Unpacking Modern Slavery in Business Research: Conceptualization and Operationalization

Charl de Villiers
ORCiD: 0000-0002-0715-8957
The University of Auckland, New Zealand; and University of Pretoria
Email: charl.devilliers@auckland.ac.nz

Jing Jia
ORCiD: 0000-0002-5193-8475
University of Newcastle, Australia
Email: jing.jia@utas.edu.au

Zhongtian Li
ORCiD: 0000-0001-9478-9804
University of Newcastle, Australia
Email: zhongtian.li@newcastle.edu.au

Abstract

Despite the humanitarian repercussions of modern slavery, research on modern slavery in the business and management field is underdeveloped and progressing slowly. Although many theoretical studies exist, the literature lacks quantitative studies with large-scale, empirical evidence to test and further develop theory. To advance the literature, focused on quantitative methods, we conduct a review of the literature to better understand how researchers have defined and operationalized modern slavery. Our analysis reveals that there is a wide discrepancy in conceptual definitions of modern slavery among the limited number of studies that define the concept. Only a few studies operationalize modern slavery. To aid conceptual clarity, we develop a definition of modern slavery in the business context. We also identify and elaborate six data sources for quantitative studies and identify research opportunities and recommendations. These insights will be of interest to future studies taking a quantitative approach, as well as practitioners.

Keywords

1. Introduction

Modern slavery is a pressing global issue for both society and business (Caruana et al., 2021). In response, governments worldwide have enacted legislation [1], e.g., the United Kingdom (UK) Modern Slavery Act of 2015, to address the issue. As Christ and Burritt (2021, p. 1486) note, "modern slavery is a business issue," and as such, it involves multiple business disciplines. However, research on modern slavery in the business and management field has been described as underdeveloped and progressing at a slow pace (Caruana et al., 2021; Crane, 2013). For example, Caruana et al. (2021, p. 252), state that "the "field" of modern slavery in business and management overall is in *a sad and sorry state*".

Our work aims to advance modern slavery research in the business field, particularly through quantitative research, in an approach and scope similar to that employed by Krause et al. (2022), who examine the conceptualization and operationalization of the concept of 'top management team' in their article in *Journal of Management*. Although many theoretical studies on modern slavery, including Burmester et al. (2019), Caspersz et al. (2022), Crane (2013), Stringer and Michailova (2018), and Szablewska (2022), have proposed and elaborated on the conditions that induce and sustain modern slavery, the literature lacks quantitative research with large-scale empirical evidence to support, refine, and extend these theoretical studies. For example, in their literature review of modern slavery in the supply chain, Szablewska and Kubacki (2023) identify five quantitative studies. In general, quantitative research can advance the development of the literature by using numerical data to describe, explain, and predict phenomena, as well as to establish cause-and-effect relationships (Creswell, 1994).

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[1] The Trafficking Victims Protection Act of 2000 in United States (US) specifies that 'trafficking in persons is a modern form of slavery', and that the victims of modern slavery are mainly women and children (in Section 102 of the Act). The Modern Slavery Act 2018 in Austr a suggests that modern slavery encompasses several crimes, including slavery, servitude, forced labour, deceptive recruiting for labour or services, forced marriage, and debt bondage (please refer to Section 4 of the Act). Differently, the Modern Slavery Act 2015 in United Kingdom (UK) also recognises sexual exploitation and organ removal as forms of modern slavery (in Part 1 of the Act).

Following our aim, we conducted a review of the literature to identify how researchers have defined and operationalized modern slavery. By analyzing, synthesizing and critically reviewing the research, our review is likely to stimulate and inform future quantitative research. Our review is informed by the research methodology literature (Babbie, 2020; Bisbe et al., 2007; Libby et al., 2002; Nijs et al., 2014; Wacker, 2004), particularly Libby et al.'s (2002) predictive validity framework. Their framework highlights that conceptualization and operationalization form the foundation of quantitative research. Conceptualization is the process of coming to an agreement about what the term (modern slavery in our case) means. Conceptual clarity ensures that quantitative researchers are clear about the concept they are studying, enabling consistent understanding, and operationalizations. As Podsakoff et al. (2016, p. 167) note, "a lack of conceptual clarity … increases the likelihood that operationalizations of the concept … will be deficient and/or contaminated". This process is crucial for building a foundation that supports hypothesis development and guides empirical research.

Operationalization involves converting concepts into measurable variables (Bisbe et al., 2007). It specifies how a concept can be observed or quantified, allowing researchers to collect data and perform statistical analysis. To enable theory testing, researchers must access observed scores of the measurable or operational variables (Babbie, 2020; Wacker, 2004). In other words, data sources play a crucial role in the operationalization. Overall, being instructed by Libby et al.'s (2002) predictive validity framework, our review investigates the following two research questions (RQs).

RQ1- Conceptualization: How do researchers conceptualize modern slavery?

RQ2- Operationalization: How do researchers operationalize modern slavery?

Our literature review is based on Scopus and Web of Science. This selection ensures that we include studies from well recognized business journals. We identify 96 studies published in 62 journals.

For RQ1 - Conceptualization, we find that 37.5% of studies treat 'modern slavery' as a given without defining it. 19.8% of studies use enumerative definitions by referencing a series of elements or nouns (e.g., servitude and forced labour), without establishing a clear scope or boundary for 'modern slavery', making it hard to determine whether a new element or noun should be included. 42.7% of studies (seek to) clarify the fundamental essence of the concept by providing conceptual definitions, but these definitions vary widely. To effectively examine these conceptual definitions, we follow an Aristotelian approach (Berg, 1982). Specifically, we code each conceptual definition by identifying its genus (i.e., the family to which the concept is perceived to belong) and differentiae (i.e., the characteristics used to distinguish 'modern slavery' from other concepts). Furthermore, we synthesized these conceptual definitions and consulted relevant legislation to develop our definition of 'modern slavery'. Our definition is intended to promote more consistency in future quantitative research. We recommend that future quantitative researchers use our definition as a starting point to explicitly define 'modern slavery' in their studies, tailoring it to fit their specific research contexts.

Regarding RQ2 - Operationalization, we find that about 9.4% of studies operationalize 'modern slavery'. For measurable or operational variables at the country level, the prevalence of modern slavery within a region or country is frequently used. In addition, modern slavery media coverage and modern slavery risk at the country level are adopted in a few studies. Firm-level operationalizations are supply chain slavery risk, the occurrence of modern slavery, and modern slavery allegations. As data sources are crucial in quantitative research, we suggest six key data sources and provide detailed recommendations to guide future studies. Our discussion on operationalizing 'modern slavery' will assist future researchers in choosing and using appropriate data sources for conducting quantitative research on modern slavery.

As modern slavery attracts increasing research interest (Mai et al., 2023; Rogerson et al., 2020), our literature review will be of substantial interest to researchers. The modern

slavery literature provides many testable theories and theoretical frameworks, and quantitative studies have significant potential to advance this field by empirically examining and validating them. Our review, guided by the predictive validity framework, offers insights and recommendations in conceptualization and operationalization, supporting future quantitative research on modern slavery.

Our literature review also aligns with the growing emphasis on research methodology in the business field. Some research topics, including corporate social responsibility (Dahlsrud, 2008), organizational autonomy (Arregle et al., 2023), strategic entrepreneurship (Simsek et al., 2017), talent (Nijs et al., 2014), top management team (Krause et al., 2022), and workplace backlash (Lee, 2023), have been reviewed and discussed with a focus on conceptualization and/or operationalization. Our work contributes to this literature by reviewing an emerging research topic, namely modern slavery.

We also make several practical contributions. First, our study should be of interest to managers and directors, as the lack of clarity in defining modern slavery could hinder their decision-making on mitigating modern slavery risks. Our review clarifies what modern slavery is and discusses its data sources. Thus, our work could help firms effectively understand and monitor their risk of modern slavery. Second, our findings are relevant to investors, particularly regarding risk management. Our work focused on operationalising and measuring modern slavery can assist investors in developing indicators to trace and red flag the exposure of their investees to modern slavery. Third, as Datta et al. (2018) suggest, quantifying modern slavery can empower stakeholders (including firms, regulators, and non-governmental organizations) to mitigate and address this social issue. Thus, our work may contribute to policy-making and related discussions.

The remainder of the paper is structured as follows: Section 2 explains how our work sets itself apart from other literature reviews on modern slavery, and Section 3 outlines our

review method, while Section 4 presents our findings, and Section 5 elaborates data sources. Section 6 concludes the whole paper.

2. Prior Literature Reviews on Morden Slavery and Our contribution

Given the growing focus on combating modern slavery, there are few literature reviews available on this research topic. For example, with regard to *supply chain* studies on modern slavery, Han et al. (2024) reviewed 44 studies from 2013 to 2022, Strand et al. (2023) focused on 2010-2023 and identified 106 studies, and Szablewska and Kubacki (2023) covered 2017-2021 with 26 studies. The three literature reviews synthesize supply chain studies by themes (e.g., 'modern slavery assessment and detection' in Han et al., 2024, and 'solutions to modern slavery' in Szablewska and Kubacki, 2023) while providing research recommendations. There are reviews on studies of specific industries. Bansal et al. (2023) focused on 2017-2022 studies in the Brazilian *mining industry*, and Stringer et al. (2022) examined 2012-2021 studies in the Thai *fishing industry*. Our work goes beyond these reviews. Unlike previous reviews focusing on a business discipline (supply chains) or specific industries (mining and fishing), our review is based on studies from various business disciplines. This allows us to present a much more comprehensive portrayal of modern slavery research.

McLaren et al. (2024) comes closest to our work. Reviewing 47 studies from 2010 to 2023, they aim to "identify key and diverse *stakeholder groups*, while elucidating their distinct and multifaceted roles in relation to modern slavery detection, monitoring and disclosure" (p. 1315). Distinct from their focus on stakeholders, we would like to support future quantitative researchers from three essential aspects, namely conceptualization, operationalization, and data sources. As far as we could ascertain, our work is the first in this regard. In addition, as we systematically review the definitions on modern slavery, we contribute to the understanding of the conceptual foundations of modern slavery. This allows us to respond to Montiel's (2008,

p. 246) call that future research on modern slavery needs "well-defined, clearly bounded, and commonly agreed on constructs".

Overall, our work stands out from prior literature reviews because it has a unique yet important focus – the conceptualization and operationalization of modern slavery. This focus allows our literature review to effectively support future quantitative research. Given that prior literature reviews are devoted to a specific business discipline or industry, our work provides a previously unknown and comprehensive portrayal of modern slavery research in the business field.

3. Method

To identify the studies on modern slavery, we follow Daugaard et al. (2024), de Villiers et al. (2022), Hsiao et al. (2022), Mueller et al. (2018), and Szablewska and Kubacki (2023), and use a series of search keywords – 'modern slave*', 'modern-day slave*', 'contemporary slave*', and 'neo-slavery' – in Scopus and Web of Science to retrieve the journal articles that are consistent with all of the following criteria:

1. They are published in business journals (as specified below),

2. not literature review studies,

3. published (online) before 30 January 2024,

4. focus on and research modern slavery, rather than merely mentioning it[2], and

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[2] As Criteria 1, 2, 3, and 5 are straightforward, we would like to better explain criterion 4. In manually screening the outcomes, there are two scenarios where a study only mentions modern slavery. First, some studies mention the term 'modern slavery' in their abstracts or keywords, but they do not mention it in their main bodies. For example, Dahan-Kalev (2012) uses 'modern slavery' as a keyword. However, she does not mention the term in the main bodies of her study. Bakirci's (2007) work is another example. The term is only mentioned in the abstract. Second, some studies briefly mention 'modern slavery' in their main bodies to explain how they are somehow related to it. For example, modern slavery is one of (many) areas where they can demonstrate research impacts; "… blockchain technology could enable firms to extend visibility of their supply chains beyond tier one and respond, for example, to calls for greater transparency in the form of modern slavery legislation" (Cole et al., 2019, p. 480); "a lack of SCV goes some way to explaining the persistence of pernicious supply chain issues such as modern slavery ……" (Lafargue et al., 2021, p. 737). Overall, we exclude these studies from our literature review, as they do not provide the information to answer our RQs and are remotely relevant to the literature of modern slavery.

5. in English.

As mentioned in Section 1, given that the scope of our work is specifically focused on modern slavery, we do not make assumptions about which enumerative definition on modern slavery is correct. In other words, we do not consider terms may be related to or included within modern slavery when defining our search keywords. This approach has advantages. First, we do not need to assume any predefined relationships between these terms (for example, human trafficking is a synonym of modern slavery or not), allowing for an unbiased analysis of how the term 'modern slavery' is conceptualised or defined. In contrast, using search terms related to modern slavery hinders our ability to answer the two RQs. For example, including 'human trafficking' as a search term could result in the underrepresentation or exclusion of studies that do not consider 'human trafficking' as part of modern slavery. Thus, our approach ensures that the results are not affected by how we perceive modern slavery, which could otherwise distort the results. Our approach is consistent with prior literature reviews. For example, Szablewska and Kubacki (2023) deliberately avoid using terms relating to modern slavery as keywords in their literature review, as it can minimize the risk of skewing results toward specific forms or definitions of modern slavery. Second, this approach allows us to address the second RQ more efficiently. Studies that mention 'modern slavery' are more likely to operationalize this concept in its entirety. By focusing on these studies, we can examine the operationalizations of modern slavery more efficiently and without diluting the focus of our literature review. In contrast, including related terms such as 'human trafficking' would have led our literature review to cover the operationalizations of human trafficking, which goes beyond the intended scope of modern slavery.

The journals included in our literature review are those indexed in Scopus for Business, Management, and Accounting, as well as Scopus for Economics, Econometrics, and Finance. Additionally, we include journals from the Web of Science Core Collection's Social Science

Citation Index for Business, Business Finance, Management, and Economics. This selection ensures a comprehensive representation of the business literature. We do not include Google Scholar as a literature database to ensure that our work includes studies from well recognized business journals. Lastly, we search through the reference lists of the articles identified in the preceding step to minimise the likelihood of missing articles in our collection process. After manually screening the outcomes, we identify 96 studies in 62 journals.

With regard to RQ1 - Conceptualization, we examine the 96 studies to develop a specific, agreed-upon conceptual definition for 'modern slavery'. First, we leverage terms such as 'we define', 'defined', 'definition', and 'slavery' to conduct a comprehensive search throughout the entire article. Second, because definitions primarily appear in the abstract and introduction sections, we carefully read these sections to identify how a study defines modern slavery. Third, we use an Aristotelian approach to analyse the definitions found (Berg, 1982; Meuer et al., 2020). As Section 1 explains, we focus on a definition's genus and differentiae. The former specifies the family to which a concept belongs (e.g., 'wine glass' belongs to the family of glasses), while the latter refers to characteristics that can set the concept apart from others within the same family (e.g., the word 'wine' sets the 'wine glass' apart from other 'glasses'). Using this Aristotelian approach, we trace how researchers define modern slavery with specific genus and differentiae.

Regarding RQ2 - Operationalization, we focus exclusively on studies with quantitative methods, given that studies with other research methods (e.g., interview) do not operationalize nor measure 'modern slavery'. For an article, we read its research design and/or methodology section to understand how 'modern slavery' is operationalized and measured. It is noted that given the relative paucity of quantitative studies, we discuss novel sources for data in Section 5.

4. Findings

4.1 Overview of Business Literature on Modern Slavery

Figure 1 shows the number of studies on modern slavery over time. We find that the number of studies on modern slavery increases over time. For example, there is only one in 2013, and this number increased to 16 in 2021. This is consistent with that the research on modern slavery is relatively emerging and novel (Caruana et al., 2021; Gold, 2015).

Table 1 Panel A presents the list of journals that published modern slavery studies. The top three journals are *Supply Chain Management: An International Journal* (8 studies), *Journal of Business Ethics* (6), and *British Accounting Review* (6). In addition, we observe that journals of operations, logistics, and supply chain management tend to publish modern slavery studies. For example, more studies have appeared in *International Journal of Operations & Production Management* (3), *Journal of Supply Chain Management* (1), and *The International Journal of Logistics Management* (1). Given the connections between modern slavery and supply chains, it is unsurprising that these journals are key outlets for modern slavery studies. This also aligns with the findings of Caruana et al. (2021), Strand et al. (2023), and Szablewska and Kubacki (2023) that many of supply chain researchers are interested in understanding and addressing modern slavery. Accounting journals are an important outlet for modern slavery studies. For example, *British Accounting Review* (6) and *Accounting, Auditing & Accountability Journal* (3). Last, it is worth noting that modern slavery is interesting to a wide audience, as relevant studies appear in interdisciplinary journals, including *Journal of Business Ethics* (6), *Business and Human Rights Journal* (3), *Business Strategy and Development* (3), *Business Strategy and the Environment* (3), and *Business & Society* (2). Overall, as Panel A shows, modern slavery is a phenomenon interesting to researchers from various business disciplines.

Table 1 Panel B shows the research methods used in the papers. We find that conceptual or theoretical studies (which are not devoted to collecting and investigating empirical evidence)

make up the largest proportion of the 96 studies (27 out of 96), followed by studies employing textual analysis (19) and those using a combination of methods (17). Interviews are another commonly used empirical method, adopted by 21 studies, with 9 of them combining interviews with other methods. Overall, the fact that nearly a third of studies are conceptual or theoretical underscores the importance of our work, which aims to encourage quantitative studies that can support, refine, and refute the current theoretical studies.

Table 1 Panel C presents various research topics in the 96 studies. Out of the 96 studies, 46 focus on the factors that drive or prevent modern slavery. For example, Caspersz et al. (2022) conceptually discuss the supply chain characteristics that induce the occurrence of modern slavery. 27 studies offer insights into slavery-related practices. For example, examining small family businesses, Salmon (2022) offer insights into how modern slavery-related recruitment unfolds. As the panel shows, very few studies (Crane et al., 2022; Yagci Sokat and Altay, 2023) inspect the consequences of modern slavery. For example, Yagci Sokat and Altay (2023) are interested in examining the relationship between media coverage of modern slavery scandals and corporate operational performance.

Table 1 Panel D shows the top five studies based on total citations (Column 1) and citations per year[3] (Column 2). The top five studies (measured by total citations) are Crane (2013), Gold et al. (2015), New (2015), Stevenson and Cole (2018), and Caruana et al. (2021). Crane (2013) is the first study that proposes a theory of modern slavery. New (2015) discusses that modern slavery cannot be effectively mitigated through corporate social responsibility. Both Gold et al. (2015) (focusing on researchers on supply chains) and Caruana et al. (2021) (for researchers on business) call for increased research efforts and encourage researchers to draw on knowledge from other disciplines. In contrast to these conceptual studies, Stevenson

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[3] The citation analysis is based on Harzing's Publish or Perish package. The analysis is performed on 8 September 2024.

and Cole (2018) is an early study investigating corporate modern slavery statements. As shown in Column 2 of Panel D, when considering citations per year, Monciardini et al. (2021) replaces New (2015) among the top five studies. Monciardini et al. (2021) explores how firms navigate compliance with the Modern Slavery Act in the UK. Appendix A provides a summary of all 96 studies reviewed.

[Figure 1 about here]

[Table 1 about here]

4.2 RQ1 – Conceptualization

We find that 37.5% of studies (36 studies) do not define modern slavery and generally take this concept as a given without providing clear explanations of what it is. 62.5% of studies (60 studies) provide a definition of modern slavery. The definitions are tabulated in Appendix B. As mentioned in Section 3, we coded these definitions using an Aristotelian approach by identifying their genus and differentiae. The results are presented in Appendix B.

19 studies provide enumerative definitions. For example, Trautrims et al. (2020, p. 1071) define modern slavery as "… an umbrella term encompassing slavery, servitude, forced or compulsory labour and human trafficking". Wilhelm et al. (2020) suggest that forced marriage should be included in modern slavery, while Szablewska (2022) treats forced organ harvesting as another element. Notably, rather than offering a conceptual definition, the Australia Modern Slavery Act (Part 1 Section 4) and the California Transparency in Supply Chains Act (SB 657) also use enumerative definitions. Overall, as noted by Babbie (2020), enumerative definitions do not offer conceptual clarity and are of limited value to quantitative research.

For the remaining studies (41 studies) that provide conceptual definitions, we examine and categorize each definition by identifying its genus and differentiae. With regard to genera, the literature is heterogeneous. We find that 17 studies (e.g., Simpson et al., 2021) view it as *exploitation*, 12 studies (e.g., Burritt and Christ, 2023) define it as a set of *activities* or *practices*,

and 7 studies (e.g., Flynn, 2020) consider it as a group of *situations*, *statues*, or *conditions*. The literature also mentions other families (e.g., *relationship*, *coercion*, *concept*, and *method*) which modern slavery could belong to. However, 8 studies (e.g., Vaughan, 2024) do not mention or propose a genus. Overall, we find that a significant proportion of the studies with a conceptual definition (17 out of 41) identify exploitation as the genus of modern slavery. This aligns with the UK Modern Slavery Act - Part 1 Section 1(4)(b), which specifies that a criterion of offences is "… work or services provided in circumstances which constitute *exploitation*". As a result, we propose that exploitation as a genus can better capture the essence of modern slavery.

Regarding differentiae, diverse characteristics are mentioned, including unethical, abuse, and cannot refuse or leave. Among these, we find that coerciveness (17 studies) and workplace situations (10 studies) are the most frequently used differentiae. By synthesizing the literature and considering the business context, we identify three differentiae: coerciveness, workplace situations, and underpayment. First, modern slavery cannot be sustained without coercion, which is defined as a situation where workers cannot refuse or leave their work[4] (Bakirci and Ritchie, 2022; Caruana et al., 2021; Christ and Burritt, 2023). While a few studies (e.g., Benstead et al., 2018; Gold et al., 2015) refer to 'deprived of individual liberty' to define coerciveness, this is arguably too broad. For example, workers in China are unable to exercise their liberty to bargain and form unions (Li et al., 2018; Li and Haque, 2019), yet they retain the ability to resign and seek alternative employment. This example highlights that the absence of certain individual liberties does not necessarily constitute modern slavery, and coercive constraints on workers' freedom to refuse or leave their work is the key.

Second, *workplace situations* is the second differentia. Given that our review examines modern slavery within the context of business, this emphasis on workplace scenarios is both

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[4] For example, this expression 'refuse or leave' is used by Bakirci and Ritchie (2022), Caruana et al. (2021), and Christ and Burritt (2023).

relevant and appropriate (e.g., Crane, 2013; Christ and Burritt, 2023; Christ et al., 2023; Kunz et al., 2023). This also aligns with the fact that none of the 96 studies examine modern slavery outside of the workplace (e.g., forced marriage).

Third, we suggest that *underpayment* be the third differentia. Without this economic dimension, the first two characteristics, coerciveness and workplace situations, would lead to misclassifications. For example, according to the first two differentia, soldiers on a military mission could be misclassified as modern slaves. The inclusion of underpayment as an additional differentia underscores the central role of economic exploitation, helping to distinguish modern slavery from other forms of restricted autonomy or institutional control. Moreover, following ILO (2024), we specify that underpayment covers five scenarios – (1) paying workers less than the legal minimum wage; (2) paying workers less than the amount agreed upon in the labour contract; (3) failing to provide overtime pay (based on regulations or labour contract); (4) violations of other wage-related regulations; and/or (5) illegal deductions for the recovery of recruitment fees and related costs. Clearly, the extent of underpayment can reflect the seriousness of modern slavery. For instance, victims of modern slavery practices in the Thai fishing industry (Stringer et al., 2022) received no payment, which is significantly worse than the victims of 'slavery-like' practices at a construction site in Brazil[5]. In this latter scandal, the victims still received (part of) their wages.

Overall, after analysing and synthesizing business studies that define modern slavery and consulting with relevant legislations, we suggest that modern slavery can be defined as exploitations that occur in the workplace, where workers are underpaid and cannot refuse or leave their work. Our definition meets all four of Suddaby's (2010) criteria, at least to some degree. Foremost, it has three differentiae with a genus, while eschewing antecedents or

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[5] Readers may refer to https://www.reuters.com/business/autos-transportation/byd-contractor-denies-slavery-like-conditions-claims-by-brazilian-authorities-2024-12-26/ (accessed 14 May 2025).

consequences that could lead to circularity. However, we acknowledge that future studies may include other differentiae given their research backdrops and questions. Second, our definition explains scope and boundary conditions. For example, exploitations that do not occur in the workplace are excluded. Third, the definition enables researchers to distinct modern slavery from other concepts. For example, practices such as deceptive recruiting for labour or services, unpaid labour, wage theft, and sweatshop labour are not considered as modern slavery, primarily because in many cases, victims of these exploitative activities retain the ability to leave their work. Last, it remains to be decided in future research whether our definition is adequately coherent. However, we argue that future quantitative studies can use our definition as a starting point, and they should explicitly define modern slavery in line with their specific research context and the modern slavery phenomenon being investigated. We hope that our definition will provide a clear set of criteria to guide the operationalization of modern slavery and support researchers and journal reviewers in reflecting on whether a quantitative study examines modern slavery or another labour-related issue within business context.

4.3 RQ2 – Operationalization

After providing clarity around the concept of modern slavery, we then investigate how it is operationalized in the literature. We find 9 studies operationalizing modern slavery[6], and a variety of measurable or operational variables are considered. From the view of unit of analysis, these variables can be grouped into country-level and firm-level. With regard to country-level operationalizations, Moussa et al. (2022) analyse the relationship between institutional environment quality and the extent of modern slavery risk (at the country level). They measure this risk using three dimensions extracted from the Global Slavery Index (GSI): the prevalence

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[6] It is worth noting that few quantitative studies (e.g., Silverman, 2020; Willert, 2022) are devoted to introducing statistical models and model testing, without focusing on operationalizing and/or measuring modern slavery. Thus, these studies are not relevant to Section 4.2.

of modern slavery, vulnerability to modern slavery, and government responses. The prevalence of modern slavery is measured by the percentage of modern slavery victims of the population. Vulnerability to modern slavery is quantified by a score shows a country's overall vulnerability to modern slavery. Government responses to modern slavery are measured by a comparative assessment of the legal, policy, and programmatic actions that governments are taking. Geng et al. (2022, p. 335) consider another operational variable, modern slavery media coverage, and it is defined "as the extent to which modern slavery issues are reported by news media". This variable is measured by the number of UK news articles with the term 'modern slavery' in the headline. Last, the prevalence of modern slavery within a region or country is a frequently used variable. Silverman (2020) operationalizes the concept as the number of victims. Araujo et al. (2024) operationalize the concept as instances of slave labour based on data obtained from the Law of Access to Information in Brazil. Heller et al. (2018) and Lavelle-Hill et al. (2021) both use the proportion of enslaved individuals in the population to operationalize the concept.

Firm-level operationalizations are heterogenous. For example, investigating firms in the UK, Geng et al. (2022, p. 336) operationalize supply chain slavery risk "as the extent to which modern slavery incidents will occur in a focal firm's supply". They combine the countries where suppliers are headquartered, supply chain relationship data from Factset, and the GSI to measure this operational variable. Distinct from Geng et al. (2022), Bodendorf et al. (2023) use the occurrence of modern slavery as their operational variable with a five-point Likert scale in questionnaire. In another approach, Yagci Sokat and Altay (2023) analyse a cross-country sample of firms and operationalize and measure modern slavery allegations based on the presence of media coverage of a firm's involvement in modern slavery. They use Business and Human Rights Resource Centre as their data source with a series of keywords related to modern slavery to screen news articles archived by the Centre. They find 217 articles (for 79 firms in sample) from 2003-2018. Following Libby et al.'s (2002) predictive validity framework, we

visualise the discussions in Section 4.2 and our discussion on the operationalizations of modern slavery in Figure 2.

[Figure 2 about here]

Given that data sources are important in quantitative research, we also examine the data sources used in the literature. We find that many studies (4 out of 9 studies) use the GSI as the data source to measure their operational variables. Two studies use news media, while another two studies use the data released by governmental bodies to measure their operational variables. One study, Bodendorf et al. (2023), uses a questionnaire to collect primary data, measuring their variable based on respondents' reported experiences. We acknowledge that identifying data sources for modern slavery is difficult. For example, Weitzer (2015, p. 227) suggests that "it is impossible to satisfactorily count the number of persons involved or the magnitude of profits in an illicit, underground economy internationally or nationally …… This means that (a) the worldwide magnitude of victims of trafficking and slavery is unknown. (b) Without a baseline from which to measure changes and continuities over time, the notion that a problem is growing cannot be confirmed". While Weitzer's (2015) view focuses on measuring modern slavery victims at the country level, it is also applicable to measuring slavery-related variables at the firm level. Given this difficulty, we recommend and discuss six data sources for modern slavery in Section 5.

5. Data Sources for Modern Slavery

For quantitative research, data sources are crucial. Accordingly, we recommend six data sources to support researchers in conducting quantitative studies on modern slavery. To assist researchers in identifying data sources suitable for their research questions, the discussion in Section 5 is summarised in Table 2.

[Table 2 about here]

5.1 Modern Slavery Disclosure

Given that measuring modern slavery can be challenging, researchers may construct a dataset by analysing firms' modern slavery disclosures. This is supported by prior research, for example Geng et al. (2022, p. 340) suggest that "a firm's modern slavery statement is the best data source available for us to make sense of its effort to address modern slavery issues". The disclosures offer a valuable data source for quantitatively examining how firms perceive and combat modern slavery. Researchers can systematically collect and code these disclosures using textual analysis techniques to quantify the presence, intensity, and comprehensiveness of firms' efforts on risk assessment, supplier auditing, anti-slavery training, and remediation. For example, in our literature review, 20 studies focus on modern slavery disclosures[7] per se, with 16 of these investigating modern slavery statements (the disclosures mandated by regulations). Detailed information is tabulated in Appendix C. Leveraging manual textual analysis, these researchers use various thematic categories (e.g., child labour, forced labour, human trafficking, whistleblowing, and code of conduct) to examine the disclosures. For instance, focusing on modern slavery statements in UK, Flynn (2020) uses seven categories (e.g., supply chain information, policies, and due diligence) to code these statements. Another example is Rao et al. (2022) who examine voluntary modern slavery disclosure in Australia with similar thematic categories. The datasets based on manual textual analysis can identify patterns in corporate efforts on anti-slavery and levels of compliance with regulations across industries, countries, and time.

As Bochkay et al. (2023) and Zhang et al. (2019) suggest, researchers can apply machine-based techniques (e.g., natural language processing (NLP) models) to construct datasets. These include sentiment analysis, which can assess the tone or emotional framing of modern slavery

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[7] It is noting that modern slavery disclosure is not limited to modern slavery statements, and the disclosure covers modern slavery information in other corporate communication channels (e.g., annual report and standalone non-financial report).

disclosures. The literature on sustainability disclosures (e.g., Clarkson et al., 2020; Hummel and Schlick, 2016; Li et al., 2023) shows that the tone in modern slavery disclosures measures how firms perceive and combat with modern slavery. Readability analysis is another machine-based analysis technique. It evaluates how accessible and comprehensible the disclosures are to audiences. Following the literature on sustainability disclosures (e.g., Nazari et al., 2017), the readability of modern slavery disclosures may be related to firms' efforts on anti-slavery. Disclosure comparability, where similarity measures can be used to compare modern slavery disclosures across firms, industries, or time periods, enables researchers to present large-scale evidence on changes in how firms perceive and address modern slavery. Moreover, researchers are motivated to identify and analyse forward-looking information, which indicates a firm's intent or future commitments to addressing modern slavery. Therefore, a dataset based on this information allows researchers to operationalize and measure the strategic orientation of anti-slavery policies. Lastly, unlike manual textual analysis of thematic categories, topic modelling and clustering algorithms help researchers to process large volumes of disclosures in a short time, uncovering latent and recurring themes. Overall, these machine-based techniques enable large-scale, systematic examination of modern slavery disclosures, and the techniques allow future researchers to tailor datasets to align with their operationalizations of modern slavery.

Constructing datasets based on modern slavery disclosures has two advantages. Foremost, the disclosures are accessible. For example, firms in the UK are mandated to publicly release annual modern slavery statements (Flynn, 2020). Second, datasets derived from the disclosures can effectively support firm-level analyses. In contrast, some data sources, such as the Global Slavery Index, require additional efforts to be adapted for firm-level analyses. However, as a data source, disclosures may be unreliable, particularly due to the potential disconnect between what firms disclose and what they actually practice (Clarkson et al., 2008; Clarkson et al., 2011; Hummel and Schlick, 2016; Mahoney et al., 2013; Tregidga et al., 2014). For example, modern

slavery statements in the UK are found to lack substantial information (Jones and Comfort, 2022; Schaper and Pollach, 2021), a result that aligns with the well-documented disconnection phenomenon in the literature. As a result, researchers should critically assess the credibility of datasets based on modern slavery disclosures and, where possible, triangulate them with information from independent sources, such as media coverage and regulatory filings, to enhance the credibility of their analyses.

5.2 Sustainability Rating Agencies

Distinct from modern slavery disclosures, modern slavery-related ratings or data points are 'ready to use' in firm-level analyses and relatively independent from firms. These ratings or data points allow researchers to measure corporate exposure to modern slavery and efforts on anti-slavery. Despite their potential value, these sustainability ratings or data points remain largely overlooked in the modern slavery literature, representing an important future avenue for quantitative studies. Being inspired by de Villiers et al. (2022), we first investigate whether mainstream corporate sustainability ratings offer slavery-related data. Given our limited access, we consult Asset4/ Refinitiv/ LSEG Data & Analytics[8]. Although Asset4 does not contain data points specifically labelled as modern slavery, it includes three data points relevant to modern slavery. SOHRDP0102 measures the presence of policies to avoid child labour, SOHRDP0103 captures the presence of corporate policies to avoid forced labour, and SOHRDP033 measures the number of media controversies related to a firm's use of child labour. The descriptive data of the above data points (2002- 2022) are shown in Appendix D. Foremost, the data coverage for corporate policies to avoid child labour and forced labour is comprehensive, with 69,856 and 74,836 firm-year observations, respectively. Second, as Panel C of Appendix D shows,

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[8] As this product is a good representative of other mainstream products and we have no access to other products, our paper focuses on Asset4/ Refinitiv/ LSEG Data & Analytics.

there are 135 controversies reported linked to a rated firm's use of child labour from 2002 to 2022. Firms located in the US, the UK, and South Korea are more reported in this regard. Overall, modern slavery-related ratings have the great potential to support quantitative studies with large-scale, cross-country findings.

There are also novel ratings dedicated to human rights and modern slavery. For example, ISS ESG' Modern Slavery Scorecard[9]. ISS ESG claims that as of June 2024, the Scorecard covers 60,000 issuers globally, evaluating 25 quantitative and qualitative sources to measure modern slavery risks in operations and supply chains. Compared with Asset4, the Scorecard provides richer data points, allowing researchers to measure modern slavery risks in operations and supply chains, corporate preparedness to address those risks, and links to modern slavery controversies[10]. RepRisk also provides Due Diligence Scores[11], covering slavery-related issues like forced labour, child labour and other human rights abuses. This makes it a quite valuable data source for quantitative studies on modern slavery. Similar with ISS ESG' Modern Slavery Scorecard, the Due Diligence Scores provide rich data points. Thus, researchers can measure how firms are exposed to and combat modern slavery.

Using modern slavery-related ratings or data points has three advantages. Foremost, they are 'ready to use' in firm-level analyses. Second, given the coverage of ratings, researchers can present large-scale, cross-country evidence. Third, the ratings would enhance the replicability of quantitative studies. In contrast, datasets based on modern slavery disclosures can be easily affected by low intercoder reliability (for manual textual analysis) or programming errors and changes in software packages (for machine-based textual analysis). However, these ratings or data points are proprietary, and they can be costly to access. In addition, these ratings may be

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[9] https://www.issgovernance.com/esg/screening/modern-slavery-scorecard/ (accessed 25 May 2025).
[10] https://insights.issgovernance.com/posts/iss-esg-launches-modern-slavery-scorecard-and-augments-thematic-engagement-solution/?utm_source=chatgpt.com (accessed 25 May 2025).
[11] https://www.reprisk.com/insights/reports/flagging-human-rights-risk-with-reprisk-s-due-diligence-scores?utm_source=chatgpt.com (accessed 25 May 2025).

misused because they do not match the operationalizations that are being measured. As Roberts and Wallace (2015, p. 84) suggest, "researchers must foremost have a clear understanding of their data …… whether the ratings appropriately measure the underlying construct". Our work can help quantitative researchers to minimize such misuse by providing a definition of modern slavery. This conceptual clarity of modern slavery enables researchers to screen out irrelevant data points. For example, following our definition on modern slavery, human trafficking is not considered modern slavery. While it has the purpose of exploitations[12] and may use coercion, it occurs outside the workplace (Cockbain and Bowers, 2019; Russell, 2018; United Nations, 2000; Weitzer, 2014). Thus, based on our definition, data on human trafficking ought to be excluded. Including such data would misrepresent the operationalization of modern slavery in a business context. Overall, sustainability ratings or data points have great potential to support quantitative studies with large-scale, cross-country evidence, thereby extending the literature.

5.3 News and Social Media

News and social media may be ideal data sources. Compared with sustainability ratings, they are more accessible. For example, most university libraries subscribe to at least one news database. Social media platforms, such as X (formerly Twitter), offer researchers an application programming interface (API) to search and bulk download posts. More importantly, news and social media are relatively independent from firms. Thus, they may be helpful in triangulating with modern slavery disclosures. In addition, social media enables researchers to examine real-time data. In contrast, most sustainability ratings are updated annually or semi-annually. In the literature, Yagci Sokat and Altay's (2023) work is a neat example that news media can serve as a valuable data source for how firms are exposed to modern slavery. Analysing news articles

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[12] For example, the National Action Plan to Combat Modern Slavery 2020–25 (2020, p. 9) defines it as "…… the physical movement of people across or within borders through coercion, threat or deception for the purpose of exploiting them when they reach their destination".

from 2003 to 2018, Yagci Sokat and Altay (2023) find 121 articles on firms' involvement in child labour. In addition, anti-slavery organizations' posts on social media platforms are a good data source for future quantitative studies. For example, Lucas and Landman (2021) find that anti-slavery organizations actively use Twitter during the COVID-19 pandemic. Many textual analysis techniques discussed in Section 5.1 can be applicable. For example, sentiment analysis, topic modelling, and clustering algorithms help to construct datasets based on posts on social media platforms. Researchers may leverage the datasets to measure firms' exposure to modern slavery and identify patterns in how modern slavery issues are perceived by firms and discussed or negotiated between firms and stakeholders. News and social media also enable researchers to conduct regional level analyses (e.g., the prevalence of modern slavery in a region). Overall, as versatile data sources, news and social media would effectively support quantitative studies with different units of analysis (e.g., firms, industries, regions, and countries).

There are three drawbacks in news and social media. Foremost, small-to-medium firms are likely to be omitted, and large firms can attract more media attention. As a result, datasets based on news and social media may overrepresent large firms. However, studies such as Salmon (2022), suggest that small-to-medium firms are not immune to modern slavery. Second, given the threat of misinformation and disinformation (e.g., Broda and Strömbäck, 2024; Pérez-Escolar et al., 2023), researchers should be cautious about the validity of posts on social media platforms and news articles. Third, researchers constructing datasets from social and news media must filter posts or articles. This requires a definition clarity of modern slavery, to which our review effectively contributes. For example, future researchers may use our definition in Section 4.2 as a basis for developing their search keywords to identify modern slavery-related posts on social media platforms or news articles. In addition, a clear definition helps researchers to screen out irrelevant posts or articles.

5.4 Governmental Bodies and International Organizations

For researchers who need to measure regional-level or country-level operationalizations of modern slavery (e.g., the prevalence of modern slavery in a region or area), they can leverage a range of data sources provided by governmental bodies and international organizations. For instance, the UK's Home Office releases statistics through the National Referral Mechanism (NRM), detailing the number of potential victims identified and referred for support services[13]. Similarly, the US Department of Labor provides reports on goods produced by child labour or forced labour, offering insights into industries and countries at risk[14]. In addition, international organizations compile and publish some country-level datasets. For example, The International Labour Organization (ILO), in collaboration with Walk Free and the International Organization for Migration (IOM), publishes the Global Estimates of Modern Slavery for 2021[15]. It provides prevalence figures and analyses of forced labour and forced marriage worldwide. Additionally, the ILO's Forced Labour Observatory[16] offers statistics, legal cases, detailed information on legal frameworks, enforcement measures, and victim support mechanisms across countries. We find that these data sources are under-used in the literature. For example, only four studies (i.e., Araujo et al., 2024; Heller et al., 2018; Lavelle-Hill et al., 2021; Silverman, 2020) utilize data sources provided by governmental bodies and international organizations. Overall, the datasets enable researchers to analyse trends, assess the effectiveness of country or regional anti-slavery policies, and identify regions and countries with higher incidences of modern slavery.

Using the datasets provided by governmental bodies and international organizations has two obvious advantages. First, they are very accessible. Second, they can effectively support

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[13] Readers may refer to https://www.gov.uk/government/collections/national-referral-mechanism-statistics (accessed 26 May 2025).

[14] Readers may refer to https://www.dol.gov/agencies/ilab/resources/reports/child-labor (accessed 26 May 2025).

[15] Readers may refer to https://www.ilo.org/resource/news/50-million-people-worldwide-modern-slavery-0 (accessed 26 May 2025).

[16] Readers may refer to https://webapps.ilo.org/flodashboard/ (accessed 26 May 2025).

country-level or regional-level analyses. However, researchers need to be cautious about two drawbacks. First, because datasets provided by different countries may be incomparable, it can be hard for researchers to present cross-country evidence. For example, the National Referral Mechanism (NRM) in UK covers a range of modern slavery-related practices. In contrast, the US Department of Labor concerns forced labour and child labour. Our work can be very helpful in a sense that researchers would use our definition on modern slavery to consistently merge datasets from different countries. Second, it can be difficult for researchers to use these datasets to measure firm-level operationalizations of modern slavery. For example, although the ILO's Forced Labour Observatory provides country-level data on forced labour, the data are useless in measuring the prevalence of forced labour in specific firms. Overall, the datasets released by governments and international organizations are valuable for quantitative studies at regional and country levels.

5.5 Satellite or Remote Sensing

Satellite images also support researchers who need to measure regional-level or country-level operationalizations of modern slavery (e.g., the prevalence of modern slavery in a region or area). For example, leveraging high-resolution images provided by Google Earth (from 2014 to 2016), Boyd et al. (2018) estimate the number of brick kilns in the Brick Belt region of South Asia. The region across Pakistan, northern India, Nepal, and Bangladesh, and it contains a large proportion of the brick kilns found globally. As brick kilns are known sites of modern slavery, the total number of brick kilns is a good measurement on modern slavery. As Boyd et al. (2018) suggest, given their large size and distinct spatial form, brick kilns can be identified on satellite images. Boyd et al. (2018) collaborate with volunteers to visually label brick kilns on images, estimating the total number of brick kilns across the Brick Belt region to be 55,387. Clearly, a critical research design component is justifying the relationship between certain sites or places

(which are later identified on satellite images) and the occurrence of modern slavery. Our work helps researchers evaluate which sites or places would be selected by clarifying what modern slavery is and how to operationalise this concept.

Compared with data sources maintained by governments and international organizations, satellite images have two unique advantages. First, they allow researchers to examine real-time data. For example, researchers may use satellite images to trace monthly and quarterly changes in the Brick Belt region of South Asia. In contrast, governments and international organizations tend to annually update their data sources. Second, if researchers are able to link sites of modern slavery to firms based on ownership and/or trading relationships, satellite images can support firm-level analyses. However, there are two caveats. First, the sample period of a study based on satellite images tends to be limited, as high-resolution images have become more readily in recent years. In contrast, other data sources, for example sustainability ratings and news, allow a longer range of sample period. Second, for researchers unfamiliar with remote sensing, the learning curve for extracting data from satellite images can be steep.

5.6 First-hand or Primary Data

Researchers can adopt action or interventionist research method to collect first-hand data on modern slavery (Benstead et al., 2018; Benstead et al., 2021; Dodd et al., 2023; Trautrims et al., 2021). This method allows researchers to become embedded in real-world initiatives and then access first-hand data. For example, Benstead et al. (2018) engage in five collaborative initiatives (including joint training and supplier audits), Benstead et al. (2021) focus on supply chain auditing practices, Dodd et al. (2023) works with a not-for-profit housing provider to strengthen management anti-slavery controls, and Trautrims et al. (2021) engage in an inter-firm initiative (i.e., developing procurement guidance) for the UK construction and facilities management industry. On the one hand, these partnerships with firms and non-governmental

organizations create opportunities to access and investigate primary data that would otherwise remain inaccessible. On the other hand, compared with secondary data sources, opportunities to participate in real-world initiatives are quite rare or unavailable to most researchers. Overall, given the hidden and complex nature of modern slavery, the action or interventionist research offers a particularly effective means of uncovering real-time, context-specific data, making it a promising and underutilized data source for future quantitative studies.

6. Conclusion

This literature review serves to enhance our understanding of modern slavery from three omitted yet important aspects, namely conceptualization, operationalization, and data sources. Given that the term 'modern slavery' is often used vaguely in the existing literature, and there is a lack of systematic understanding of how to operationalize and measure it, our work lends support to advancing the literature, particularly through quantitative research.

By conducting a comprehensive review of 96 business studies, we offer valuable insights to research and practice. First, we reveal that heterogeneous definitions of modern slavery are in use. To support future quantitative studies, we provide clarity around the essential attributes that define modern slavery. Second, we review how modern slavery is operationalised. Third, we elaborate six sources for data to support quantitative studies. The sources include modern slavery disclosure, sustainability rating agencies, news and social media, governmental bodies and international organizations, satellite images, and potential collaborations with firms and non-governmental organizations. For practitioners, our review provides valuable insights into understanding and measuring modern slavery, which could be useful to the corporate sector, regulators, investors, and society in addressing this critical issue.

Like other studies, our review is not without limitations. Because our search approach was narrow, our review may have excluded some studies that are arguably relevant to modern

slavery, such as those on forced labour without mentioning 'modern slavery'. However, as previous literature reviews cover fewer studies (e.g., Han et al., 2024 – 44 studies, Szablewska and Kubacki, 2023 – 26; McLaren et al., 2024 – 47), our work is more comprehensive.

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Figure 1: Number of Publications Per Year

This figure presents the number of publications by year. We do not find any papers on modern slavery in 2014 or 2016. Furthermore, as our review is limited to modern slavery papers published before January 30, 2024, a decrease in the number of publications in 2024 is expected.
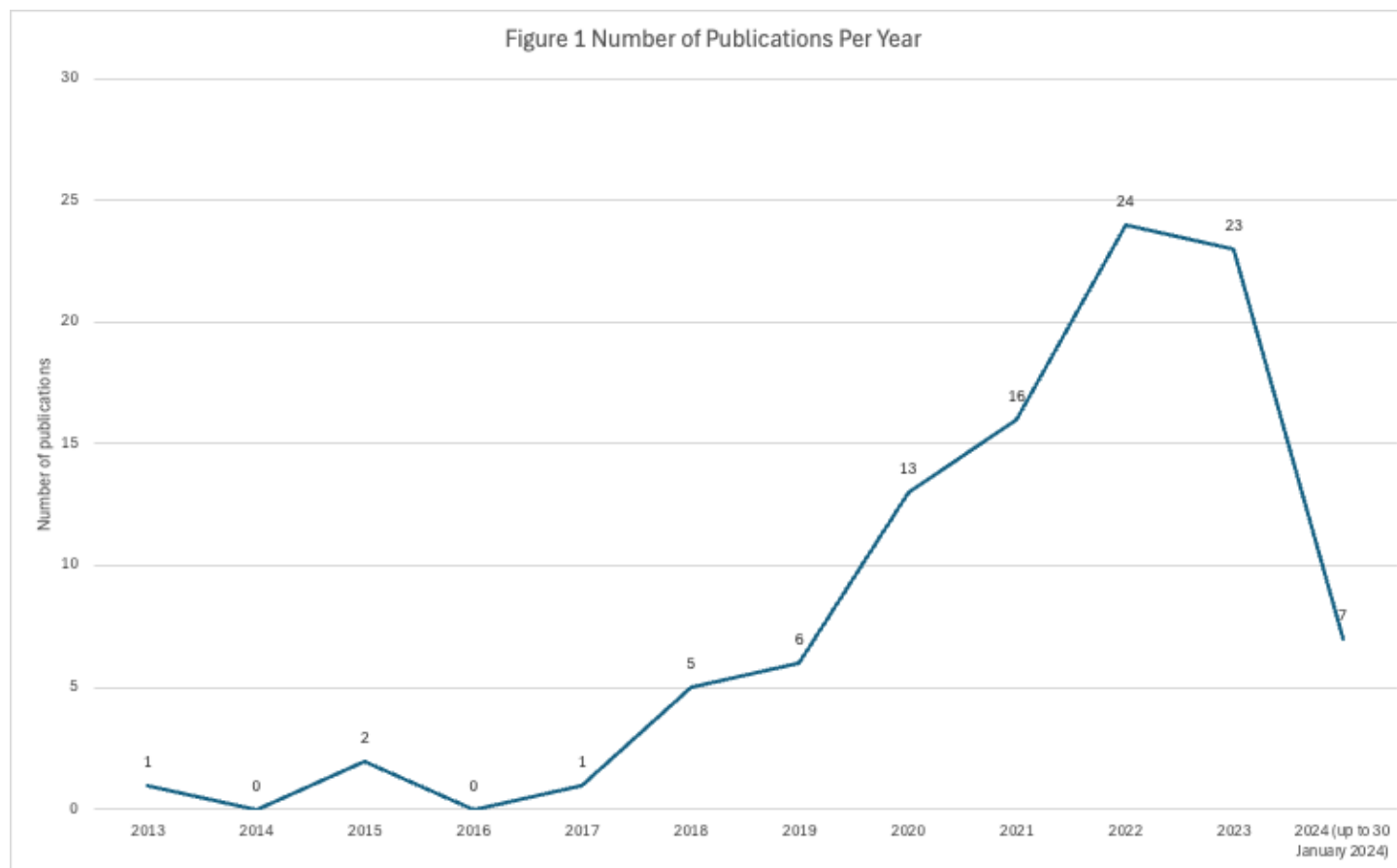

Figure 1 Number of Publications Per Year

Figure 2: Predictive Validity Framework for Modern Slavery

This figure presents our discussion in Sections 4.2 and 4.3. It is adopted from Libby et al.'s (2002) predictive validity framework. Following an Aristotelian approach, we proposed a definition of modern slavery, specifying its genus and differentiae. Regarding operational or measurable variables, we group them into country-level or regional-level and firm-level to better visualize our discussion in Section 4.3.

Conceptualization

Modern Slavery

Exploitations that occur in the workplace, where workers are underpaid and cannot refuse or leave their work.

Operationalization

Modern Slavery Media Coverage

Prevalence of Modern Slavery

Modern Slavery Risk

Country-level or Regional-level

Supply Chain Slavery Risk

Modern Slavery Allegations

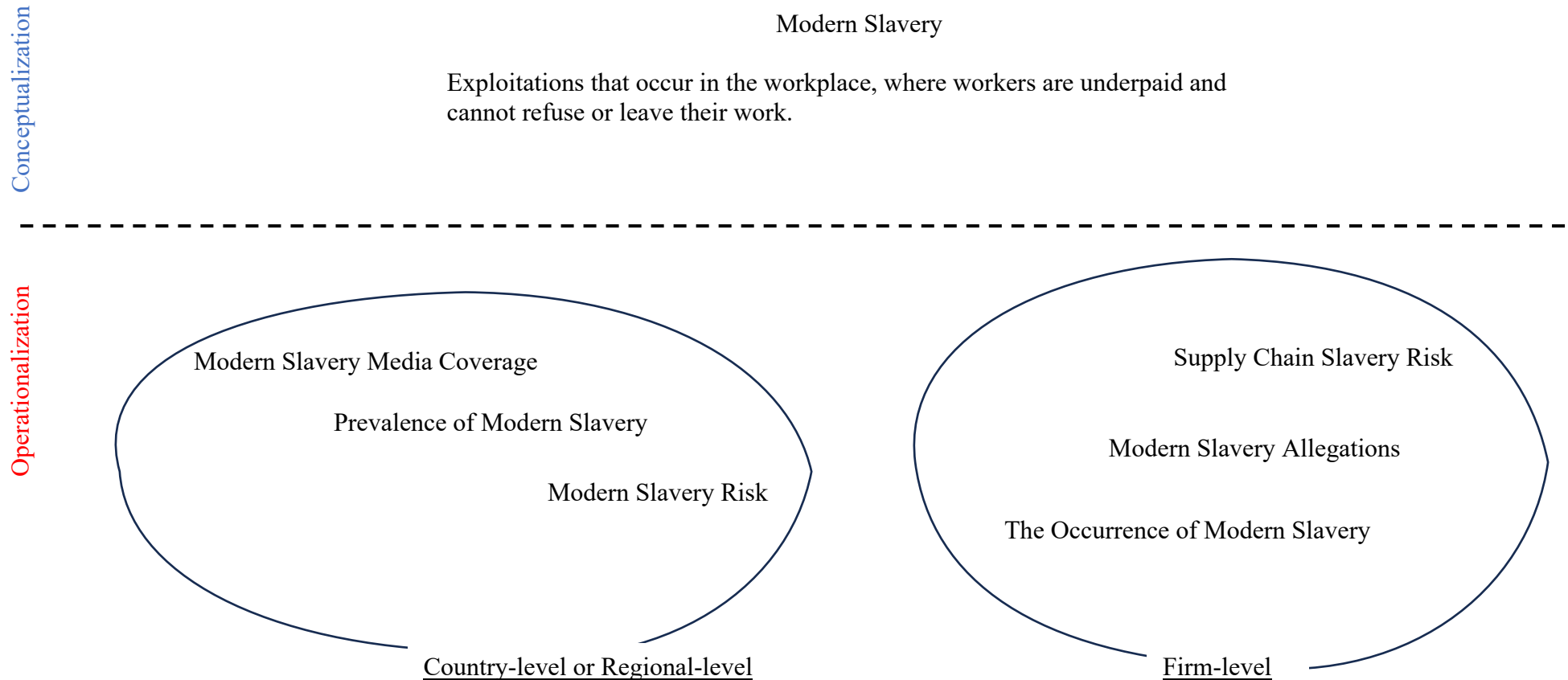The Occurrence of Modern Slavery

Firm-level

Table 1: Overview of Business Research Studies on Modern Slavery

This table provides an overview of studies on modern slavery. Panel A shows the journals that published more than one article. Panel B presents the research methods of the studies. Panel C groups the studies by their research topics. Panel D shows the top five modern slavery studies based on their citations. It is noted that the citation numbers are provided by Publish or Perish 8.

Panel A: The list of journals that published more than one article	
Journal	*Number of Publications*
Supply Chain Management: An International Journal	8
British Accounting Review	6
Journal of Business Ethics	6
Accounting, Auditing & Accountability Journal	3
Business and Human Rights Journal	3
Business Strategy and Development	3
Business Strategy and the Environment	3
International Journal of Operations & Production Management	3
Business & Society	2
Cornell Hospitality Quarterly	2
Journal of Financial Crime	2
Journal of Industrial Relations	2
Journal of Risk Research	2
Journal of the Royal Statistical Society Series A: Statistics in Society	2
Work, Employment and Society	2
Panel B: Research method	
Research Method	*Number of Publications*
Conceptual/ Theoretical	27
Studies with more than one method	17
Interview	12
Textual analysis	19
Quantitative methods	10
Case study	7
Action/ interventionist research	<u>4</u>
Total	96
Panel C: Research topic	

Research Topic	Number of Studies
Motivators and demotivators of modern slavery	46
Insights into modern slavery-related practices	27
Regulatory issues	13
Practitioners and researchers in modern slavery	8
Consequences of modern slavery	2
Total	96

Panel D: Top five modern slavery studies

Papers	(1) Number of Total Citations	Papers	(2) Number of Citations per Year
Crane (2013)	234	Caruana et al. (2021)	21.33
Gold et al. (2015)	154	Crane (2013)	21.27
New (2015)	124	Gold et al. (2015)	17.11
Stevenson and Cole (2018)	90	Stevenson and Cole (2018)	15.00
Caruana et al. (2021)	64	Monciardini et al. (2021)	14.67

Table 2: Data Sources for Modern Slavery

This table summarizes our discussion in Section 5. Specifically, there are six data sources, and we present advantages and drawbacks for each source.

Data Source	Advantages	Drawbacks
Corporate modern slavery disclosures	Accessible Suitable for firm-level analyses	Firms may strategically change the disclosure content Requiring additional effort to extract data
Modern slavery-related ratings	Comprehensive coverage on firms across countries Ease to use Improving replicability of results Suitable for firm-level analyses	Costly to access The likelihood of misuse in operationalization
News and social media	Accessible Real-time data Suitable for different units of analysis (e.g., countries and firms)	The presence of misinformation and disinformation Requiring additional effort to extract data Small-to-medium firms may be omitted
Governmental bodies and international organizations	Accessible Suitable for regional-level or country-level analyses	It can be difficult to merge datasets across countries Requiring additional effort to use the datasets at the firm-level analyses
Satellite or remote sensing	Real-time data Suitable for different units of analysis (e.g., countries and firms)	Limited sample periods Requiring additional effort to extract data
First-hand or primary data (based on action or interventionist research)	Unique data	Opportunities are rare