

Utilising ChatGPT-4 in SLR Design: AI Streaming in AgilePM and Responsible (Risk)  
Management (APM-RM) Discourse

Keywords: ChatGPT-4, SLR, AgilePM, Responsible management

## Abstract

The role of AI (particularly ChatGPT) in academic writing is an emerging discipline; however, the stream of discourse is currently at a deficit of empirical data, i.e. applied AI in scholarly writing is yet to mature despite the fact that the growth in capabilities and accessibility of AI has exponentially increased since ChatGPT first became available in November 2022. Whilst some may view AI as a threat to the integrity of academia, entrepreneurs, industry, and governments worldwide are embracing the technology toward solving complex problems due to the advantages that an AI language model provides. Although it could be said AI has the potential to universally transform business operations, as well as deprecate several human jobs—it has already done both—lack of standardised methodology risks ethical failings and laxity of academic rigour in research output. To solve this problem, this paper examines the potential of ChatGPT-4 to assist writing SLRs in the management science domain. The assumption of this paper is that ChatGPT-4 streams SLRs best when the subject is so diffuse that capturing a hard core of the discourse is not possible. To this end, this paper conducts AI streaming methodology of Agile PM and Responsible Management (APM-RM) discourse utilising AI generated Boolean search terms and textual and thematic analysis. The result generates an operationalisation of APM-RM concepts, providing high accuracy, repeatability, and relevance resulting in a comprehensive identification of AgilePM risks.

## Introduction

Systematic literature reviews (SLRs) are essential for academic discourse. Not only do they offer a structured methodology to synthesise and critically analyse extensive bodies of academic research (Tricco et al., 2018), but also they can help inform policy, guide future research, and provide comprehensive overviews of existing knowledge in various fields. However, the traditional methods of conducting these reviews, while thorough, are often plagued by time-intensive processes and the potential for subjectivity bias (Shojania et al., 2007), a challenge that is increasingly evident in risk management research whereby multiple terms and concepts are used to refer to the same phenomena. As such, the challenge of collating research in this ambiguous context means that one must often engage in ad hoc and/or trial and error to produce a body of literature which encapsulates a 'hard core' of the relevant corpus. Therefore, generalisability of SLR methodology becomes problematic when needing to establish a novel or emerging stream of discourse (Tranfield, Denyer, & Smart, 2003).

One example of this issue is the subject of AgilePM and responsible management (APM-RM). 'Agile' as a search term is problematic as it is not always clear whether the term is being used in its most general sense (to be flexible or adaptable), or its methodological application to project management. This is further compounded by the fact authors sometimes use the term 'agile' on its own to mean 'AgilePM'. So, in a Boolean search for 'Agile PM' some relevant articles may be excluded. Using the 'OR' operand can help alleviate this issue by including both terms, but this risks importing irrelevant results when an author is using the term in its general meaning. Extant literature on AgilePM has identified it as having a lack of standardisation (compared to Prince2 for example) and therefore can increase risk by virtue of 'discretion without accountability (Serrador and Pinto, 2015); in fact, AgilePM practitioners suggest adapting the approach to a given context,

making the method one of ad hoc, with the skill of the manager playing a leading role in project success (Fitriani et al., 2016; Zhang et al., 2023).

And so, due to its inherent ambiguity, the concept of responsibility in AgilePM is at worst an oxymoron and at best a ‘threading the needle’ exercise in which there are too many opportunities for lack of rigour to result in bias or even abuse when managers may manipulate AgilePM ambiguity to *escape* responsibility (Serrador and Pinto, 2015). Therefore, an SLR exploring the literature specifically focussed on APM-RM will need to expand the search terms to be as comprehensive as possible to include any and all specific references to AgilePM, e.g. Kanban, Scrum, etc., as well as references to responsible management, e.g. accountability, culpability, CSR, risk management, etc.

One is then left with a conundrum. On the one hand, one can rely on experience and graft to ‘hammer through’ the SLR process utilising existing methods and tools, for example PRISMA and NVivo (a powerful SLR combination); however, when dealing with emerging disciplines, this method still leaves one with the albeit creative problem of needing to code our concepts for relevance and meaning. The need for manual coding arises because new fields often have unique terminologies and conceptual frameworks that automated tools like NVivo may not readily recognise or categorise effectively without initial researcher input. This is not to say coding a diffuse discipline cannot be done ‘manually’, but rather that it is a time-intensive process which may or may not be repeatable by other social scientists, and therefore may include irrelevant—or exclude relevant—literature. On the other hand, one can use AI to triangulate the methodology. In this way, ‘AI streaming’ can create more robust results as well as save time when combined with other methods. A simple example is asking the AI to produce all synonyms of a search term, but with a contextual caveat. Simply turning to a static thesaurus can be useful; however, what is to be

done with concepts consisting of multiple words and phrases? In SLRs, the Boolean search terms in and of themselves are so fundamental that wrong inclusions or exclusions can lead to a snowball error effect as the selection bias—however unintentional—reinforces itself throughout the analysis of an incomplete literature selection (Alharbi and Stevenson, 2020).

Whilst NVivo is a powerful qualitative coding tool, ChatGPT-4 is capable of extending its capabilities. The AI is built on complex Python-based frameworks that utilise libraries like TensorFlow and PyTorch, enabling the model to process large datasets with a strong level of efficiency and depth (Vaswani et al., 2017; Paszke et al., 2019). The integration of such AI technologies into SLRs not only promises to mitigate the limitations (e.g. bias) of more manual coding methods, but also introduces a synergistic approach in adhering to and enhancing the rigorous standards of existing coding, collation, and parsing of data, including interpretation and extrapolation capability (Atkinson, 2023; Virtanen et al., 2020; Althoff et al., 2020).

To wit, ChatGPT-4 can analyse and categorise literature with accuracy, repeatability, and relevance by making sense of complex and diffuse fields such as APM-RM. This means the researcher can now have access to the Power of Python pre-configured for such variables as stochasticity, i.e. the randomness of a given answer. Python's advanced computing libraries equip ChatGPT-4 with the ability to perform intricate tasks such as identifying key themes, discerning patterns, and recognising research gaps within extensive bodies of literature (Loper & Bird, 2002). This is particularly important in areas whereby the interplay of multiple variables presents a multifaceted horizon of research. To put it simply, AI helps clear the fog of research when concepts (and the juxtaposition of concepts) have no identifiable hard core.

Yet, the integration of AI into SLRs is not without its challenges. The concerns surrounding AI's ability to fully comprehend nuanced academic texts, the potential biases inherent in AI algorithms, and the ethical implications of AI-driven conclusions in scholarly research necessitate a thorough and critical examination (O'Connor et al., 2019; Mittelstadt, 2016). Therefore, it is imperative to approach the integration of AI in SLRs with a critical perspective, acknowledging its potential while remaining acutely aware of its limitations. This is why AI cannot be relied on solely for SLRs (or literature reviews in general), but must triangulate with existing methods to be most efficacious.

In this vein, this paper attempts to create a method for leveraging AI, specifically ChatGPT-4, in conducting SLRs within the framework of PRISMA, not only replacing the basic functions of NVivo, but also extending these capabilities to include conceptual taxonomy.

The subsequent sections will begin with exploring canon theory of AI in academic research applications. Following this, the methodology will be outlined, detailing the AI streaming of Boolean search term generation, as well as an application to APM-RM utilising ChatGPT-4. A sample table will illustrate the practical application of this methodology in this emerging field toward identifying risks in AgilePM. Finally, the paper will discuss the potential outcomes, challenges, and future directions of integrating AI into SLRs, culminating in a conclusion that synthesises the key findings and implications of this novel approach.

The research objective is not entirely to replace the status quo, but to triangulate AI with existing research methods, for example, combining the interpretive power of the researcher who (still) has ultimate accountability for the research. In subjecting AI to a 'hard case' in creating a more cohesive stream of discourse in a diffuse and under-explored theme (addressing the risk of lack of responsibility in AgilePM), this paper seeks to contribute to a new field of data science which

maximises the utility of AI, particularly in constructing SLRs. Whilst the application here is APM-RM, the findings are generalisable and can therefore be repeated using different concepts and themes. This paper is not itself an SLR, but rather a pilot study on the potential of AI to transform the way SLRs are conducted.

To complete this study, a research question is posed and answered utilising AI streaming:

RQ: How does responsible management play a role in AgilePM to reduce the risk of project failure?

Theory

SLRs have undergone significant evolution, transitioning from traditional manual methods to more technologically-advanced approaches. Initially, these reviews were characterised by exhaustive manual searches and analysis, a process that, while thorough, was often cumbersome and time-consuming (Petticrew & Roberts, 2006). The advent of digital databases and search engines marked the first major shift, allowing for more efficient data retrieval. However, the analysis remained a manual, labour-intensive process. The integration of advanced computational tools and AI technologies represents the latest development in this evolution, offering a level of speed, efficiency, and comprehensiveness unattainable with traditional methods (Haddaway et al., 2015; Tsafnat et al., 2014). The primary difference between (proprietary) AI systems integrated into such platforms as NVivo and Chat GPT-4 is that the latter is capable of the advanced data processing, and, in addition, it has the capability to extrapolate operationalisation of concepts. Recent developments in the user interface allows file uploads which means instructions and data in the prompt window can be used to analyse the attachment to one's specific requirements.

In the domain of SLRs, the advent of advanced AI technologies like ChatGPT-4 marks a significant shift from traditional methodologies. Historically, AI's role in SLRs has been confined to automating literature search and screening, as highlighted by Wallace et al. (2010). However,

ChatGPT-4 transcends these boundaries, offering a range of capabilities that revolutionise the process by providing greater nuance from the outset of the research, for example, creating a highly comprehensive and relevant corpus of existing literature on a given subject. This is especially important when seeking to identify management risks in AgilePM.

ChatGPT-4's capabilities extend significantly beyond those of traditional AI tools like NVivo. Whilst NVivo has been instrumental in qualitative data analysis—and is likely to persist as a leading tool for doing so—it still relies on the ability of the researcher to code concepts, variables, and indicators. ChatGPT-4 introduces advanced inferential capabilities and therefore generates robust operationalisation of concepts within the context of a specified theoretical framework. Unlike NVivo, which requires manual direction for thematic development, ChatGPT-4 can autonomously identify themes, synthesise findings, and even pinpoint research gaps, leveraging its advanced data processing abilities powered by Python frameworks and libraries (Paszke et al., 2019).

Moreover, the inferential power of ChatGPT-4 is a notable advancement. It can intuitively navigate through vast datasets, identifying underlying patterns and themes that may not be immediately apparent. This ability is crucial for developing theoretical frameworks, whereby it can self-generate original hypotheses and theoretical constructs (with the correct prompting) that are both novel and robust. Such an operationalisation process is far more sophisticated than what NVivo offers, primarily due to ChatGPT-4's integration of machine learning and natural language processing technologies (Esmaeilzadeh, 2023).

Considering these advancements in AI, there is a growing discourse on whether ChatGPT-4 could eventually replace tools like NVivo. ChatGPT-4's comprehensive data analysis capabilities, coupled



with its ability to perform complex tasks such as sentiment analysis and predictive modelling, present a strong case for its potential as a stand-alone tool. Notwithstanding this potential, the transition to AI-dominant methodologies must be approached cautiously, considering the nuanced understanding and contextual analysis that human researchers bring to qualitative data interpretation.

#### Collaboration with PRISMA:

While AI might supplant certain functionalities of NVivo, its integration within SLR tools like PRISMA (Preferred Reporting Items for SLRs and Meta-Analyses) can be particularly synergistic. ChatGPT-4 can enhance PRISMA's efficacy by automating data extraction processes, improving data accuracy, and ensuring more comprehensive literature reviews (Molla et al., 2023). This collaboration potentially leads to a more rigorous and expansive approach to SLRs, maintaining the methodological rigour of PRISMA while leveraging the computational power of AI.

Fig. 1. AI streaming conceptual framework.

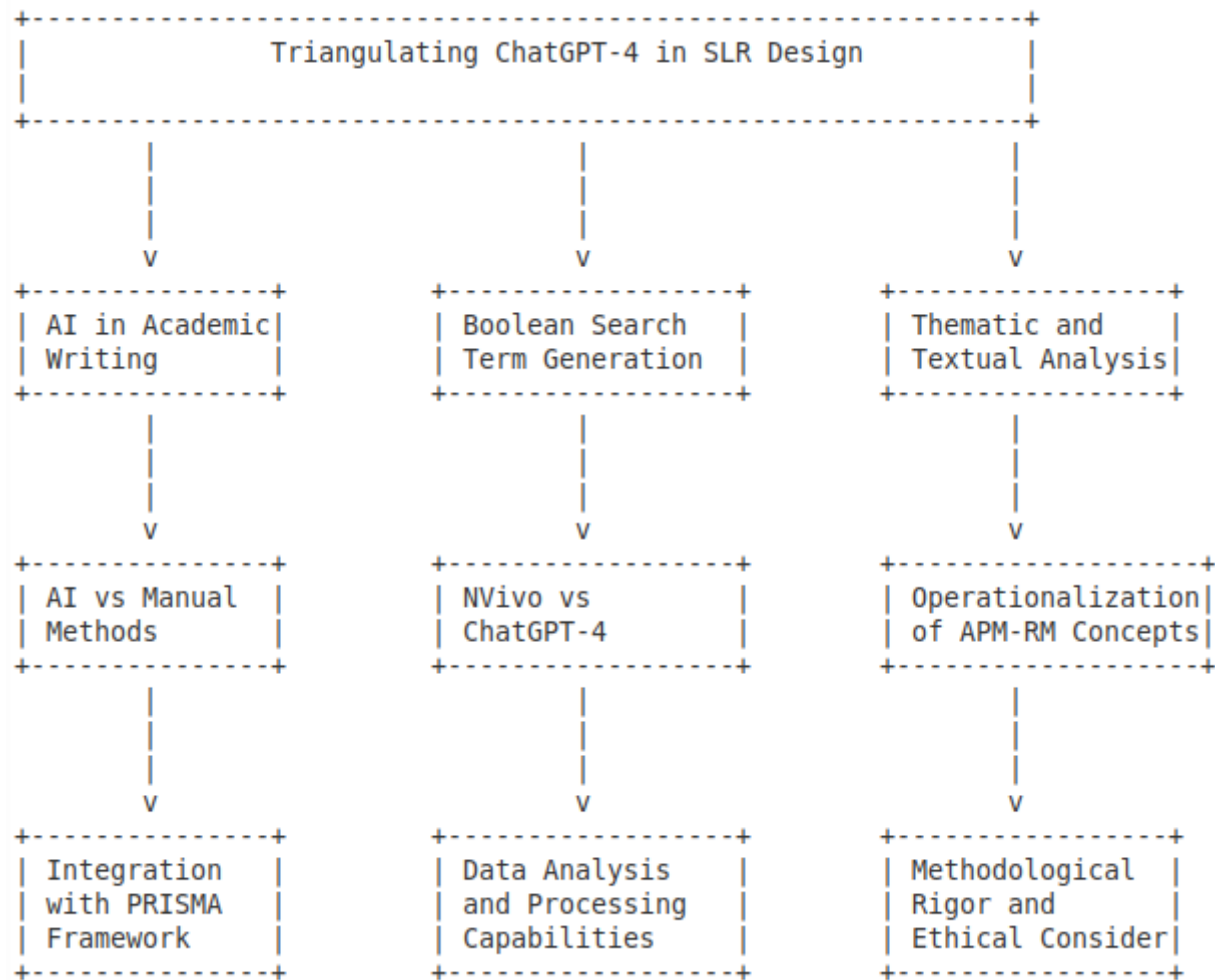


Table 1. NVivo, ChatGPT-4, and PRISMA comparison.

Factor	NVivo	ChatGPT-4	PRISMA
<b>Data Analysis</b>	Detailed coding and thematic analysis. Requires manual direction for theme development.	Advanced inferential capabilities and autonomous theme identification. Synthesises findings and identifies research gaps efficiently.	Guideline for systematic review and meta-analysis that emphasises transparency and reproducibility.
<b>Operationalisation of Concepts</b>	Effective in operationalising concepts within frameworks, but requires manual input.	Generates robust operationalisation of concepts autonomously.	Provides a structured approach to define and categorise concepts, ensuring clarity and consistency.
<b>Data Processing</b>	Limited to manual data processing.	Leverages advanced data processing abilities	Not directly involved in data processing, but

<b>Factor</b>	<b>NVivo</b>	<b>ChatGPT-4</b>	<b>PRISMA</b>
		powered by Python frameworks and libraries.	provides a framework for systematic and standardised data handling.
<b>User Interface</b>	User-friendly interface designed for qualitative data analysis.	Requires familiarity with AI models and potential programming knowledge.	Not applicable - PRISMA is a set of guidelines, not a software tool.
<b>Inferential Analysis</b>	Limited inferential capabilities.	High-level inferential analysis using machine learning and NLP technologies.	Not directly involved, but guidelines support the systematic approach to inferential analysis in reviews.
<b>Integration with Systematic Review Frameworks</b>	Efficiently used within frameworks like PRISMA for coding and analysis.	Enhances the efficacy of PRISMA by automating data extraction and improving accuracy.	Central framework for conducting systematic reviews and meta-analyses.
<b>Methodological rigour</b>	High level of methodological rigour, but potentially more time-consuming.	Offers methodological rigour combined with computational efficiency.	Establishes a high standard for methodological rigour in systematic reviews.
<b>Versatility</b>	Primarily focused on qualitative data.	Capable of handling both qualitative and quantitative data analysis.	Applicable to a wide range of review types and methodologies, though primarily quantitative.
<b>Predictive Modelling and Sentiment Analysis</b>	Limited capabilities in predictive modelling and sentiment analysis.	Strong ability to perform complex tasks like sentiment analysis and predictive modelling.	Not directly relevant, as PRISMA focuses on reporting and methodology rather than data analysis techniques.
<b>Human Insight</b>	Relies heavily on human interpretation and context analysis.	May lack nuanced understanding and contextual analysis compared to human researchers.	Depends on human researchers for insightful synthesis and interpretation of data.

<b>Factor</b>	<b>NVivo</b>	<b>ChatGPT-4</b>	<b>PRISMA</b>
<b>Learning Curve</b>	Steep learning curve for new users unfamiliar with qualitative analysis software.	Requires understanding of AI, machine learning concepts, and potentially coding.	Requires familiarity with systematic review methodologies and guidelines.

In conclusion, the advent of ChatGPT-4 represents an opportunity to triangulate existing methods towards greater nuance and rigour. Its potential for replacing certain aspects of NVivo is further enhanced by its synergy with SLR frameworks like PRISMA. As the field of AI continues to evolve, its integration into SLRs promises to yield more comprehensive, accurate, and theoretically robust research outcomes. This paper is an attempt to benefit from this potential, establishing a repeatable AI streaming methodology which can be built on and extended as more SLRs utilise AI in the way presented in this paper. Directing this methodology toward risk management is advantageous as humans are prone to false positives and negatives when evaluating risk in AgilePM due to a lack of understanding of what constitutes responsible management in the context of management ambiguity.

**Methodology**

*Boolean Search Term Generation*

The development of a comprehensive Boolean search string is essential for capturing the interplay and mitigating effects of Responsible Management within AgilePM.

- Agile Project Management Terms: Core terms such as "Agile," "Scrum," "Kanban," and "Lean" are integral to encompass the broad spectrum of Agile methodologies (Schwaber & Beedle, 2002; Poppendieck & Poppendieck, 2003).
- Incorporating Responsible Management: Responsible Management is represented through phrases like "Ethical Leadership," "CSR," and "Sustainability." These terms reflect the

varied aspects of Responsible Management within Agile contexts (Aguinis & Glavas, 2012; Carroll, 1999).

- **Emphasising Mitigating Effects:** To align with the research question, the search string includes terms such as “mitigating impact,” “influence on Agile outcomes,” and “responsibility in Agile frameworks.” This refinement ensures literature retrieval is focused on the mitigating effects of Responsible Management on Agile methodologies (to reduce risk of project failure).
- **Leveraging AI for Comprehensive Search Terms:** Utilising ChatGPT-4’s natural language processing capabilities, the search string is refined to include synonyms and related expressions, broadening the scope to capture all relevant literature (Bengio et al., 2013; Manning et al., 2008).
- **Construction of the Boolean String:** The final Boolean string is constructed using AND/OR operators to effectively combine these diverse terms, ensuring a focused yet extensive collection of relevant literature.

### *Data Processing and Analysis*

The subsequent stages of data processing and analysis are facilitated by ChatGPT-4’s advanced AI capabilities. **Initial Screening by AI:** ChatGPT-4 employs sophisticated algorithms to filter studies based on Boolean Search Term Generation. The development of a comprehensive Boolean search string is essential for capturing the interplay and mitigating effects of Responsible Management on Agile Project Management to reduce the risk of project failure.

- **Agile Project Management Terms:** Core terms such as "Agile," "Scrum," "Kanban," and "Lean" are integral to encompass the broad spectrum of Agile methodologies (Schwaber & Beedle, 2002; Poppendieck & Poppendieck, 2003).

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### *Data Processing and Analysis*

The subsequent stages of data processing and analysis are facilitated by ChatGPT-4's advanced AI capabilities.

- **Initial Screening by AI:** ChatGPT-4 employs sophisticated algorithms to filter studies based on inclusion criteria, focusing on those discussing Responsible Management's influence on Agile methodologies.
- **In-depth Thematic Analysis by AI:** Employing machine learning models, ChatGPT-4 identifies key themes and patterns, revealing how Responsible Management principles are integrated within Agile practices (Blei et al., 2003).

- **Synthesising Findings with AI:** The AI synthesises qualitative and quantitative data, offering a comprehensive overview of research trends and insights in this interdisciplinary area.

### *Systematic Categorisation*

The systematic categorisation of the literature is integral to the analysis.

- **Development of a Detailed Taxonomy:** A complex taxonomy is developed based on identified themes, codes, and indicators, reflecting the intricate relationship between Agile methodologies and Responsible Management.
- **Mapping Studies to the Taxonomy:** Each study is mapped to this taxonomy, illustrating the diverse ways Responsible Management principles intersect with Agile projects. The inclusion criteria will focus on those discussing Responsible Management's influence on Agile methodologies.
- **In-depth Thematic Analysis by AI:** Employing machine learning models, ChatGPT-4 identifies key themes and patterns, revealing how Responsible Management principles are integrated within Agile practices (Blei et al., 2003).
- **Synthesising Findings with AI:** The AI synthesises qualitative and quantitative data, offering a comprehensive overview of research trends and insights in this interdisciplinary area.

### *AI Streaming Process*

1. **Boolean Search Term Generation:** The initial step involves generating a set of Boolean search terms to comprehensively cover topics such as "Agile Best Practice," "Scrum Management Principles," "Kanban Governance," and related permutations. This step ensured a wide-ranging collection of relevant literature across various aspects of agile methodologies.

2. **Data Collection:** Utilising the generated search terms, a query was conducted on the Scopus database. The search was filtered to include articles and books from 2001-2023 and limited to the English language. This step provides a contemporary and diverse dataset for analysis.
3. **Data Download and Preparation:** Titles, abstracts, and keywords of the articles were downloaded. This raw data served as the basis for further coding and analysis.
4. **Data Coding and Thematic Analysis:** The AI is tasked with coding the articles into themes, codes, and indicators taking into account the overarching research question focused on the mitigating effects of responsible management on risk in AgilePM. This involved categorising data into coherent themes and sub-themes.
5. **Iterative Refinement and Analysis:** Through an iterative process, feedback was provided to refine the categorisation and thematic analysis. This step ensured that the analysis was aligned with the research objectives and academic rigour.
6. **Synthesis and Critical Review:** The final step involved synthesising the coded data into a structured narrative. This narrative critically evaluated the themes in relation to the research question, providing insights into the impact of agile management practices in various sectors.

## **Experiment**

Working collaboratively with my research Team, it was established by one of my co-authors that a simple search for “Agile Project Management” AND “Responsible Management” did not produce the quality results required for a SLR as many hits did not specifically focus on the juxtaposition of these two concepts. Comprehensiveness and relevance were therefore lacking in the initial ‘simple search’.



Fig 2. AI generate Boolean search terms.

The researcher asks ChatGPT-4:

Prompt: ‘Create a comprehensive Boolean search for “Agile Project Management” AND “Responsible Management” using all relevant terms to refer to each concept’.

*Boolean search terms:*

"Agile Best Practice" OR  
"Best Practice in Agile" OR  
"Agile Management Principles" OR  
"Management Principles in Agile" OR  
"Agile Sustainability" OR  
"Sustainability in Agile" OR  
"Agile Ethical Leadership" OR  
"Ethical Leadership in Agile" OR  
"Agile Corporate Strategy" OR  
"Corporate Strategy in Agile" OR  
"Agile Governance" OR  
"Governance in Agile" OR  
"Agile and Business Ethics" OR  
"Business Ethics in Agile" OR  
"Agile Organizational Practices" OR  
"Organizational Practices in Agile" OR  
"SCRUM Best Practice" OR  
"Best Practice in SCRUM" OR  
"SCRUM Management Principles" OR  
"Management Principles in SCRUM" OR  
"SCRUM Sustainability" OR  
"Sustainability in SCRUM" OR  
"SCRUM Ethical Leadership" OR  
"Ethical Leadership in SCRUM" OR  
"SCRUM Corporate Strategy" OR  
"Corporate Strategy in SCRUM" OR  
"SCRUM Governance" OR  
"Governance in SCRUM" OR  
"SCRUM and Business Ethics" OR  
"Business Ethics in SCRUM" OR  
"SCRUM Organizational Practices" OR  
"Organizational Practices in SCRUM" OR  
"Kanban Best Practice" OR  
"Best Practice in Kanban" OR  
"Kanban Management Principles" OR  
"Management Principles in Kanban" OR  
"Kanban Sustainability" OR  
"Sustainability in Kanban" OR  
"Kanban Ethical Leadership" OR  
"Ethical Leadership in Kanban" OR  
"Kanban Corporate Strategy" OR  
"Corporate Strategy in Kanban" OR  
"Kanban Governance" OR  
"Governance in Kanban" OR  
"Kanban and Business Ethics" OR  
"Business Ethics in Kanban" OR  
"Kanban Organizational Practices" OR  
"Organizational Practices in Kanban" OR  
"Lean Best Practice" OR  
"Best Practice in Lean" OR  
"Lean Management Principles" OR  
"Management Principles in Lean" OR  
"Lean Sustainability" OR  
"Sustainability in Lean" OR  
"Lean Ethical Leadership" OR  
"Ethical Leadership in Lean" OR  
"Lean Corporate Strategy" OR  
"Corporate Strategy in Lean" OR  
"Lean Governance" OR  
"Governance in Lean" OR  
"Lean and Business Ethics" OR  
"Business Ethics in Lean" OR  
"Lean Organizational Practices" OR  
"Organizational Practices in Lean"

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This search resulted in 127 articles which were given IDs. Columns are organised into:

- Article ID
- Article Title
- Article Abstract
- Author's keywords

The full text of the articles were not imported, as for the purposes of this pilot study, and demonstration of principle, it was determined this step would best be served in a full SLR following the methodology of this pilot study. In future studies utilising this methodology the inclusion of the full text could result in a more refined and comprehensive operationalisation taxonomy.

AI Prompt (See Appendix A for list of Article Ids and Titles):

Please analyse the list of article titles provided, and for each article:

- Identify the overarching theme (e.g., "Media Influence", "Language Politics").
- Determine the specific codes that segment the theme into subcategories (e.g., "Consent Manufacturing", "Regional Linguistics").
- List the indicators that describe the methods or metrics used within the codes (e.g., "Mechanisms of media manipulation", "Language use in political discourse").
- Assign the corresponding Article ID to each theme, code, and indicator you've identified.
- Present this analysis in a visually formatted table directly in your response (not as code or ASCII text) with the following columns: Themes, Codes, Indicators, and Article\_IDs. The table should be displayed as if it were rendered on a webpage, ready to be copied into a word processing document without the need for additional formatting or conversion from code.

Table 2. APM-RM ChatGPT-4 Operationalisation.

Theme	Code	Indicator	Relevance to RQ (Description)	Article IDs
<b>Lean and Agile Management Practices</b>	Sector-Specific Applications	Implementation in manufacturing, healthcare, education, services, technology, and tourism	High (examines sector-specific applications of lean and agile principles)	1-10, 12-15, 17-20, 22-30, 32-42, 44-50, 52-70, 72-80, 82-100, 102-120, 122-127
	Healthcare Efficiency and Patient Focus	Lean approaches enhancing healthcare processes	High (lean principles improving healthcare delivery)	7, 21, 22, 66, 79, 90, 95, 108, 116, 124, 127
	Recovery and Resilience in Tourism	Lean strategies aiding post-pandemic recovery in tourism	Medium (focuses on lean principles for tourism industry recovery post-pandemic)	126, 127
<b>Governance and Organisational Readiness</b>	Agile Governance and Industry 4.0 Readiness	Readiness and impact of agile governance in I4.0	High (critical for agile project oversight and accountability)	27, 37, 41, 83, 89, 96, 103, 107, 113, 119, 120, 122, 123, 124, 125, 127
<b>Sustainability and Environmental Stewardship</b>	Integration with Circular Economy	Lean and sustainability aligning with circular economy principles	High (promotes environmental, social, and economic sustainability)	18, 33, 51, 56, 67, 77, 87, 97, 106, 118, 121, 122, 123, 124, 127
<b>Technological Advancements and Agile Methods</b>	Technology Development and IoT Projects	Agile methods in IT, software, and IoT development	High (applies agile methodologies in technology development)	12, 15, 19, 74, 78, 94, 104, 114, 125, 127
<b>System Efficiency and Optimisation</b>	Supply Chain and Systems Engineering	Lean systems and supply chain optimisation	High (optimisation of systems and supply chains using lean principles)	30, 38, 51, 61, 71, 73, 76, 81, 87, 92, 106, 118, 120, 121, 122,

Theme	Code	Indicator	Relevance to RQ (Description)	Article IDs
				127
<b>Educational and Service Industry Practices</b>	Lean in Education and Professional Services	Lean principles in educational and service sectors	Medium (explores lean principles for service delivery and management)	40, 48, 50, 65, 79, 80, 98, 113, 123, 124, 127

### Thematic analysis (generated by ChatGPT-4)

Prompt: 'Generate an analysis of the taxonomy in the table to answer the research question in about 1000 words'.

#### *Lean and Agile Management Practices*

Lean and Agile management practices in diverse sectors (articles 1-10, 21-30, 41-50)

demonstrate a trend towards integrating efficiency and flexibility in organisational processes. In manufacturing (articles 1-10), the emphasis on precision and quality control, as seen in the application of Six Sigma in metal casting (105), represents a commitment to process optimisation. However, a critical challenge in manufacturing is aligning these practices with evolving market demands and technological advancements. The integration with Industry 4.0 (122) exemplifies this need for a more adaptive approach, blending traditional efficiency with digital innovation.

In healthcare (articles 21-30, 41-50), lean and agile methodologies primarily focus on patient care and operational efficiency. Studies such as the improvement of workflows in clinical laboratories (91) and the reduction of patient wait times (116) highlight this focus. However, the unique challenges of healthcare, such as the complexity of clinical environments and ethical considerations, necessitate a nuanced application of these principles. The key question is how lean methodologies can enhance patient-centric care while maintaining healthcare's core values.

In terms of relevance to the research question, these practices demonstrate a clear shift towards responsible management, aiming to mitigate the challenges posed by rapid changes and increasing

complexities in various sectors. The integration of lean and agile principles is critical in achieving this, as it allows organisations to be more responsive and efficient while maintaining quality and ethical standards.

### *Governance and Organisational Readiness*

Governance and organisational readiness in lean and Agile adoption (articles 11-20, 31-40, 51-60) is essential for the effective implementation of these methodologies. The commitment of leadership and management (articles 31-40) is crucial in driving lean transformations, as seen in the tourism industry's recovery efforts post-COVID-19 (126). However, this transformation requires a balance between strategic guidance and empowering employees to innovate and adapt.

The readiness of organisations to adopt these practices (articles 51-60), especially in dynamic and crisis situations like the COVID-19 pandemic, highlights the importance of agility in governance. The adaptability of organisations in such situations, as demonstrated in the healthcare sector's response to the pandemic (articles 41-50), shows the need for flexible and responsive decision-making processes.

This readiness directly correlates with the research question's focus on mitigating the effects of rapid organisational and environmental changes. The ability of organisations to adapt and implement lean and agile principles effectively is pivotal in navigating these challenges, emphasising the importance of governance and organisational readiness.

### *Sustainability and Environmental Stewardship*

Sustainability and Environmental Stewardship in the context of lean and agile management (articles 61-70, 71-80) reflects a growing awareness of the need to integrate environmental considerations into business practices. Lean principles, traditionally focused on efficiency and waste reduction, are increasingly being viewed through the lens of sustainability.

In industries like manufacturing (articles 61-70), the challenge is to align lean practices with environmental sustainability, ensuring that operational efficiency does not come at the cost of ecological degradation. For instance, the application of lean principles in the context of a circular economy (127) illustrates this trend towards a more holistic approach to sustainability.

The relevance to the research question lies in the recognition that responsible management involves not only addressing operational challenges but also considering the environmental impact of business practices. The integration of sustainability into lean and agile methodologies is a key aspect of this, highlighting a shift towards more environmentally conscious and sustainable business models.

### *Technological Advancements and Agile Methods*

Technological Advancements and Agile Methods (articles 81-90, 91-100) explore the intersection of technology and agile practices in enhancing operational processes. The integration of Industry 4.0 technologies with lean principles (122) exemplifies this trend, where digital innovation complements traditional efficiency approaches.

This theme is crucial in understanding how technological advancements can facilitate agile and lean methodologies, making organisations more adaptable and responsive to changes. However, the challenge lies in ensuring that these technological integrations do not compromise the core values of lean and agile methodologies, such as employee involvement and continuous improvement.

In addressing the research question, this theme underscores the role of technology in enabling organisations to better manage rapid changes and complexities. The use of technology in supporting agile and lean practices is a key factor in ensuring that organisations remain competitive and responsive in a fast-evolving business landscape.

### *System Efficiency and Optimisation*

System Efficiency and Optimisation (articles 101-110, 111-120) focuses on enhancing operational processes through lean and agile methodologies. This theme is particularly evident in sectors like healthcare and manufacturing, where process efficiency directly impacts service delivery and product quality.

Studies exploring the optimisation of workflows in healthcare (108, 116) and manufacturing processes (105) reflect this focus on system efficiency. The challenge here is to maintain high levels of efficiency while adapting to changes in the operational environment and stakeholder needs.

The relevance to the research question is seen in the way these practices contribute to responsible management by ensuring that organisational processes are not only efficient but also adaptable and sustainable in the long term. This balance between efficiency and adaptability is critical in managing the effects of rapid changes in the business environment.

### *Educational and Service Industry Practices*

Educational and Service Industry Practices (articles 121-130) show how lean and agile principles are being applied beyond traditional sectors like manufacturing and healthcare. In education (123, 124), the focus is on adapting teaching methodologies to be more responsive and engaging, while in the service industry (125, 127), the emphasis is on enhancing customer experience and service delivery.

These applications demonstrate the versatility of lean and agile methodologies in different contexts. However, they also present unique challenges, such as aligning these practices with the specific needs and dynamics of these sectors.

In relation to the research question, this theme highlights the broad applicability of responsible management practices across various sectors. The adaptation of lean and agile methodologies in education and service industries is a testament to their potential in addressing the challenges of rapid changes and increasing complexity in these fields.D

### Discussion

This pilot study focuses on integrating ChatGPT-4 into Systematic Literature Reviews (SLRs) within Agile Project Management and Responsible (Risk) Management (APM-RM). It presents a novel approach in academic research. Utilizing AI, specifically ChatGPT-4, in this context has shown potential in enhancing the efficiency and depth of literature reviews. This is particularly relevant in complex areas like Agile Project Management and responsible management, which lack standardisation.



However, important considerations for future research should be noted. Firstly, as indicated in Table 1, there is a steep learning curve in learning to prompt ChatGPT-4. This time investment might compare to learning platforms like NVivo; therefore, this methodology might not suit all SLRs. The AI proves most useful in new or diffuse subjects. In mature subjects, NVivo may be preferable. In fact, a combination of methods, such as using AI for Boolean search prompts, could be effective.

It's also important to mention that the prompt window was found to be more user-friendly than the ChatGPT-4 API, which quickly exhausts credits for complex tasks. In contrast, the prompt window has more generous limits. Future research should consider using Python code to complement AI's textual analysis, reducing computational load when interpretation is not crucial.

Aiming for repeatability presents another challenge with current language models. The stochastic nature of responses means identical prompts can yield different results. This can be mitigated by providing the AI with an exemplar. The development of the SLR table, in collaboration with ChatGPT-4, demonstrated repeatability and has been tested multiple times, showing consistent accuracy and depth. Utilising AI to create a template and refining the method with stand-alone Python code could enhance repeatability. Adapting prompts for specific research needs is also crucial.

Despite its limitations, this study demonstrates that leveraging AI for generating Boolean search terms and conducting textual and thematic analysis can refine understanding in complex fields. The AI-generated analysis is valuable, but human refinement of the text can enhance it further. The original AI output is retained in the analysis for experimental integrity.

Therefore, ChatGPT-4's flexibility and adaptability in handling diverse and complex data make it a valuable tool for SLRs across various study fields. By automating initial stages of literature review and providing sophisticated analytical tools, ChatGPT-4 can assist researchers in fields from social to natural sciences, particularly in emerging research areas where standard methodologies are not yet established.

### Reducing Risk and Enhancing Project Success

Applying AI in synthesising SLRs contributes to better risk management in project settings.

ChatGPT-4's ability to identify a broader range of potential risks and synthesise diverse management strategies helps project managers anticipate and mitigate challenges more effectively.

This is especially valuable in AgilePM, where flexibility and responsiveness are crucial. A thorough understanding of the interplay between management strategies and project outcomes can lead to more robust project execution.

### Conclusion and Future Directions

In conclusion, this pilot study showcases the potential of AI, especially ChatGPT-4, in revolutionising how SLRs are conducted. Its capacity to manage and analyse large datasets precisely and in-depth holds significant promise for enhancing academic rigor across disciplines. Looking forward, refining and expanding this methodology to include full-text analysis and further customisation of AI capabilities is anticipated. This approach aids researchers in navigating complex and evolving academic landscapes by triangulating ChatGPT-4 with existing frameworks.

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Appendix A. Article IDs and titles resulting from AI driven Boolean search (Abstracts are not included due to space limitations of the submission).

ID Title

- 1 The sustainability of Lean in pediatric healthcare: A realist review
- 2 Application of lean management techniques for achieving energy efficiency in building construction: Procurement and handling of building materials
- 3 An innovative measurement programme for agile governance
- 4 Creating the bank enterprise risk management function of the future
- 5 Readiness for lean-sustainability in start-ups during the COVID-19 era
- 6 Exploring the Application of Lean Best Practices in Remanufacturing: Empirical Insights into the Benefits and Barriers
- 7 Lean manufacturing improves emergency department throughput and patient satisfaction
- 8 Internship program management information system with lean management
- 9 Behind closed doors: The potential of lean management in safety audit services
- 10 Applying lean management to reduce radiology turnaround times for emergency department
- 11 Assessment framework for lean-sustainable HRM practices
- 12 Lean, sustainability and the triple bottom line performance: a systems perspective-based empirical examination
- 13 A framework to assess sustaining continuous improvement in lean healthcare
- 14 Linking pre-existing biorepositories for medical research: the PopGen 2.0 Network
- 15 A discrete dynamic system approach to studying project management processes using the general theory of linear max plus systems
- 16 How to foster Sustainable Continuous Improvement: A cause-effect relations map of Lean soft practices
- 17 IEEE Technology and Engineering Management Society Body of Knowledge (TEMSBOK)
- 18 Embedding sustainability in lean six sigma efforts
- 19 THE AGILE PROJECT MANAGEMENT UNDERPINNINGS: BACKLOG REFINEMENT, TEAM COMPOSITION, AND BACKLOG PREPARATION
- 20 Workflow optimization in a clinical laboratory using lean management principles in the pre-analytical phase
- 21 Contributions of Industry 4.0 to lean management within the supply chain operations reference model
- 22 Digitalization of learning resources in a HEI – a lean management perspective
- 23 Improving nurses' hand-offprocess on oncology setting using lean management principles
- 24 The lean prescription for non-traditional adult learners
- 25 Is Czech health care going to be lean?
- 26 A realist evaluation to identify contexts and mechanisms that enabled and hindered implementation and had an effect on sustainability of a lean intervention in pediatric healthcare
- 27 Strengthening Sustainability in Agile Education: Using Client-Sponsored Projects to Cultivate Agile Talents
- 28 Application of agile management methods in companies operating in Slovakia and the Czech Republic
- 29 Derivation of an agile method construction set to optimize the software development process
- 30 Multinational enterprises and the governance of sustainability practices in emerging market supply chains: An agile governance perspective
- 31 Continual usage intention of platform-based governance services: A study from an emerging economy
- 32 Validation of sustainability benchmarking tool in the context of value-addedwood products

- manufacturing activities
- 33 How managers in poland use the principles and instruments of the kaizen philosophy in their personal lives – the personal kaizen approach
  - 34 Analysing agile governance processes in the Brazilian Government scenario
  - 35 A case study in requirements engineering in context of agile
  - 36 The effects of lean organizational practices on employees' attitudes and workers' health: evidence from France
  - 37 Adopting Lean Management Principles for Renovation Projects
  - 38 Achieving Lean Warehousing Through Value Stream Mapping
  - 39 Quality Improvement Report: Improving Pre-and Postprocedure Care Area Work-flows at a Busy Urban Academic Hospital Using Lean Management Principles
  - 40 Decreasing ct acquisition time in the emergency department through lean management principles
  - 41 Examples of transport policy formulations: Japanese institutions and organisations from ancient times to the present
  - 42 Implementation of a 'lean' cytopathology service: Towards routine same-day reporting
  - 43 Critical factors for sustaining lean manufacturing in the long-term: a multi-method study
  - 44 Can lean management change the managerial culture in higher education?
  - 45 Lean practices implementation and their relationships with operational responsiveness and company performance: an Italian study
  - 46 Safety maintains lean sustainability and increases performance through fault control
  - 47 Lean in information technology departments or companies: identifying publications on the Scopus and Web of Science databases
  - 48 Running Lean: Refactoring and the Multiliteracy Center
  - 49 Eco-innovation influencers: Unveiling the role of lean management principles adoption
  - 50 Relation between cost driven green kaizen and pharmaceutical production
  - 51 Benchmarking outcomes on multiple contextual levels in lean healthcare: a systematic review, development of a conceptual framework, and a research agenda
  - 52 Unpacking government social media messaging strategies during the COVID-19 pandemic in China
  - 53 Applied business process management: An information systems approach to improve service delivery in public hospitals of low- and middle-income countries
  - 54 Lean-sustainability assessment framework development: evidence from the construction industry
  - 55 Agile governance theory: operationalization
  - 56 Smart governance as key to multi-jurisdictional smart city initiatives: The case of the eCityGov Alliance
  - 57 Modeling a transformational route to infrastructure sustainability in South Africa
  - 58 Lean facilities management: preliminary findings from Singapore's international schools
  - 59 Integrating safety, health and environmental management systems: A conceptual framework for achieving lean enterprise outcomes
  - 60 From Modeling the Interactions among Institutions to Modeling the Evolution of an Ecosystem: A Reflection on the Triple Helix Model and beyond
  - 61 Lean Sustainability: Creating Safe, Enduring, and Profitable Operations
  - 62 Occupy the semantic space! Opening up the language of better regulation
  - 63 The digital Wild West: on social entrepreneurship in extended reality
  - 64 A New Methodology for Supply Chain Management: Discourse Analysis and its Potential for Theoretical Advancement
  - 65 Lean tools, knowledge management, and lean sustainability: The moderating effects of study conventions

- 66 The relationship between lean operations and sustainable operations
- 67 Improving Autopsy Report Turnaround Times by Implementing Lean Management Principles
- 68 Assessing Lean 4.0 for Industry 4.0 Readiness Using PLS-SEM towards Sustainable Manufacturing Supply Chain
- 69 Agile and adaptive governance in crisis response: Lessons from the COVID-19 pandemic
- 70 Integrating Ergonomics and sustainability: A framework with LDA methodology and implementation roadmap
- 71 How much of Toyota's philosophy is embedded in health care at the organisational level? A review
- 72 Modernizing innovation governance to meet policy ambitions through trusted environments
- 73 Lean versus green: The impact of lean logistics on greenhouse gas emissions in consumer goods supply chains
- 74 Lean daily management in healthcare: origins, practices, and associations with lean leadership and lean sustainability
- 75 Exploring critical success factors for the implementation of lean manufacturing in machinery and equipment SMEs
- 76 Enhancing the performance of micro, small and medium sized cluster organisation through lean implementation
- 77 The Role of Information Infrastructures in Scaling up Video Consultations During COVID-19: Mixed Methods Case Study Into Opportunity, Disruption, and Exposure
- 78 Rethinking lean supplier development as a learning system
- 79 Lean Implementation Framework: A Case of Performance Improvement of Casting Process
- 80 Preparedness, agility, and the Philippine response to the covid-19 pandemic: The early phase in comparative Southeast Asian perspective
- 81 Integration of lean approach with energy efficiency: Application in kitchenware manufacturing company
- 82 Lean processes in hospitals; [Schlanke Prozesse im Krankenhaus]
- 83 Performance evaluation of lean sustainable systems using adaptive neuro fuzzy inference system: a case study
- 84 Sustainable lean redesign of manufacturing enterprises
- 85 Investigating the Readiness Factors for Industry 4.0 Implementation for Manufacturing Industry in Egypt
- 86 Implementation of modern tools in autopsy practice—the way towards contemporary postmortal diagnostics
- 87 Readiness for agile-sustainability in health-care organizations
- 88 Enhancing the performance of micro, small and medium sized cluster organisation through lean implementation
- 89 Insights on lean gamification for higher education
- 90 Sustainable lean implementation: a study of serbian companies
- 91 'Experimental union' and Baltic sea cooperation: The case of the European union's strategy for the Baltic sea region (EUSBSR)
- 92 Socially responsible innovation in health care: Cycles of actualization
- 93 Agile government: Emerging perspectives in public management
- 94 Using Quality Improvement Methodology to Reduce Costs while Improving Efficiency and Provider Satisfaction in a Busy, Academic Musculoskeletal Radiology Division
- 95 Enhancing IoT Project Success through Agile Best Practices
- 96 Lean Management Improves the Process Efficiency of Controlled Ovarian Stimulation Monitoring in IVF Treatment
- 97 Toward a Rapid and Sustainable Recovery in the Tourism Industry Using Lean

## Manufacturing Principals

- 98 Lean Sustainability: A Pathway to a Circular Economy
- 99 An Application of Value Analysis for Lean Healthcare Management in an Emergency Department
- 100 Lean integration in maintenance logistics management: A new sustainable framework
- 101 Examining Information and Knowledge Processes to Enhance Best Practices in Agile Knowledge Intensive Environments
- 102 Important considerations for agile software development methods governance
- 103 Systemic criterion of sustainability in agile manufacturing
- 104 Minimum pain, maximum gain
- 105 Lean systems approaches to health technology assessment: a patient-focused alternative to cost-effectiveness analysis.
- 106 Less is more: A framework for a sustainable university
- 107 Lean management principles for information technology
- 108 Agile testing: How to succeed in an extreme testing environment
- 109 The impact of an accelerated improvement workshop on ordering and receiving
- 110 Managing for continuous improvement in off-site construction: Evaluation of lean management principles
- 111 Project cell: Cellular organization of the building design process
- 112 Lean management of environmental consulting
- 113 Spreading a patient-centered medical home redesign: A case study
- 114 A Practical guide to applying lean tools and management principles to health care improvement projects
- 115 A case study in applying lean sustainability concepts to universities
- 116 AGILE: An iron fist in a velvet glove
- 117 Can Lean Systems Engineering enhance the value of astrophysical projects?
- 118 Recognizing constraints
- 119 An exploratory study of best lean sustainability practices in higher education
- 120 The wheel world
- 121 Managing risk and uncertainty in an agile construction environment: Application of agile building specialist model
- 122 Get your OR organized.
- 123 Reinventing Lean
- 124 Lean principles and techniques for improving the quality and productivity of software development projects: A case study
- 125 The great 2008 Chinese ice storm its socioeconomic-ecological impact and sustainability lessons learned
- 126 Applying lean management principles to the creation of a postpartum hemorrhage care bundle
- 127 Software development in the cloud