in simulated environments</td>
</tr>
<tr>
<td></td>
<td>Research on societal adaptations to negative climate change impact</td>
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<tr>
<td></td>
<td>Understanding why the global system is rigid and reluctant to change when faced with an existential crisis</td>
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<tr>
<td></td>
<td>Systematic modeling combining climate change with the sociopolitical processes thought to drive collapse</td>
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5. Implications, future research directions, and discussion

The main purpose of this article was to offer a systematization of the extant research on societal collapse and to indicate potential future research directions. As presented in the previous section, the key theoretical tensions and themes within five scholarly conversations on collapse literature across different scientific disciplines offer a more coherent view on the field of societal collapse studies. As pointed out by Renn (2021), bringing together disciplines underpinned by different methodologies and theories is never an easy task, and this review represents a modest attempt in that direction.

Table 3 suggests the future research emerging from the findings.

The remainder of this section discusses how the results of the review may inform the futures-oriented studies. Whereas the future research suggestions indicated in Table 3 mainly concern future avenues within the particular disciplines, future research could also combine tensions, themes, and notions across the conversations. Already, the introduction and the background sections indicated that societal collapse is a heterogeneous concept and that it perhaps cannot be quite distinguished as a separate field of study. Rather, this article approached societal collapse as a framed range within which relevant research was conducted. The background section showed that relevant springboard research was conducted either in history, anthropology, and sociology, with the focus on past collapses, or in systems research and environmental studies, with the focus on future climate change and societal collapse. Thus, research appears to be relatively fragmented.

The results of the literature review largely confirm this fragmentation and demarcation between studies on past collapses and possible future collapse. The fragmentation and demarcation are visible in the overlaps between the categories in the classification of the identified publications (see Appendix 2) and are supported by the results of the bibliometric study (Appendix 3). Most of the existing overlaps occur between the first three conversations, which dominantly studied past collapses, and between the fourth and fifth, interested in possible future collapse. However, despite this demarcation, there are some influential publications arguing that lessons from past collapses may inform societal transformation in light of future climate change and societal collapse. For example, Costanza et al. (2007) argued that the integration of records of how human-environment systems co-evolved over time is needed to provide a basis for a deeper understanding of the present and for forecasting the future. Likewise, Diamond’s (2005) framework of collapse factors was developed based on the insights from past collapses, but included considerations about future climate change and collapse, and Tainter and Taylor’s (2014) reflections on Tainter’s (1988) complexity theory applied to the modern world are also influential studies. Nevertheless, studies attempting to use insights from past collapses to inform possible future collapse are surprisingly scarce, in relative terms, although they have the potential to be influential. This relative scarcity is even more surprising because many publications about past collapses in their problematization present the argument that more knowledge about a particular past collapse in which they are interested might provide insights for future climate-change-related challenges. However, they rarely follow up on this argument in the results. For example, Mensing et al., (2013, p. 122) stated that “[a] more complete understanding of how both natural and human-caused changes have affected the environment in the past can potentially guide policy decisions aimed at promoting future sustainability,” but did not connect their results to this statement.

Thus, there is more potential to develop highly relevant research focusing on how insights from past collapses could inform research on future climate change and societal collapse. For example, Cumming and Peterson (2017) identified 14 mechanisms of collapse of past societies and used them to reflect on the need to increase the resilience of the global socioecological system in particular areas. However, they simultaneously expressed their reservations against this approach, stating that the analyses of historical collapses may not offer relevant insights for contemporary society because of recent human developments and the specificities of the modern socioecological system (Cumming & Peterson, 2017). In performing such research, one must acknowledge that earlier collapses were societal, local, regional, and civilizational in nature, but that the possible future collapse—or decline—is global, presenting an existential threat to humanity and the planet (Sardar, 2021; Young et al., 2006). However, exploring historical collapses, their aftermath, and the resilience of past societies may provide valuable lessons for local, marginal environments facing hydroclimate change, overpopulation, and scarcity of resources (Nicoll & Zerboni, 2020) and should, therefore, not be dismissed. This literature review showed several influential voices exhibiting that such cross-pollination is possible, even on a more general level (Costanza et al., 2007; Diamond, 2005; Tainter & Taylor, 2014).

Another intriguing finding of this review has been the fourth conversation about fictional collapses. Although the most modest measured by the number of publications, it offered some interesting insights for future studies. For example, the review has indicated the importance of fiction and narratives in strengthening the human spirit, but also its potential to guide societal transformation. An example of an SF-writer concerned with how climate change might affect humanity and how global society responds to associated challenges is Kim Stanley Robinson. His novel The Ministry for the Future (Robinson, 2020) presents an idea of the eponymous body advocating for the rights of future generations. The novel is scientifically accurate, also, when it described history and social sciences, and future events are told from the perspectives of various characters expressing their views on ecology, climate, and other issues relevant in the context (Poole, 2020). Such narratives may help in navigating through the future.

There is also an overlap between the fourth conversation’s discussion about how fictional narratives could influence social and public opinion in a more negative manner (see ecocriticism by Schneider-Mayerson et al., 2020) and the fifth conversation’s theme concerning emotional responses to future climate change (e.g., Baker, 2009). This overlap represents a promising and relatively unexplored research avenue, with the future research potential even more pronounced if contemporary fictions from certain past collapses or fictional works about past collapses are included in such studies, such as contemporary works from and/or novels about the late Roman Empire and the narratives existing in them. Studying narratives in works of nonfiction, as in Randall (2016), is also promising, especially the characteristics of the optimistic narrative opposed to the narrative of “climate alarmism.”

Although research streams on societal collapses exhibit heterogeneity, some common denominators of studies on past collapses and
studies on future climate change and societal collapse can be recognized. Thus, societal response in the face of collapse is crucial; more concretely, the most valuable lessons are that a society should transform its institutions, change policies and politics, and increase resilience in areas such as food production and biodiversity in order to mitigate collapse. These insights appear regardless of the conversation or the focus on the past or the future. Indeed, how societies react when confronted with a crisis proved most crucial in avoiding or mitigating an environmental-change-related collapse (Coombes and Barber 2005). The last several years have seen an increase in climate-change-related effects on human society and the global economy, not the least of which were the recent pandemic, floods, wildfires, and droughts. In light of these and potential further effects, transforming the current global society emerges as necessary; the literature offers many suggestions, indicated in the associated theme in the fifth conversation (e.g., Odum & Odum, 2001; Meadows et al., 2004; Gowdy, 2020; Paterson, 2020).

Some of the literature assumed that the negative effects of climate change will increase in the future, arguing that global society should adapt to such effects (Bendel and Read, 2021). Diamond (2005) also wrote that a future collapse might not entail an apocalyptic collapse of industrial civilization, but “just” a future of significantly lower living standards, chronically higher risks, and the under-mining of what we now consider some of our key values. He underlined the worldwide spread of diseases or wars, triggered by a scarcity of environmental resources, as manifestations of such a future collapse. In their interesting article combining the first and the fifth conversation, Gunn et al. (2019) pointed out how the Classic Maya collapse may imply that necessary transformations of global societies probably will occur because of the scale of disruptions, but that they would likely lead to social disruptions.

Increasing resilience in global society has also emerged as necessary, as another lesson from past collapses (McAnany & Yoffee, 2009; Schwartz & Nichols, 2010; Yoffee & Cowgill, 1988), both to mitigate collapse and to minimize its effects if it becomes inevitable. Table 3 indicated several research directions that can be utilized to that end. For example, studying highly resilient societies that have never experienced collapse (Diamond, 2005), as well as systematic modeling combining climate change with the sociopolitical processes thought to drive collapse, may provide valuable guidance. The application of Turchin et al.’s (2013) study on modern global society can also be intriguing. In any case, one manner of increasing resilience is through innovation (Tainter, 1988). Taking into consideration both the opponents and proponents of technological innovation as a means to confront collapse, it is reasonable to assume that innovations are necessary to mitigate the immediate negative effects of climate change. However, observing this insight through Tainter’s (1988, 1995) complexity theory lens, continued increases in complexity of the global society merely postpone, and do not mitigate, collapse. Thus, innovation should probably not be accepted as the ultimate remedy to the situation (Butler, 2016), but rather, soundly skeptical, as a means that buys humanity time to profoundly transform society in a more sustainable direction.

However, the review has also indicated that such transformations may have inherent pitfalls. Future research bringing more understanding to why the collapse template repeats, why past societies failed and did not learn from previous mistakes, and what the possible causes of the rigidity of our global system might be can help in mitigating the pitfalls. Some examples of pitfalls indicated in the review have been social hubris (Middleton, 2017b) and technological utopia (Gómez-Baggethun, 2020), as well as the tendency of societies to make decisions based on past investments rather than on future returns (Jansen & Scheffer, 2004). Another interesting insight is the role of chance, or randomness and luck, in overcoming societal collapse. Several authors indicated this factor (Hadlock, 2012; Kemp, 2019; Pugesek, 2014), leading to the conclusion that a society may collapse even if it makes all the right moves, so to speak (Frank et al., 2018).

As it is, the future is highly uncertain, and models and predictions cannot provide simple answers to how it will unfold (Costanza et al., 2006). According to the authors, the purpose of any scenario, consequently the ones shown in this literature review as well, is to create utopias that guide appropriate responses to changes in the environment.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.futures.2022.103075.

References


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