Trade-based money laundering: a systematic literature review

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Abstract

Purpose – This paper aims to offer the first known synthesis of peer-reviewed literature on trade-based money laundering (TBML). Given the topic is in its nascent stage yet gaining prominence across scholarship and practice, this foundation is pertinent for future TBML research.

Design/methodology/approach – A systematic literature review was undertaken with a formulaic search string. Both qualitative (thematic) and quantitative (meta) analysis methods were used to illustrate the findings.

Findings – The systematic literature review, using qualitative and quantitative synthesis, led to a thematic categorization of extant TBML literature into four categories: TBML risk assessment, TBML detection, the role of professionals and understanding of TBML. Due to the limited number of studies, insights that can be drawn from the extant literature on the best way to combat TBML are also limited.

Originality/value – As the first systematic literature review on TBML, this study identified that the existing TBML literature has focused on increasing the understanding of the phenomenon in terms of its definition and mechanisms, detection, linkage with other crimes, such as organized crime and terrorism financing, and risk assessment frameworks. The originality of these findings lies in identifying areas future researchers might explore to broaden the academic literature.

Keywords Trade-based money laundering, TBML, Systematic literature review, Illicit trade, Detection, Money laundering

Paper type Research paper

Introduction

Money laundering is the act of disguising the illicit origin of dirty money (Buchanan, 2004). There are several ways illicitly obtained funds can be laundered; one mechanism is via global trade. Trade-based money laundering (TBML) is the process of disguising the proceeds of crime by moving value through trade transactions to legitimize their illicit origins via misrepresentation of the price, quantity or quality of imports or exports (FATF, 2006). It may involve the use of legitimate international trade systems to transfer value through over- or under-invoicing (invoicing the goods at a price above or below the fair market price), over- or under-shipment (overstating or understating the quantity of goods being shipped or services being provided), or falsely describing the quality of goods and services. In the case of services, due to difficulties associated with measurement and a lack of consistent prices, the same service may be invoiced multiple times.

It is not apparent when the term “TBML” was first coined; Zdanowicz (2009) attributes it to research conducted between the 1960 and 1980s when abnormal international trade pricing patterns prompted suspicions that money was illegally being transferred across borders. Pre-2006 peer-reviewed academic literature has highlighted illicit practices within trade transactions (Bhagwati, 1974; De Wulf, 1981; Zdanowicz, 2004). However, the focus of this scholarship was not exclusively on identifying TBML but rather on highlighting other types of financial crimes that occur through trade transactions. For example, Soudijn (2014) pointed
out that overstating the value of goods to obtain export subsidies constitutes subsidy fraud, not TBML. In other words, TBML did not feature in the peer-reviewed scholarship; at best, it was discussed peripherally (Waszak, 2004).

Consequently, after the Financial Action Task Force (FATF) published its TBML report in 2006, the concept gained prominence (FATF, 2006; FATF, 2008; FinCEN, 2010; Liao and Acharya, 2011; Sullivan and Smith, 2011). TBML has emerged as a typology used by organized crime groups, white-collar criminals, and terrorist organizations, such as Hezbollah, to launder funds. These entities may use TBML to hide profits, pay bribes, and move value to lower taxation zones (O’Halloran et al., 2018; Rollins and Wyler, 2011). In terms of terrorist organizations, there is a conceptual delineation that must be made. As we are explicitly discussing money laundering, we only consider terrorist organizations using trade to “clean” illicitly obtained funds, not typical terrorist financing and resourcing activities such as Hawala (Razavy, 2005). For instance, cars and other goods are purchased using drug proceeds from the United States and shipped to countries in West Africa; sale proceeds are sent back to Lebanon with help from colluding exchange houses (O’Halloran et al., 2018; Rollins and Wyler, 2011); this activity employed by Hezbollah would fall under the TBML definition given the purpose of trade stream exploitation was to obfuscate the origin of the drug money. In other words, TBML must start with dirty money that requires “cleaning”. Trade-based terrorism financing should not be conflated with TBML (Sinha, 2013).

The magnitude of the problem can be gauged from the estimates provided by Global Financial Integrity (2017). According to their analysis, an average of 87% of illicit financial flows from developing countries between 2005 and 2014 were accomplished through fraudulent invoicing of trade—a method commonly linked to TBML. Similarly, Saenz and Lewer (2022) estimated the annual magnitude of TBML within the European Union to range from USD 0.9 to 1.8 trillion. The legitimacy provided by global trade allows offenders to transfer billions of dollars between jurisdictions without any adherence to state-level currency regulations (Hataley, 2020). Furthermore, FinTech advancements in digital payments further complicate TBML detection (Financial Action Task Force And Egmont Group, 2020).

Motivated by the complexity and magnitude of TBML, this study aims to examine the peer-reviewed literature on TBML, identify gaps, and direct attention towards addressing them to propel further study. Notably, the desire for financial gain serves as a significant driving force for illicit actors to engage in money laundering, including TBML (Byrne, 2011). As a result of the strong link between money and crime (Canhoto, 2020), accounting knowledge becomes critical to manage the huge capital accumulation resulting from such crimes (Compin, 2008). Consequently, an increasing amount of illicit funds needing to be laundered increases the importance of accountants in detecting and reporting money laundering (Habib et al., 2018; Mitchell et al., 1998a, b; Neu et al., 2013; Ravenda et al., 2017, 2018). This paper directs attention towards the proceeds of crime being laundered through trade, directly affecting the role of accounting and accountants in society (Murray, 2018). Given the growing prominence of TBML in disguising illicit funds and role of accountants in combating illicit flows, a literature review on TBML enhances accountants’ understanding of the subject matter, including the identification of red flags, associated challenges, the need for skill development and required training for its effective detection.

The definition of TBML as provided by the FATF has been criticized for its vagueness (Soudijn, 2014). This can be attributed to the diverse nature of trade transactions and the absence of a clear delineation of what encompasses such transactions. Moreover, the FATF’s definition offers a narrow perspective due to its exclusive focus on international goods trade, thus undermining the significance of domestic trade (Soudijn, 2014). Nevertheless, this viewpoint has been debated, as most domestic anti-money laundering (AML) regulations also incorporate home-based TBML in their money laundering offenses (Chuah, 2022). Furthermore, incorporating the phrase “financing their activities” in the definition of TBML broadens its scope, given that it encompasses all money laundering transactions (Soudijn, 2014).
Despite these limitations, FATF’s definition of TBML explicitly associates it with laundering money using “trade transactions”. Considering the broad nature of what encompasses “trade transactions” and in alignment with the existing financial crime literature (Brodie et al., 2000; Dagirmanjian, 2018; Giroud and Boudry, 2015; Mashberg, 2019; Mosna, 2022; Stoll, 2022; Viollaz et al., 2018; Warchol, 2017), we focus exclusively on the exploitation of the global trade network to launder money. Both of those key aspects must be present. This means excluding literature that primarily addresses, for instance, the cross-border movement of goods (i.e. art) resulting in profits that later require laundering. That is, predicate, or even separate offenses and associated goods, such as art, antiquities and wildlife trafficking are excluded. For example, fraudulently invoicing turtle shells as waste to smuggle the shells is wildlife trafficking, not TBML. However, literature addressing, for example, the undervaluing of art to move value through trade to obfuscate dirty money is included. This delineation helps build on the definition of what TBML is – and what it is not. Generally, the literature addressing illicit trafficking, including antiquities and wildlife trafficking, is viewed distinctly from the literature on TBML within the context of financial crime (Machado and Ollaik, 2022; Massy, 2008; Schindler and Gautier, 2019; Viollaz et al., 2018; Warchol, 2017; Warchol et al., 2003), and has been examined separately (Teichmann, 2017). Depending on how those goods are used (and the intent) is what makes them intersect with TBML; this article endeavors to highlight this intersection.

The following section provides a brief overview of the systematic literature review process, followed by a synthesis of the results, and discusses the identified research gaps. Finally, pathways for future work are presented.

Methodology
Literature reviews are critical to assessing existing knowledge aligned with an academic field (Tranfield et al., 2003). Subsequently, a scoping exercise, in line with Briner and Denyer (2012), was conducted to establish the current state of research on TBML. Scopus and Clarivate Web of Science (WoS), two prominent databases with comprehensive coverage of relevant content (Siva et al., 2016; Suárez et al., 2017), were used to access the journal articles that would form the basis of the systematic literature review. The advantage of these databases is they can be accessed through university library systems (Linnenluecke et al., 2019), allowing for keyword searches across various fields, including title, abstract, topic and source title. Finally, they host citation records from scholarly journals across research areas.

Following the identification of the databases, searches were conducted with the key phrase “Trade based money laundering” in the title, abstract and keywords fields. After an initial systematic literature review, additional Boolean searches were conducted using keywords found during the scoping exercise. The additional search keywords were “trade-based money laundering”, “TBML”, “drug traffic”, “traffic”, “detect”, “crime”, “organised crime”, “organized crime”, “terror”, “terror finance”, “terror fund”, “white collar crime”, “white-collar crime”, “bank”, “predicate crime”, “fraud”, “piracy”, “counterfeit”, “smuggle”, “typo”, “monitor”, “misinvoi”, “misprice”, “trad”, “briber”, “corrupt”, “internal control”, “AML”, “prevent” and “investigat” as documented in Table 1.

The search string, as set out in Table 1, was deployed within WoS and Scopus. At the same time, several parameters were considered to ensure any results were reliable and valid within the constraints of this research. The first parameter restricted the period data would be drawn from. TBML is a comparatively new concept when compared to other financial crime types. It received limited academic attention before the release of the FATF’s 2006 report. Since 2006, TBML has gained traction in academic and practitioner circles. Despite this, the researchers acknowledge the pre-2006 literature (Bhagwati, 1974; De Wulf, 1981; Cuddington, 1986; Money Laundering Alert, 1992; Zdanowicz, 2004; De Boyrie et al., 2005). However, for this systematic literature review, and to emphasize the time delay between industry insights and
<table>
<thead>
<tr>
<th>Database</th>
<th>Search string</th>
<th>Date accessed</th>
<th>Results (peer-reviewed)</th>
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<tbody>
<tr>
<td>Web of Science</td>
<td>“Trade based money laundering”</td>
<td>31/08/2022</td>
<td>30</td>
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<tr>
<td>Scopus</td>
<td>“Trade based money laundering”</td>
<td>3/09/2022</td>
<td>36</td>
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<tr>
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<td>11/09/2022</td>
<td>37</td>
</tr>
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<td>Scopus</td>
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<td>11/09/2022</td>
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<tr>
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<td>(“trade based money laundering” OR “TBML” OR “trade-based money laundering”) AND (“drug traffic*” OR traffic* OR detect* OR “crime*” OR “organised crime*” OR “organized crime*” OR terror* OR “terror finance*” OR “terror fund*” OR “white collar crime*” OR “white-collar crime*” OR bank* OR “predicate crime*” OR fraud* OR piracy* OR counterfeit* OR smuggle*)</td>
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<td>(“trade based money laundering” OR “trade-based money laundering”) AND (“drug traffic*” OR traffic* OR detect* OR “crime*” OR “organised crime*” OR “organized crime*” OR terror* OR “terror finance*” OR “terror fund*” OR “white collar crime*” OR “white-collar crime*” OR bank* OR “predicate crime*” OR fraud* OR piracy* OR counterfeit* OR smuggle* OR typo* OR monitor*)</td>
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<td>Scopus</td>
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<td>Web of Science</td>
<td>(“trade based money laundering” OR “trade-based money laundering”) AND (“drug traffic*” OR traffic* OR detect* OR “crime*” OR “organised crime*” OR “organized crime*” OR terror* OR “terror finance*” OR “terror fund*” OR “white collar crime*” OR “white-collar crime*” OR bank* OR “predicate crime*” OR fraud* OR piracy* OR counterfeit* OR smuggle* OR typo* OR monitor*)</td>
<td>22/10/2022</td>
<td>32</td>
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Table 1.
Search log with keywords (continued)
journal publications, the timeframe extends from June 23, 2006 to October 22, 2022, with a focus on post-2006 publications. The second parameter applied by the research team was guided by the work of Dyment and Downing (2020), who in their systematic literature review of online teacher education research, relied exclusively on peer-reviewed articles, thus excluding books, book chapters, conference papers, dissertations and technical reports. This research also limited its focus to explicitly peer-reviewed journal articles, although we do acknowledge there are relevant books, such as Cassara (2016). In line with Linnenluecke et al. (2019), there is no set way to make these considerations; consequently, to ensure consistency and avoid bias, the authors individually reviewed and documented the decision steps to add transparency to the search process.

Table 1.

<table>
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<tr>
<th>Database</th>
<th>Search string</th>
<th>Date accessed</th>
<th>Results (peer-reviewed)</th>
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<tbody>
<tr>
<td>Scopus</td>
<td>(“trade based money laundering” OR “trade-based money laundering” OR “TBML”) AND (“drug traffic” OR traffic* OR detect* OR “crim*” OR “organised crime” OR “organized crime*” OR terror* OR “terror finance” OR “terror fund*” OR “white collar crime” OR “white-collar crime” OR bank* OR “predicate crime” OR fraud* OR piracy* OR counterfeith* OR smuggl* OR typo* OR monitor* OR misinvoi* OR mispric* OR trad*)</td>
<td>22/10/2022</td>
<td>39</td>
</tr>
<tr>
<td>Web of Science</td>
<td>(“trade based money laundering” OR “trade-based money laundering” OR “TBML”) AND (“drug traffic” OR traffic* OR detect* OR “crim*” OR “organised crime” OR “organized crime*” OR terror* OR “terror finance” OR “terror fund*” OR “white collar crime” OR “white-collar crime” OR bank* OR “predicate crime” OR fraud* OR piracy* OR counterfeith* OR smuggl* OR typo* OR monitor* OR misinvoi* OR mispric* OR trad* OR trad* OR “briber*” OR “corrupt*” OR “internal control*” OR “AML” OR “prevent*” OR “investigat*”)</td>
<td>22/10/2022</td>
<td>32</td>
</tr>
<tr>
<td>Scopus</td>
<td>(“trade based money laundering” OR “trade-based money laundering” OR “TBML”) AND (“drug traffic” OR traffic* OR detect* OR “crim*” OR “organised crime” OR “organized crime*” OR terror* OR “terror finance” OR “terror fund*” OR “white collar crime” OR “white-collar crime” OR bank* OR “predicate crime” OR fraud* OR piracy* OR counterfeith* OR smuggl* OR typo* OR monitor* OR misinvoi* OR mispric* OR trad* OR trad* OR “briber*” OR “corrupt*” OR “internal control*” OR “AML” OR “prevent*” OR “investigat*”)</td>
<td>22/10/2022</td>
<td>39</td>
</tr>
</tbody>
</table>

Source(s): Tables are author’s own work.

After accounting for duplicates, the initial keyword searches returned 33 full citation records of scholarly work. The records comprised data on authors, document title, year of publication, citation count, Digital Object Identifier (DOI), affiliations, correspondence address, abstract, author keywords and funding details. After replicating the methodology proposed by Briner and Denyer (2012), the citation records were added to ResearchRabbit, an online citation-based literature mapping tool, to minimize any subjectivity associated with the selection of keywords in the search process and enhance the comprehensiveness of the literature review by leveraging citation connections rather than relying solely on keyword-based coverage. ResearchRabbit scans databases and publicly available online sources, selecting additional papers based on similarities to the initial citation records. This secondary method identified a further 214 citation records. A purposive sampling method was then adopted to assess these records (Denscombe, 2017). The research methodology is presented in Figure 1.
In line with the work of Suárez et al. (2017), the principal reason behind the exclusion of records from the secondary qualitative dataset was the requirement for the data to be published in journals that had a Journal Citation Report (Thomson Reuters) or a Scimago Journal and Country Rank by Scopus (SJR) impact factor. Many of the 214 citation records fell into this category. Similarly, from the 214 citation records, those not focusing on TBML in full or in part, as assessed by an absence of key terms in the associated article’s title, abstract or keyword sections, were excluded. This was done to ensure the primary focus of the paper was TBML as opposed to a brief mention or secondary focus. This purposive sampling method resulted in only three more scholarly articles being considered for this review, with 33 from the initial Boolean search. In total, 36 citation records were included in this study. A list of inclusion and exclusion criteria has been provided below in Table 2.

A mixed-method approach comprising quantitative and qualitative synthesis, in line with the views of MacCoun (1998), Gaur and Kumar (2018), and Donthu et al. (2021), was adopted to review the literature on TBML. Donthu et al. (2021) state that when the number of review papers is low (e.g. 50), the research field is small and does not warrant bibliometric analysis. MacCoun (1998) argues systematic literature reviews that rely on qualitative techniques alone could be marred by interpretation bias from scholars. Therefore, in line with the views of Gaur and Kumar (2018), we supplement the bibliometric analysis with an analysis of content in the articles considered for this review using a template proposed by Faff (2015).

In terms of quantitative synthesis, Bibliometrix, an R statistical package for analyzing and visualizing citation records comprising bibliographic data, was used (Aria and Cuccurullo, 2017; Linnenluecke et al., 2019). In terms of qualitative synthesis, an approach similar to
Faff (2015) was adopted to go through the full text of the study under consideration to draw out key findings and categorize studies according to the insights they generated. The next section discusses the results.

**Result synthesis**

*Quantitative synthesis*

The Bibliometrix package in R was used to perform a meta-analysis and visualize the results. Coding was used in R to conduct the analysis; it is also essential to note the analysis conducted is not exhaustive of all analyses possible. Table 3 provides a summary of statistics of publications in the field, which can be considered a good start to ascertain the extent of work done in the field. Furthermore, Figure 2 provides an overview of manuscript production and citations in the field over the years. As is evident from the figure, the work in money laundering and TBML has witnessed a significant surge and several factors can be attributed to the same; however, determining those factors is not within the scope of this paper.

A summary analysis of the literature in the field also identified the top manuscripts per annual citations, as presented in Table 3. Such an analysis provides a brief synopsis of the area of concern within the field. For instance, in Table 3, the top two manuscripts are related to methods associated with the detection of TBML, followed by a consideration of TBML from a banking perspective. Such an approach could be helpful in an initial assessment of the literature in a field with many studies to get an idea of the focus areas for combating TBML. Additionally, among the 36 studies presented in Table 3, 20 have been published in the Journal of Money Laundering Control. Furthermore, out of 36 studies, 12 have been published by the same author. Such a concentration of literature development can result in a lack of diversity in approaches, ideas and perspectives, leading to a limited understanding of the topic. It also raises the possibility of discourse on a topic being biased.

The analysis summarizes the main results of the bibliographic data frame considered. In addition, a conceptual framework using the keyword co-occurrences, in line with Aria and Cuccurullo (2017), is produced using a dimensionality reduction technique called correspondence analysis (CA). This technique is used for exploring relationships between categorical variables and uncovering hidden trends and patterns (see Figure 3). The codes used to perform the analysis have been provided in appendices.

Figure 3 shows three clusters of keywords that express the key focus areas identified using CA. The clusters of keywords are associated with TBML risk assessment, compliance, due diligence, banking and money laundering/terrorism financing, among others. The formation of such clusters is understood and supported via themes identified through a qualitative synthesis of the literature.

**Qualitative synthesis**

As mentioned previously, an approach similar to Faff (2015) was used to analyze selected articles and categorize them based on underlying themes. The review using the qualitative

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Inclusion</th>
<th>Exclusion</th>
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<tbody>
<tr>
<td>Focus</td>
<td>TBML focus and its impact</td>
<td>Trade mis invoicing and capital flight without a focus on TBML</td>
</tr>
<tr>
<td>Publication Date</td>
<td>Post 2006</td>
<td>Prior to 2006</td>
</tr>
<tr>
<td>Publication type</td>
<td>Scholarly peer-reviewed articles with SJR or JCR impact factor</td>
<td>Books, book chapters, technical reports, dissertations or proceedings</td>
</tr>
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<td>Tables are author’s own work</td>
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Table 2. Inclusion and exclusion criteria during search strategy
approach led to the categorization of literature on TBML into four broad categories, namely, (1) TBML risk assessment, (2) TBML detection, (3) the role of professionals and (4) understanding of TBML. To better understand TBML, research efforts have been made to clarify the concept of TBML, its vulnerabilities and challenges and the methods adopted to undertake it.

Similar to Tiwari et al. (2020), the categorization of literature on TBML into somewhat overlapping categories helps identify under-researched aspects and provides future research directions. Keeping this in mind, the following subsections analyze the critical research in each category.

**TBML risk assessment.** Naheem (2015c) highlighted critical elements of TBML from a banking perspective and outlined the gaps in banking risk assessment to tackle the issue. He extended the views of Soudijn (2014), who described the definition of TBML as vague. Consequently, Naheem (2015c) attempted to define TBML from a banking perspective as using financial services to move money through fraud or deception. He stated that using the term “deception” in the definition implied the adoption of techniques aimed at bypassing banks’
existing risk assessment systems. Similarly, using the term “money” in the proposed definition directed attention towards the objective of TBML, that is, to give dirty funds a legitimate appearance. Furthermore, He (2010) highlighted, along with suspicious transaction activity, the need to consider elements associated with client behavior, transaction patterns, the geographic profile of the business/customer and involvement/links to third-party organizations. The author proposed that considering such elements within the definition of TBML for the banking sector could provide a more comprehensive approach to detecting and preventing TBML activity. For instance, considering the geographic profile and links with third-party organizations can provide contextual information suggesting potential TBML activity. Similarly, considering transaction patterns may help identify unusual transactions indicative of wrongdoing.

Moreover, He (2010) emphasized the banking system’s exposure to TBML risk and the need for trade-based risk assessment tools. Consequently, Naheem (2017a, 2017c), motivated by the implications of TBML for the banking and financial services sector, especially via free

![Average Article Citations per Year](chart1)

![Average Total Citations per Year](chart2)

*Figure 2. Manuscript production and citation (continued)*
trade zones (FTZs), and considering the challenges posed by the real estate sector, highlighted the need to focus on developing money laundering risk assessment models through a combination of risk-based and rules-based approaches. Naheem (2019, 2020) extended the discussion in this direction by comparing the effectiveness of risk assessment strategies with data-driven approaches and the applicability of the risk assessment framework through agency theory. However, the studies focusing on developing risk assessment frameworks tend to use it interchangeably with money laundering and TBML
risks, where more precision could aid the global fight against TBML. Moreover, the literature lacks empirical evidence showcasing the effectiveness of the proposed framework, as is evident from Table 4, which summarizes key studies on risk assessment.

**TBML detection.** Academic and professional publications provided evidence of TBML even before the FATF (FATF, 2006) published its first report on the phenomenon (Bhagwati, 1974; De Wulf, 1981; Cuddington, 1986; Zdanowicz, 2004; De Boyrie et al., 2005). One attempt to empirically analyze trade mispricing was made in 1992 (Money Laundering Alert, 1992) by comparing the average world price to the average country price for every product. However, the analysis did not account for country/product heterogeneity. The first attempt to measure, detect and monitor abnormal transactions with a specific focus on TBML and terrorism financing after the 2006 FATF report examined the application of statistical techniques on monthly data in the US Merchandise trade databases (Zdanowicz, 2009). The study focused on analyzing trade data to detect wrongdoing and discussed the application of money laundering profiling techniques focusing on country risk profiles, customs district profiles, product risk profiles and transaction price risk characteristics. The notion of detecting TBML using economic analysis of trade data was further supported by Unger and den Hertog (2012) but was questioned by Soudijn (2014) due to concerns over data distortion.

<table>
<thead>
<tr>
<th>Significant work</th>
<th>Key objective</th>
<th>Key findings</th>
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| Naheem (2015c)   | Explore critical elements involved in TBML and outline prevailing gaps in banking risk assessment | • Current banking risk assessment techniques are inadequate  
• Banks require stronger AML risk assessment framework  
• Proposed a risk framework comprising of factors, namely, geographic risk, client behavioral risk, third party risk and transactional risk |
| Naheem (2017a)   | Review challenges that international money laundering schemes pose for the Chinese banking sector | • In contrast to rules-based system, the author suggests the need to develop risk-based system for managing AML risk assessment  
• A new framework for AML risk assessment is suggested  
• Emphasizes on the need to identify sources and purpose of fund transfers related to trade and shipping finance and establishing beneficial ownership of clients and businesses in which they are working  
• Highlights the need to consider reports and academic papers to expand knowledge on TBML |
| Naheem (2017c)   | Proposes risk-based assessments within banking sector to address risks posed by TBML | |
| Naheem (2019)    | Determine whether AML risk assessment strategies are reactionary focused and/or whether it is possible to predict where increased costs and resources need to be targeted in AML processes | • Risk-assessment strategies are reactionary focused, thus, exposing banks to unassessed risks  
• Highlights, in context of AML, how things are done and the problems it poses |
| Naheem (2020)    | Propose a theoretical framework for application of AML regulation in the banking sector | • Provides a comprehensive multi-agency framework considering all factors affected by AML regulation  
• Agency dilemma is a dual problem for banks and a real situation that regulators need to consider |

Source(s): Tables are author’s own work

Table 4. Overview of research on TBML risk assessment
Ferwerda et al. (2013) extended the discourse on TBML detection by testing the gravity model prototype for money laundering (Walker and Unger, 2009) on TBML. Using Nonlinear Least Squares (NLS) estimations, they rejected the application of the gravity model prototype, at least for TBML. Apart from limitations associated with model design or implementation affecting model performance and the type of data being used, Ferwerda et al. (2013) acknowledged the limitation of Walker and Unger’s gravity model prototype as not reflective of real-world conditions and based on a guess. Additionally, they directed attention towards the differences prevailing between TBML and money laundering, in general, for the failure of the gravity model prototype. Using the Lorenz curve on the trade dataset of Zdanowicz (2009), the authors found countries with strict AML regulations experience more trade-related money laundering, suggesting criminals may have discovered a new way of laundering by using TBML to escape AML regulations.

Gara et al. (2019) proposed using trade gap/mirror analysis on Italian trade data to detect TBML. The methods proposed to detect TBML can be classified into (a) statistical approaches comparing the average price of goods with customs declarations to identify discrepancies and (b) economic methods used to find isolated points by considering TBML in a regression process whereby TBML is the dependent variable and price and payments are the independent variables. These methods have limitations due to the focus on the statistical properties of single-source data, the inability to capture contemporary trends in TBML behavior and the integration of multisource data to test micro-market behavior. All this creates the need to develop machine learning methods to detect abnormal behavior in international trade (Chao et al., 2019). Chao et al. (2019), using data from provinces in China, used a classification algorithm to build a model which set up a theoretical basis for responding to TBML in emerging markets and developing economies. The study proposes a potential path for future research as it does not demonstrate a performance comparison with other TBML detection techniques. To provide a sense of how research about TBML detection has developed, Table 5 summarizes key works in the domain of TBML detection.

Role of professionals. Naheem (2015b, 2016, 2017b) raised the issue of providing appropriate training to detect money laundering and TBML related activities. Gikonyo (2019) extended the debate by highlighting the importance of Kenya as a transit point for TBML while advocating for the inclusion of lawyers in Kenya’s AML regime, citing their importance in assisting in the detection and gatekeeping of money laundering activities. Similarly, Hataley (2020) argued in favor of the growth of TBML as a preferred methodology for money laundering globally. He acknowledged the need for criminal organizations to investigate TBML as a means of moving money between jurisdictions and, consequently, transferring skillsets to other organized crime groups to do the same. He asserts the need for the police and customs agencies to be better equipped to detect TBML, including what types of intelligence and evidence to collect.

Hataley (2020) also emphasized the composition of investigative teams. He proposed incorporating police officers, customs agents, private customs brokerage firms, freight forwarders and bankers on the team to carry out TBML investigations. However, studies focusing on the role of professionals and their importance in specifically combating TBML are still nascent. The literature highlights the opportunity to initiate a discourse on developing appropriate training programs to equip the key personnel responsible for detecting and investigating TBML behavior. Additionally, attempts can be made to conduct cross-jurisdictional studies to assess the role of professionals and the importance they place in the AML regime. Table 6 provides a snapshot of research on the role of professionals in combating TBML.

Understanding of TBML. The focus placed on the financial system by governmental agencies, such as the Financial Crimes Enforcement Network (FinCEN) in the US and the Australian Transaction Reports and Analysis Centre (AUSTRAC), intergovernmental
<table>
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<tr>
<th>Author(s)</th>
<th>Key objective</th>
<th>Key findings</th>
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</table>
| Zdanowicz (2009) | Highlights how statistical analysis of US trade databases can assist in measuring, detecting and monitoring abnormal transactions | - Demonstrates how new statistical techniques can mitigate the risks associated with TBML with a focus on country, customs district, product, and transaction price risk characteristics  
- Statistical techniques can be utilized to identify abnormal transactions and minimize TBML |
| Unger and den Hertog (2012) | Determine whether money laundering has decreased over time or not | - Difficult to ascertain the trend in proceeds of crime and laundering over time with a particular reference to drug trade  
- Acknowledges switch from controlled banking sector to less controlled part of financial and nonfinancial markets such as electronic payments, trade, and real estate  
- Suggests use of economic analysis of trade data to develop risk indicators for identifying suspicious trading countries, suspicious merchandise and for determining the scale of TBML |
| Ferwerda et al. (2013) | Determine the effectiveness of prototype models of money laundering developed by Walker and Unger (2009) on TBML | - Rejects the specifications of Walker and Unger prototype models, at least for TBML  
- Findings suggest that countries with strict AML regulation experience more TBML and suggest TBML to be proportional to licit trade |
| Soudijn (2014) | Critiquing the definition of FATF on TBML and proposing the indicators to look for in identifying TBML | - FATF’s definition involves misrepresentation of value, quantity or quality of traded goods resulting in detecting and combatting TBML using analysis of price anomalies  
- In contrast to over/under invoicing, the paper highlights the shipment of goods at their true value in context of TBML  
- Questions TBML detection via analysis of statistical trade data by highlighting the possibility of data distortion and attributing data discrepancies to fraud or capital flight instead of money laundering |
| Gara et al. (2019) | Develop a model factoring in the main structural determinants of discrepancies between mirror trade data | - Adopts an econometric analysis to provide empirical evidence supporting identification of a group of explanatory variables accounting for misalignment of mirror trade data  
- Suggests that a model defining country-product indicators of TBML risk may be useful for detecting potential money laundering commercial transactions |
| Chao et al. (2019) | Establish a monitoring method of TBML via knowledge driven multi-classification algorithms | - Development of TBML detection model utilizing feature engineering and data mining to monitor abnormal behavior  
- Knowledge driven classification algorithms can be used to effectively forecast TBML behavior |

Source(s): Tables are author’s own work
organizations such as FATF, banks and other financial institutions, has increased the possibility of detecting the laundering of illicit funds, resulting in offenders resorting to money laundering typologies outside the financial system, primarily TBML. This notion illuminates the need to increase understanding of TBML (McSkimming, 2010). Before the 2006 FATF report, there is some evidence in both professional and academic literature suggesting the presence of TBML (Bhagwati, 1974; De Wulf, 1981; Zdanowicz, 2004). However, it was only later that the FATF (2006), in its report, recognized the misuse of the trading system as a means by which criminal and terrorist organizations could launder funds, and provided a definition for it. Subsequently, the literature has directed attention towards enhancing the understanding of TBML by focusing on what the concept of TBML entails, how it can be committed, the vulnerabilities it exploits and the challenges posed. A step taken in this direction was by McSkimming (2010), who used the reports of the FATF to draw observations on TBML, its methodologies and associated challenges. He observed the efforts to prevent TBML were minimal, finding a lack of cost-benefit consideration given to systematic monitoring of the trading system to determine policy effectiveness. Furthermore, he highlighted the poor data quality limiting the effectiveness of already flawed analytical methods for detecting TBML.

<table>
<thead>
<tr>
<th>Significant work</th>
<th>Key objective</th>
<th>Key findings</th>
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| **Naheem (2015b)** | Provides an analysis of HSBC Swiss bank accounts scandal from an AML perspective and highlights the implications of the same for banking sector | • Using a case study analysis, the paper demonstrates the weakness in AML compliance systems  
• Highlights banking sector as a target for TBML without exploring the possible modus operandi that may be adopted to accomplish the same  
• Proposed the need to conduct training to upskill workforce in detecting TBML |
| **Naheem (2016)** | Determine the efforts of banks to prevent money laundering and why the activity cannot be stopped | • Explored development of approaches to tackle complex and covert types of money laundering schemes such as TBML  
• Directs attention towards the need to bridge the knowledge gap between what money launderers know about using financial services and what the banks are aware of |
| **Gikonyo (2019)** | Examine the effectiveness of inclusion of lawyer in Kenya’s AML regime and their importance in detecting money laundering, especially when Kenya is considered as a transit point for TBML | • Highlights gap between Kenyan legal professional compliance with AML best practice and what is being practiced  
• Suggests the inclusion of legal practitioners for combatting money laundering |
| **Hataley (2020)** | Examine the link between TBML and organized crime | • Using rational choice approach, the paper argues in favor of TBML’s growth as a preferred methodology for money laundering  
• Emphasize on the need of investigative teams to include experts, have judicial authorization to acquire information from foreign countries and have required skills to conduct investigations |

**Table 6.** Overview of research on role of professionals  
**Source(s):** Tables are author’s own work
Soudijn (2014) advocated broadening the discussion on TBML by criticizing the definition of TBML provided by the FATF because it was fuzzy, tunnel-visioned and did not acknowledge data distortion. He stated the focus of the provided definition had been on misrepresenting the value, quality or quantity of the traded goods. It resulted in analyzing price anomalies as a signal of over- or under-invoicing. He argued that TBML could also occur without manipulating these factors and directed attention towards the possibility of data distortion. He proposed looking for indicators in identifying TBML, such as changes in payment mechanisms, and examining the flow of goods uncharacteristic of the business sector/enterprise in question.

To try to enhance the understanding of TBML, Naheem (2017c) questioned whether TBML should be viewed separately from other money laundering schemes due to the use of shipping routes rather than being restricted to financial systems/cash-based transactions. He stated that TBML should not be treated differently from other forms of money laundering but should be considered one of the many methods used to launder money while at the same time acknowledging its unique aspects. For instance, detecting TBML would require a more comprehensive approach, including trade finance units and compliance staff with business and shipping trade processes knowledge.

To enhance the understanding of TBML, apart from the focus on the banking sector (Naheem, 2015a, b, 2017b, c), the literature has also focused on various other mechanisms used for TBML, such as Baltic shells, free trade zones, trade finance, the use of multinational corporations (MNCs), trans-shipments and informal remittance services (He, 2010; Liao and Acharya, 2011; Stack, 2015; Menz, 2019; Umar, 2021; Gilmour, 2022; Gobena, 2022; Jayasekara, 2022). These link to parallel literature about fraud, tax evasion and professional money launderers. Finally, to develop a further understanding of TBML, the literature, directly or indirectly, has also focused on the vulnerabilities exploited in terms of the use of trade cycles by drug cartels, suspicious activity reports, regulatory effectiveness, difficulty in distinguishing between the legitimacy of trade flows, facilitating terrorism financing and the advent of new technology, among others (Thanasegaran and Shanmugam, 2007; Naheem, 2015a, b, 2017b, 2018a, b, c; Louise, 2020; Marzouk, 2022; Tamayo-Alvarez, 2020; Chuah, 2022; Gilmour, 2022). Table 7 summarizes key works focusing on enhancing the understanding of TBML.

The initial literature review, comprising the results highlighted above, covered the period up to October 2022. However, to ensure its relevance and comprehensiveness, an additional search was conducted using the same set of keywords on WoS and Scopus. This was done to incorporate the coverage of literature up to July 2023. As a result, three additional works were identified and included. Sivaguru and Tilakasiri (2023) attempted to enhance the understanding of TBML by reviewing reports, case studies and secondary data to highlight the danger TBML poses to the Sri Lankan economy. Similarly, Milon and Zafarullah (2023) used semistructured interviews to identify commodities most susceptible to being exploited for TBML in Bangladesh and the factors contributing to their vulnerability. They identified food products, garments, capital machinery and chemicals as having a higher risk of being exploited for money laundering. Moreover, they outlined key factors, such as the lack of cooperation among government agencies, insufficient transactional due diligence, inadequate trade transparency and a lack of required expertise for detection as the critical factors contributing to their vulnerability.

Finally, Saenz and Lewer (2022) critically assessed past efforts to estimate TBML (Ferwerda et al., 2013; Zdanowicz, 2009) and highlighted their inability to account for money laundering via the use of services. Consequently, they proposed using a multiple indicators multiple causes model (MIMIC) to estimate TBML for members of the European Union between 2005 and 2015. They concluded that TBML complements traditional money laundering activities.
Overall, these additional works contribute to the understanding of TBML by shedding light on the vulnerabilities that can be exploited, the challenges that lie ahead, the role of professionals in combating it and the need for an effective detection mechanism. The next section will discuss the insights obtained from this systematic literature review.

Table 7.
Overview of research on understanding of TBML

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<tr>
<th>Significant work</th>
<th>Key objective</th>
<th>Key findings</th>
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<tbody>
<tr>
<td>Thanasegaran and Shanmugam (2007)</td>
<td>Highlight the dangers posed by money laundering activities undertaken by criminals through international trade mechanisms from Malaysian perspective</td>
<td>States that common techniques of laundering money via international trade involve over-invoicing and under-invoicing of goods, over-shipment and under-shipment of goods, falsely described goods and complex trade approaches</td>
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<tr>
<td>McSkimming (2010)</td>
<td>Enhance understanding around TBML by highlighting ways it can be executive, detection mechanisms available and associated challenges</td>
<td>Highlight lack of information available on existence of such activity in Malaysia</td>
</tr>
<tr>
<td>Stack (2015)</td>
<td>Describe a platform of interconnected international shell companies operated through Baltic banks, used for TBML across post-Soviet states</td>
<td>Highlight a lack of consideration in determining whether monitoring of trade system would be cost effective relative to number of offenders detected and harm prevented</td>
</tr>
<tr>
<td>Umar (2021)</td>
<td>Attempts to define the concept and determine the extent to which trade mis invoicing influences money laundering activities in developing countries</td>
<td>Highlights poor data quality and raises questions about effectiveness of proposed policy responses to TBML</td>
</tr>
<tr>
<td>Chuah (2022)</td>
<td>Explore how AML regulation should respond to the use of blockchain technology in shipping and trade</td>
<td>Directs attention toward cost associated with inspection of goods</td>
</tr>
<tr>
<td>Gilmour (2022)</td>
<td>Provide an overview of freeports’ trading operations and to what extent they may present a money laundering and tax evasion risk</td>
<td>Highlighted the role of TBML in laundering corruption and crime proceeds</td>
</tr>
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Source(s): Tables are author’s own work
Comparison of results

Compared to other financial crime methodologies, the academic discourse on TBML remains underdeveloped. Far from a criticism, the authors acknowledge the significant potential this status provides for TBML and financial crime scholars in broadening the scope and scale of TBML related literature. This systematic literature review conducted a comprehensive analysis of the existing literature and has identified significant opportunities for future research to advance the existing body of knowledge. Moreover, the methodology used to review the current literature is influenced by approaches undertaken in other empirical studies (Linnenluecke et al., 2019; Suárez et al., 2017; Siva et al., 2016; Tranfield et al., 2003; Briner and Denyer, 2012).

It was evident throughout this systematic literature review that scholars have sought to deepen the research on TBML. These efforts strongly suggested four key areas of inquiry remain underdeveloped. Those areas are related to definitional challenges surrounding TBML, the need for increased empirical evidence focusing on the typological features of the crime, how system vulnerabilities are identified and in turn exploited by criminal actors, and finally how practitioners and scholars can address the challenges posed by TBML.

The academic literature on TBML has highlighted its intricate nature and the many factors contributing to its complexity. Firstly, the volume of global trade presents a challenge for conducting transactional due diligence, therefore hindering the detection of suspicious transactions. Furthermore, the absence of standardized associated trade data, comprising language and format variations, impedes reliance on trade anomalies as an effective detection mechanism (Zdanowicz, 2009). Secondly, the diversity of goods involved in trade transactions coupled with limited expertise among customs officers concerning each specific commodity, make it difficult to identify abnormalities in trade patterns (Hataley, 2020). The complexity is exacerbated further by cross-border transactions and the use of trade finance instruments, such as letters of credit and bills of lading. These instruments can obscure the true value of goods, or the identity of parties involved in the transaction, thus adding an additional layer of complexity to TBML investigations (Chuah, 2022). Lastly, limited resources dedicated to TBML detection, inadequate regulatory frameworks and jurisdictional differences contribute to the complexities associated with the phenomenon.

Consequently, these complexities are reflected in difficulties associated with understanding the phenomenon. For instance, an assessment of the literature identified inconsistencies in the definitional foundations of TBML as provided by the FATF in 2006 and 2008, with TBML being restricted to goods only in 2006 and expanding by 2008 to include the trade in services (Soudijn, 2014). In addition to a lack of clarity about what is covered within the purview of TBML, the definition provided by the FATF only considered cases with an international dimension, therefore seemingly ignoring the possibility that TBML may also operate at domestic and local levels. Similarly, the FATF’s definition did not clarify what the concept “use of trade transactions” meant, which is important if the aim is to understand the numerous ways trade transactions can be illicitly used. Aside from arriving at a much tighter definition, such inclusion would also clarify which comparable control techniques could be designed. The 2008 FATF definition also tends to create confusion in terms of whether the primary objective of TBML is to legitimize the illicit origins of proceeds of crime, much like money laundering, or whether it is simply to finance criminal activities. However, there is minimal effort made in the literature to address these concerns by working towards a comprehensive definition of the phenomenon.

While there are limitations, the FATF definition provides a useful starting point. Efforts must be made to align any TBML definition with the typological evolution of the problem; this would, it is suggested here, not only add to understanding of the issue but also allow for the development of appropriate risk assessment strategies to counter the crime. Furthermore, developing the definition of TBML would allow for the possibility that TBML also occurs
without manipulating the price or quantity of goods. In a similar manner, it should also signal diversity of payment mechanisms, specifically moving the discourse away from one dominated by cash or banking to advancements in payment technologies, as well as acknowledging that the flow of goods is not always in line with the nature of the business under investigation.

Apart from directing attention to aspects in the definition that need to be addressed, the literature identified a surge in interest towards differing typological methods to launder funds via trade. Until this point, TBML has been depicted via studies focusing on using networks of banks, shell companies and freeports’ trading operations (Thanasegaran and Shanmugam, 2007; Stack, 2015; Umar, 2021; Gilmour, 2022; Milon and Zafarullah, 2023). The work of Milon and Zafarullah (2023) extended this by outlining the potential for capital machinery, chemicals, food items and garments to be exploited for TBML activities. The inclusion of food items in this context outlines a vulnerability that has so far been overlooked. The ease with which prices of food items can vary depending upon quality, origin and complexity involved in testing food items, and the possibility of collusion with customs officials make the food sector an attractive avenue for undertaking TBML. The academic discourse on TBML would benefit from an in-depth exploration of such commodities and the specific vulnerabilities that make them susceptible to be exploited for TBML.

In addition to highlighting diverse typological methods for laundering funds through trade, the role of professionals, their importance in combating money laundering-related risks and the kind of training and skillset required have also been touched upon in the literature (Gikonyo, 2019; Hataley, 2020). Hataley (2020) argues that law enforcement agencies need to have a comprehensive understanding of international trade, including the documentation associated with it, to identify anomalies and suspicious activities indicative of TBML. Additionally, he asserts that investigative teams should collaborate with external agencies and possess knowledge of judicial authorizations to obtain the necessary information. Moreover, he underscores the significance of adequate training to determine the types of intelligence and evidence to collect, as well as the ability to conduct risk assessments to gain insights into movements of funds. In this regard, the need for developing a risk assessment framework was proposed, with Naheem (2015c) contending that geographical factors, client behavior, third-party risk threats and transactional risks be considered for this purpose. However, at the time of submitting this paper, no significant contribution has been made in addressing this important point.

Besides advocating for increased training to equip relevant parties to develop the requisite skills for combating TBML, Hataley (2020) acknowledges the need to address jurisdictional differences. These differences encompass variations in laws, regulations and enforcement capabilities, all of which must be accounted for in combating TBML. He stresses the need for international cooperation and information sharing to bolster enforcement capabilities. This is critical given that TBML is employed by transnational organized crime groups to undertake value transfer.

The academic literature has made progress in developing potential detection mechanisms to identify the presence of TBML. For instance, the use of statistical analysis and econometric analysis (Zdanowicz, 2009; Ferwerda et al., 2013; Saenz and Lewer, 2022) could be useful, if not foolproof, as detection mechanisms to combat TBML related activities. Although effective, these methods have limitations. They primarily focus on detecting over- and under-invoicing; therefore do not cover other known variations of TBML. Additionally, these approaches heavily rely on high-quality, detailed trade data, which is not readily accessible in all instances. The method proposed by Saenz and Lewer (2022) illustrates these limitations. It assumes the declared value of goods is the same in exporting and importing countries, which is not the case due to factors such as transportation and insurance costs, tariffs and exchange rate fluctuations. Moreover, their proposed approach fails to account for the
context of transactions, such as the nature of goods or the relationship between trading parties. Subsequently, such a lack of contextual consideration may result in false positives, that is, the flagging of legitimate transactions as suspicious due to natural variation in the prices of commodities.

The use of big data techniques, as seen in the work of Chao et al. (2019), to develop knowledge-based classification models to detect TBML is a significant step in this direction. It provides opportunities to conduct future works comparing the results of analysis using big data techniques, such as decision trees and random forests, with the existing statistical and econometric analysis to determine effectiveness. Similarly, the knowledge acquired from understanding the phenomenon of TBML could be useful in improving the accuracy of classification models.

In addition to the advancements made in detecting TBML, within the context of technological innovation, the academic literature has directed attention towards the role of blockchain in addressing various complexities associated with TBML. The immutable nature of blockchain, coupled with its benefits in the form of transparency, traceability and real-time verification, can facilitate the monitoring of trading activities and cross-border trade transactions. Furthermore, the integration of blockchain with other cutting-edge technologies, including Artificial Intelligence (AI), as well as skilled human resource expertise can provide robust solutions for combating TBML, including reliable and standardized data (Chuah, 2022).

While the surveyed studies were impactful, the limited number of studies leaves the field somewhat underdeveloped, with few areas subject to more than one study. A further observation in this area relates to the seeming dominance of one author as a major contributor to knowledge in this area. Naheem, in this instance, contributed 12 of 36 academic publications, which in any field is significant in forming that discipline. Rather than being the by-product of a what works, non-probability sampling approach, this dataset encompasses a comprehensive collection of papers on this topic. A question that arises in light of this is what impact, if any, would this seeming overrepresentation have on the development of the discipline.

Nevertheless, this systematic literature review presents numerous opportunities for scholars to tackle the issue of TBML. The systematic survey of the literature highlights the need to address definitional challenges associated with TBML. A comprehensive definition of the phenomenon could address the ambiguities associated with the phenomenon, including its scope and the use of trade transactions, and help develop effective detection strategies. Additionally, it identifies the need to investigate additional methods used to launder funds via trade, including understanding how illicit actors identify and exploit system vulnerabilities. This may include examining the role of professionals, including accountants, in combating TBML and the kind of training and skillset required. Furthermore, the current literature review focuses on integrating big data techniques with existing methods to determine effectiveness. Additionally, efforts concentrating on understanding the role of technology, including blockchain and using it to address concerns associated with TBML are observed and can be explored further in the future. Such an outlining of opportunities should encourage more researchers to contribute and address various facets associated with this complex phenomenon.

Conclusion and future directions
The FATF (2006) stated there are three main ways criminals launder funds: through the financial system, by bulk cash smuggling or the physical movement of money, and through moving goods through the global trade system. While the former two have received significant attention both in practice and scholarship, TBML is a known typology used by terrorist organizations, organized crime groups and white-collar criminals to launder illicit
The study of TBML is still in its nascent stages. There is a noted lack of direction in identifying and addressing research gaps related to the issue. Consequently, this article undertakes a systematic review of the literature on TBML to identify research gaps that could be addressed in the future.

The literature review, using a combination of quantitative and qualitative synthesis as detailed in the methodology, thematically categorized the existing literature on TBML into overlapping categories associated with producing a risk assessment framework, developing detection mechanisms, providing training and improving the investigation skills of professionals, and enhancing understanding of the issue of TBML. The body of literature reviewed provides a glimpse into the current understanding of this complex issue. However, the current body of literature is plagued by a lack of clarity on data quality and relies heavily on techniques such as interviews and generalized case studies to gain insights into TBML. Additionally, there seems to be a lack of political will and initiative to prevent TBML, and no cost-benefit consideration is given to the systematic monitoring of the trading system to determine policy effectiveness.

Nevertheless, a systematic literature review on TBML is significant to accountants and other professionals, such as bankers and customs officers. It adds to the understanding of the phenomenon, encompassing its nature, modus operandi, prevailing detection mechanisms and the need to address existing research gaps. Such a review serves as a foundation for the development of effective strategies and frameworks aimed at combating the phenomenon. Furthermore, it highlights the need for professional development among gatekeepers, including accountants, to develop the skills and expertise required for its effective detection, such as the need for professional skepticism (Olsen and Gold, 2018).

There are key areas where efforts can be focused in future research. First, in terms of developing an understanding of TBML, it is necessary to address the debate over the definition of TBML. A robust, clear definition could help states and substate entities align legislative and operational frameworks, thereby contributing to the global effort. States must cooperate on transnational issues like TBML, so a common understanding is crucial. A comprehensive definition of TBML addressing the identified inaccuracies in the literature could also help identify the type of technology and behavioral detection tools that can be used to tackle it. Second, as a bridge between research and practice, an awareness of how criminal elements manipulate trade documents should be brought to the fore across the practitioner and research sphere to identify better when it is being done and the resources required to detect and prevent it. Third, the review identifies what we don’t know about TBML; there is a dearth of empirical evidence and data, highlighting the need for efforts in this area.

In terms of practical implications or enhancing TBML detection, similar to an emphasis placed in auditing practices (Gepp et al., 2018), a focus on deploying big data techniques on data collected by state authorities could be insightful. Such findings could be compared with existing statistical and econometric analysis for TBML detection to determine effectiveness. Additionally, leveraging the benefits of big data techniques, similar to Tiwari et al. (2020), could be used to develop prototype models for TBML detection. Finally, a focus on enhancing the reliability of collected data could add value in enhancing TBML detection and identifying the misuse of trade to move value.

Regarding the risk assessment framework to combat TBML, the focus so far has been on the use of regulatory guidelines using generic examples. It will be pertinent to incorporate additional reports, academic papers and the use of localized case studies. The use of generic examples may not capture the varying nuances associated with TBML in different regions, therefore, the incorporation of local, specific case studies could aid in the development of a
better risk assessment framework catering to specific TBML risks. Furthermore, including a wide range of information, such as the latest academic papers and additional industry reports, can help capture trends and patterns in the field to develop an updated risk assessment framework. Similarly, future literature reviews could consider incorporating books, book chapters, and gray literature to generate more insights and further explore the nexus between TBML, illicit trade and terrorism. Finally, considering the need to improve the risk assessment framework, a focus on developing training programs for concerned stakeholders responsible for TBML detection is important.

TBML represents a significant money laundering mechanism. The challenges surrounding interdicting and understanding TBML will only get more difficult as new technologies, including cryptocurrency, emerge and become mainstream (Hataley and Ferrill, 2023). This systematic literature review has outlined the current state of the field and proposed several pathways to assist in developing the field. To get ahead of criminals and terrorists exploiting the trade stream to launder ill-gotten gains, there needs to be a fulsome understanding of the mechanisms used to do this. By identifying where we are and where we can go, scholars and practitioners are better placed to help combat the harmful act, for this ultimately contributes to robust global anti-financial crime architecture.

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**Further reading**


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