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Claudia Ferreira; Dusan Ecim; Warren Maroun

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An analysis of the extent of integrated thinking reflected in key performance indicators: evidence from South Africa

Claudia Ferreira and Dusan Ecim
School of Accountancy, University of the Witwatersrand, Johannesburg, South Africa, and

Warren Maroun
School of Accountancy, University of the Witwatersrand, Johannesburg, South Africa and Accounting and Finance Department, Leeds University Business School, Leeds, UK

Abstract

Purpose – This study aims to develop an index to evaluate the extent to which key performance indicators (KPIs) align with the principles of integrated thinking.

Design/methodology/approach – Prior academic research, complemented by reporting and governance standards, is used to develop an index to gauge the extent to which KPIs take an integrated approach to performance evaluation. A mixed methods approach is adopted. A qualitative content analysis of organisations' extra-financial reports is used to gain insights into the level of integrated thinking in performance evaluation structures using the index. Results are then calibrated using well-established integrated thinking proxies.

Findings – Ten indicators are identified, which point to an integrated approach to performance evaluation or the application of an underlying integrated thinking logic. The index is applied to a sample of companies from 2013 to 2021. The results point to companies increasingly incorporating integrated thinking into their KPIs. KPIs, which used to address only financial dimensions, are becoming more pluralistic and may be better described as "integrated performance indicators" (IPIs).

Research limitations/implications – The index is applied to KPI disclosures of a sample of companies in a single jurisdiction only.

Practical implications – Those charged with governance and management can use the index to structure, implement and evaluate IPIs. Investors can use the index to gauge the operationalisation of integrated thinking. Assurance providers may find the index useful when conducting risk assessments, particularly given the increased focus on the assurance of extra-financial information.

Social implications – Regulators can use the index for benchmarking organisations, compliance monitoring and identifying gaps between regulatory expectations and corporate behaviour. More broadly, the index could be used to promote alignment with sustainability frameworks and sustainable development goals at the national level.

Originality/value – This study outlines the dimensions of integrated thinking, which can be applied in the context of performance evaluation structures.

Keywords Extra-financial reporting, Integrated performance indicators, Integrated thinking, Key performance indicators, Performance evaluation structures

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1. Introduction

The International Integrated Reporting Council (IIRC) define integrated thinking as:

> [. . .] the active consideration by an organization of the relationship between its various operating functional units and the capitals that the organization uses or affects. Integrated thinking leads to integrated decision-making and actions that consider the creation, preservation or erosion of value over the short-, medium- and long-term (IIRC, 2021).

However, integrated thinking is not specific to the IIRC's reporting framework. For example, the logic is at the core of the sustainability standards published recently by the International Sustainability Standards Board (ISSB, 2021). The Task Force for Climate-related Financial Disclosures and Task Force on Nature-related Financial Disclosures (TNFD) build on the concept of integrated thinking in specific contexts [Financial Stability Board (FSB), 2021]. The Global Reporting Initiative (GRI) does not refer explicitly to integrated thinking but stresses the interconnection among economic, environmental and social factors and their importance for an organisation's longevity (Afolabi *et al.*, 2023; Dimes and de Villiers, 2023).

Given its continuing relevance (Arul *et al.*, 2020), operationalising and measuring integrated thinking is a focal point for policymakers (FSB, 2022) and academics (Malafronte and Pereira, 2021). There are numerous examples dealing with the definition of integrated thinking (e.g. Ecim and Maroun, 2023; Di Vaio *et al.*, 2021), gauging the quality of extra-financial reporting [1] (e.g. Malola and Maroun, 2019; Mans-Kemp and van der Lugt, 2020) and testing the value relevance of this type of reporting (e.g. Thompson *et al.*, 2022). Yet, little is known about how integrated thinking can be gauged and managed at an operational level and the link between how companies assess performance in keeping with an integrated thinking logic and report on the outcomes to their investors and other stakeholders.

The current research takes the first steps to develop guidelines for evaluating KPIs which address financial and extra-financial dimensions with the aim of advancing an integrated approach to performance evaluation and review. An index for evaluating the extent to which KPIs cover the management of extra-financial resources in accordance with an integrated thinking philosophy is proposed. The index is informed by key principles applicable to integrated thinking and extra-financial reporting per codes of best practice [IIRC, 2021, Value Reporting Foundation (VRF) 2022], corporate governance standards (Solomon, 2013) and applicable academic research (Alrazi *et al.*, 2015; Herbert and Graham, 2021; Oshika and Saka, 2017). The current research develops an index to evaluate the extent to which KPIs align with the principles of integrated thinking. The index is then applied to a sample of companies to evaluate whether KPIs reported in their annual, sustainability or integrated reports address both financial and extra-financial considerations in keeping with an integrated thinking logic [2]. The index is used to generate scores that capture the extent to which KPIs, which have traditionally focused on only financial dimensions, have transitioned to "integrated performance indicators" (IPIs) which cover a range of economic, environmental and social factors. The resulting index scores are compared with other proxies for integrated thinking, including report quality scores and social, environmental and governance scores as a type of calibration check.

This research makes, at least, four contributions. Firstly, the study is among the first to deal with KPIs focused on a range of financial and extra-financial issues. The use of KPIs can serve as a key "dimension" (Tirado-Valencia *et al.*, 2020, p. 337), "hallmark" (Dimes and de Villiers, 2023, p. 2; Dimes and de Villiers, 2021) or "proxy" (Malafronte and Pereira, 2021, p. 810) of integrated thinking being applied in the interest of long-term sustainable development. Nevertheless, there is little detail on how to define and evaluate what this paper refers to as IPIs. The current paper addresses these limitations.

The proposed index details the core elements of IPIs to assist managers and governing bodies with developing more robust performance measurement systems. Performance measurement systems include the systems and processes designed to assess the effectiveness and efficiency of the performance of the organisation, projects, executives and other staff (Varenova *et al.*, 2013; Mans-Kemp and Viviers, 2018). KPIs aligned with integrated thinking form an important part of performance evaluation structures as part of establishing an integrated thinking logic in driving performance and aligning the organisational and individual strategic goals, supporting decision-making processes and facilitating continuous improvement. Given that there is currently no baseline for comparing performance evaluation structures, the index may be useful for academics, practitioners and policymakers grappling with how to evaluate the development and use of KPIs in various jurisdictions.

Secondly, much of the prior research focuses on how companies explain their application of integrated thinking in their sustainability or integrated reports (e.g. Maroun *et al.*, 2023; Dimes *et al.*, 2023; Malafronte and Pereira, 2021). The link between underlying management systems and integrated thinking has not been examined in detail. Conversely, while much has been written on management control and performance evaluation in traditional financial settings, the current paper is among the first to propose how conventional KPIs can be complemented by including extra-financial considerations. Making explicit the link between KPIs and integrated thinking also builds on a related body of work dealing with how KPIs can contribute to improved sustainability performance (Oshika and Saka, 2017) and the promotion of circular economy principles (Moraes *et al.*, 2020).

Thirdly, the current paper provides one of the first accounts of KPI-related disclosures in an extra-financial reporting context. At the same time, the proposed index can be applied irrespective of the frameworks or guidelines used to prepare an organisation's sustainability report (or equivalent) [3]. In each case, an index to analyse performance evaluation in a broader context is important, given the growing emphasis on both sustainability and integrated reporting by key users (FSB, 2021) and the efforts of international standard setters to harmonise extra-financial reporting (see ISSB, 2021; Afolabi *et al.*, 2022).

Finally, performance evaluation structures of organisations in emerging economies merit further attention. Emerging economies have significant social and environmental issues that need to be managed actively (Izzo *et al.*, 2020). Organisations operating in these regions must balance competing stakeholder demands while maintaining investor confidence (Husnah *et al.*, 2023). These conditions iterate the importance of a holistic approach to gauging and managing performance using a robust set of KPIs. The current study provides a formal assessment of how companies in a major African economy define and report their KPIs. While only a single jurisdiction is covered, findings should be broadly applicable when considering the use of KPIs in other jurisdictions or settings where economic, environmental and social imperatives must be managed concurrently.

The remainder of this paper is organised as follows: Section 2 draws on the academic and professional literature to identify defining features of IPIs. Section 3 deals with the methodology. Section 4 presents the results and discussion and Section 5 concludes.

2. Integrated performance evaluation

More holistic performance evaluation systems can be traced to the 1950s. A General Electric corporate staff group suggested that financial and certain non-financial metrics be incorporated in evaluating the company's performance (Lewis, 1955). Pressure to maximise short-term financial returns, however, led to the marginalisation of indicators addressing social and environmental matters (Kaplan, 2009; Jayasiri *et al.*, 2023).

Over the next 50 years, scholars experimented with integrating non-financial indicators into an organisation's management systems (Howell and Soucy, 1987) and aligning employee objectives with their employers' strategies (Vlcek *et al.*, 1997). As the concept of sustainable development gained traction (Gray *et al.*, 1995; Guthrie and Parker, 1989) the importance of understanding and assessing how social and environmental factors impact financial performance was iterated. A major advance was the development of the Balanced Scorecard which:

> [. . .] complements the financial measures with operational measures on customer satisfaction, internal processes, and the organisation's innovation and improvement activities – operational measures that are the drivers of future financial performance. (Kaplan and Norton, 1992, p. 71)

The scorecard was not without limitations. It neglected broader social and environmental issues. Financial information and short-term performance measures continued to be prioritised (Kaplan, 2009) despite a shift to more stakeholder-centric governance models which require trade-offs among different types of capitals or resources to be managed effectively (Friedman and Miles, 2002). The current paper refers to this approach as integrated thinking.

Rather than focusing only on how to maximise financial returns for investors, organisations must manage their direct and indirect social and environmental impacts over the short-, medium and long-term (Jayasiri *et al.*, 2023). These need to be factored into more comprehensive assessments of how value is created, managed and eroded for a broader group of constituents than only shareholders (Adams, 2017). Doing so results in the organisation managing concurrently the full range of capitals on which their business models are dependent and which are impacted by how the business operates (IIRC, 2021). Examples include renewable and non-renewable resources (natural capital), technical expertise (intellectual capital) and the organisation's key employees (human capital) in addition to the financial and manufactured capitals which are usually the focal point for practitioner and management scholars (Herath *et al.*, 2021). Those charged with an entity's governance must take cognisance of how these capitals impact the risks and opportunities to which their businesses are exposed and the implications for investors and other key stakeholders (Myeza *et al.*, 2023).

Doing so requires a performance evaluation structure which covers both financial and extra-financial dimensions (De Villiers and Maroun, 2018). The performance evaluation system must reflect that an organisation is comprised of inter-related parts which are dependent on, and impact different types of, capitals to varying extents (Aprile *et al.*, 2023).

An effective performance evaluation system requires an understanding of the different sub-systems in an organisation and consideration of the multiple dimensions that contribute to long-term sustainability and not just short-term profits (Dissanayake, 2021). Equally relevant are the individuals in the organisation and how they interpret and apply principles, rules or practices (Besharov and Smith, 2014), which can be managed using performance evaluation structures. KPIs can play a key role in this regard by setting appropriate targets against which management performances in economic, environmental and social terms can be evaluated. As explained by the IIRC (2021, p. 3):

> The more that integrated thinking is embedded into an organization's activities, the more naturally will the connectivity of information flow into management reporting, analysis and decision-making. It also leads to better integration of the information systems that support internal and external reporting and communication. . ..

A robust management control system and effective stakeholder engagement enable proactivity and support an integrated evaluation of data across different capitals

(Maroun *et al.*, 2023; SAICA, 2015; SAICA, 2021). Similarly, the objectives of sustainability-related frameworks and codes of corporate governance can be integrated into the performance evaluation structures to incentivise management and stakeholders to adopt integrated thinking as part of the achievement of their performance metrics (Herbert and Graham, 2021). Put differently, IPIs involve moving away from financially focused metrics to sustainable and long-term metrics, incorporating extra-financial considerations. This will incentivise a balanced scorecard approach to performance evaluation (Kaplan, 2009), incorporating modern institutional and organisational contexts relevant to the current time, which should, over time, promote a stronger integrated thinking logic.

Despite the progress made in advocating for more holistic performance evaluation structures (Kaplan, 2009), there is limited guidance on what specific factors make up these structures and how organisations have been implementing this, particularly in an emerging economy context (Ecim, 2024). Subsection 2.1 addresses this by deriving the integrated thinking principles which can be used in performance evaluation structures.

2.1 The development of integrated thinking principles in performance evaluation structures

KPIs can play a key role in advancing integrated thinking by setting appropriate targets against which management's performances in economic, environmental and social terms can be evaluated (Maroun *et al.*, 2023). The KPIs allow an organisation to manage financial and extra-financial considerations as part of the performance evaluation structure, which can promote balanced and responsible business practices and long-term sustainable development (Herbert and Graham, 2021) that develops organically in an organisation (Al-Htaybat and von Alberti-Alhtaybat, 2018). KPIs can be used to address stakeholders' needs and assist in aligning individual and organisational goals (Raji and Hassan, 2021). Analysing and reporting on both positive and negative performance across a multi-capital dimension enables informed decision-making, strategic alignment and transparent communication with stakeholders (VRF, 2022). Actively addressing negative performance indicators drives corrective action, resulting in positive organisational change and a broader perspective on the organisation's risks, opportunities and impacts (VRF, 2022). This also acts as a value creation signal to external stakeholders (Vesty *et al.*, 2018).

However, complexities involved in the implementation of KPIs – such as the use of multiple sustainability frameworks and extra-financial metrics which are difficult to quantify – hinder the widespread use of KPIs (Afolabi *et al.*, 2023). Entities may also limit their disclosures dealing with KPIs if these are not seen as material or if the details are considered proprietary (Di Vaio *et al.*, 2021). A further consideration is the risk of KPI disclosures becoming part of a compliance or impression management exercise cannot (Haji and Anifowose, 2016).

Resource constraints can further hinder the implementation of KPIs if the necessary data, systems and processes are under-developed (Herbert and Graham, 2021). Even if this is not the case, there is little guidance dealing with the features of integrated thinking in KPIs and how these can be applied by organisations. As a result, the remainder of Section 2 relies on prior academic research [4], complemented by reporting and governance standards, to identify the core elements of KPIs that are aligned with integrated thinking principles. Each is discussed below.

2.1.1 I1: Assurance of key performance indicators (AS). From 2024, the European Union requires affected organisations to prepare sustainability reports and to have these reports independently assured (Farooq *et al.*, 2024; European Commission, 2024). Similarly, South Africa has played an active role in promoting compliance with extra-financial-related initiatives primarily enforced through codes of corporate governance (IoDSA, 2016). Major

themes align with important extra-financial topics, such as, stakeholder inclusivity, sustainability and social and environmental awareness (Maroun and Cerbone, 2020). Beyond the requirement to prepare extra-financial reports, known as integrated reports, these are also required to be independently assured or provide an explanation for not doing so (Maroun *et al.*, 2014).

At the international level, the International Auditing and Assurance Standards Board (IAASB) is developing a new standard to deal specifically with sustainability-related assurance (Hay *et al.*, 2024) [5]. The International Organisation for Standardisation (ISO), the GRI and AccountAbility (AA) are also developing guidance on how to have extra-financial reports subject to, at least, some assurance (Afolabi *et al.*, 2023; Afolabi *et al.*, 2022). As part of this, the organisation should have a formal process for approving (AP) and monitoring (MON) the KPI in line with relevant legislation requirements concerning remuneration as well as internally developed codes, voluntary practices adopted and general industry requirements (Dissanayake, 2021; Moraes *et al.*, 2020).

As is the case with the audit of financial statements, assuring sustainability information contributes to reduced information asymmetry (Donkor *et al.*, 2021), better quality reporting (Maroun, 2019) and improved stakeholder confidence in annual, integrated or sustainability reports (Farooq *et al.*, 2024). As a result, the International Organisation of Securities Commissions has endorsed efforts to have extra-financial reports externally assured (Krasodomska *et al.*, 2021).

Outside of the EU, organisations will have some discretion when selecting extra-financial information for external assurance. Given the importance of KPIs for internal decision-making and users' understanding of how organisations generate value for investors and other stakeholders (Guthrie *et al.*, 2017), KPIs would probably be assured. Existing standards already provide the basis for doing so. For example, ISO 14001/26000 certification can be used to verify aspects of companies' performance management systems and associated performance metrics in the interest of improving internal processes and ensuring credible reporting to stakeholders (Rankin *et al.*, 2011). Other assurance standards like AA1000AS and ISAE3000 may also be useful (Prinsloo and Maroun, 2021). In each case, an external expert examines how KPIs are developed, the integrity of the underlying data and the accuracy and completeness of information reported to stakeholders (Wallage, 2000).

Assurance is not only the result of testing by external parties (Prinsloo and Maroun, 2021). A combined approach to assurance can be taken which involves different risk-mitigation functions to ensure that KPIs are appropriately developed, incorporated into monitoring processes and used to drive continuous improvement (Prinsloo and Maroun, 2021). For example, the systems which support the measurement of KPIs and their evaluation can be examined by internal auditors. Senior management can be tasked with the analysis of KPIs and the formulation of resulting action plans. Specialist board committees can ensure a detailed and impartial analysis of KPIs which informs changes to management's remuneration, operational factors and the entity's longer-term plans (Solomon, 2013; Maroun and Prinsloo, 2020).

A sound system of corporate governance addresses traditional agency-related problems by curtailing management behaviour, ensuring robust internal processes and the reporting of more detailed and nuanced information for internal decision-making and stakeholder engagement (Dimes and Molinari, 2023). The ISSB's sustainability disclosure standards note that metrics and targets must enable users to understand the entity's performance in relation to sustainability-related risks and opportunities (ISSB, 2021). This highlights the transition to metrics that are aligned with integrated thinking principles and iterates the importance of assurance of those metrics to limit agency costs and enhance legitimacy.

2.1.2 I2: Timeframe (T). Both agency and stakeholder theory have been used to explain the importance of monitoring and control systems which function over the short-, medium- and long-term (Solomon, 2013). This position is iterated by the balanced scorecard literature which stresses the importance of timeframes for managing key resources (Kaplan and Norton, 1992). It follows that, to align KPIs with broader sustainable development objectives, targets should be set for the short-, medium- and long-term (IIRC, 2021; Maroun *et al.*, 2023). Emerging trends such as artificial intelligence, advanced data visualisation and dashboards, stakeholder feedback mechanisms and predictive analytics can assist in obtaining extra-financial performance-related information to use as part of a multi-timeframe decision-making process (Grougiou *et al.*, 2024). Sustainability-related guidance such as the ISSB's sustainability disclosure standards also iterate the need to transition from traditional, historic financial assessments to broader multi-timeframe horizons to assess risks, opportunities and the related performance incentives (ISSB, 2021). This will ensure an alignment between the organisation's goals and how management operate, while reducing the risk of prioritising immediate financial gains (ibid).

Consistent with the logic underpinning the balanced scorecard, a combination of lag and lead measures needs to be used to prevent a short-term focus on financial performance to the detriment of the value generation over the long run (IRC, 2018). Performance evaluation should be structured to achieve goals that encourage both short-term financial returns for management and employees, as well as long-term incentives to promote sustainability and value-creation over time for investors and other stakeholders (Pigatto *et al.*, 2023).

2.1.3 I3: Number of Sustainable Development Goals addressed (C_{SDG}). The Sustainable Development Goals (SDGs) are an urgent call for action to address key economic, environmental and social issues at the global level in keeping with stakeholder theory and the principles of responsible capitalism (Adams *et al.*, 2020; Rendtorff, 2020). The SDGs highlight how:

> [. . .] ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests [6].

The SDGs were developed by the United Nations to encourage global partnerships to tackle threats to long-term sustainability rather than inform company-level initiatives and reporting (Van der Lugt *et al.*, 2020). Nevertheless, the SDGs provide a type of over-arching framework which can be used to define sustainability with reference to issues such as climate change, health and well-being or poverty reduction; enable a better understanding of an organisation's extra-financial impacts and inform how it evaluates its performance in more than just monetary terms (Van der Lugt *et al.*, 2020; Adams *et al.*, 2020).

2.1.4 I4: Number of capitals addressed (C_{CAP}). KPIs need to address how the organisation generates returns for investors and creditors (financial capital), including the tangible (manufactured capital) and intangible (intellectual capital) resources deployed to do so (IIRC, 2021). Value cannot be framed in only financial terms (Pigatto *et al.*, 2023; Steenkamp and Roberts, 2022; Herath *et al.*, 2021). The impact on the organisation's employees (human capital), stakeholders (social and relationship capital) and the environment (natural capital) must be considered (IIRC, 2021). At the same time, the entity must be mindful of the relevance of the range of social and environmental resources/capitals for its ability to generate reliable economic returns.

KPIs which address the applicable capitals and their interconnections provide evidence of integrated thinking because they demonstrate how management and governing bodies oversee the range of financial and extra-financial resources at the heart of the organisation's

business model and value proposition. Conversely, KPIs that cover various capital objectives help organisations measure and communicate how they generate value in multiple dimensions, demonstrating a commitment to long-term sustainable development. It follows that interdependencies and trade-offs among the capitals need to be considered as part of performance evaluation systems (IIRC, 2021).

2.1.5 I5: Responsibility for the application of key performance indicator (APP). Theories on organisational and management control stress the importance of assigning responsibility for achieving targets to specific personnel (Mans-Kemp and Viviers, 2018). This enables companies to hold individuals accountable more effectively and reward outcomes that advance sustainable development more appropriately.

The implementation of an integrated thinking logic cannot be left to the organisation's governing body alone. Each part of the organisation must have a sound understanding of the strategic and operational imperatives set by management and how these take financial and extra-financial factors into consideration. While the extent to which employees will be responsible for realising the entity's goals will vary, an organisation-wide culture aligned with an integrated thinking logic is essential for ensuring coordinated and substantive actions by all organisational components (Stubbs and Higgins, 2014; Rinaldi, 2020). Performance management systems will need to be scaled accordingly (Bui and De Villiers, 2018).

Performance measures cannot only be set at the executive level (E) (Mans-Kemp and Viviers, 2018); they must be applicable to different categories of managers and employees (S) to ensure that goals are aligned to an integrated strategy and the applicable KPIs operate as a type of cultural control (Dumay and Dai, 2017). Cross-functional working groups can be used to support information-sharing, identify opportunities for collaboration and serve as an early warning mechanism when challenges emerge in different parts of the organisation (Stubbs and Higgins, 2014). These working groups can also be involved in the computation and analysis of KPIs, with results reported to senior executives. The entity's governing body is then responsible for the oversight of the firm-wide view of performance along financial and extra-financial lines (Co.) (Dimes and de Villiers, 2023) which must be included as part of the organisational goals and performance evaluation while the executive team then implements these integrated policies (Husnah *et al.*, 2023).

2.1.6 I6: Stakeholder engagement (SE). Limited stakeholder engagement hinders an organisation's ability to satisfy stakeholders' legitimate needs (Oshika and Saka, 2017). The failure to meet stakeholder expectations may lead to various challenges including access to essential inputs, strained relationships with staff and a loss of customer support. In extreme cases, the organisation's social licence to operate may be called into question (Herbert and Graham, 2022).

One way to co-opt stakeholders as part of the entity's decision-making and reporting process is to engage them in the development of KPIs. By obtaining the viewpoints of different stakeholders, the organisation can tailor performance evaluation structures to address a wide range of financial and extra-financial expectations more effectively and reduce conflicts between different stakeholder groups (Rinaldi, 2020; Dimes and Molinari, 2023). Information asymmetry is reduced; the organisation obtains additional insights when developing its KPIs and stakeholders are left better equipped to understand the entity's sustainability or integrated report (Barth *et al.*, 2017; Dimes and Molinari, 2023).

Stakeholder engagement is iterative. The first round of interaction may reveal facts and circumstances about which the organisation was unaware, leading to further interaction with key constituents (Rinaldi, 2020). After KPIs have been set and evaluated, areas for improvement and examples of best practice will be identified, leading to changes in how the organisation operates and additional engagement with stakeholders, as required

(Dissanayake, 2021). In the process, the organisation communicates more effectively with important constituents and obtains useful information on how to manage financial and extra-financial considerations more effectively (ibid). This is important because the KPIs should not only be understood as a tool for holding managers accountable; they also play an important educative role.

2.1.7 I7: Materiality (MAT). All companies, regardless of their size, must identify matters most material to their operations and ensure that these are covered by their performance evaluation process (VRF, 2022). It is important for organisations to disclose how they determine materiality. When materiality assessments vary widely among organisations, it becomes challenging for stakeholders to evaluate and compare the performance of different companies (Lai *et al.*, 2017). Transparency in the materiality determination process as it applies to performance metrics encourages organisations to consider a broader range of perspectives, leading to more meaningful sustainability reporting and enhanced legitimacy (Cerbone and Maroun, 2020).

At the same time, a well-developed system needs to be in place to ensure that managers can access and analyse the data necessary for making informed decisions (Bui and De Villiers, 2018). To avoid being overwhelmed, a clearly defined basis for identifying material issues must be in place. This will need to take qualitative and quantitative factors into consideration, given that not all information used as part of KPIs may be expressed in monetary terms (Gonzalez-Benito and Gonzalez-Benito, 2006). The process of evaluating material matters will improve the execution and monitoring of policies, compliance with legislative requirements, achieving goal congruence and maintaining communication with respective stakeholders (Alrazi *et al.*, 2015).

2.1.8 I8: Consideration of factors influencing the achievement of KPI (FAC). KPIs should be achievable. An increased risk of impression management may result if this is not the case (Haji and Anifowose, 2016). In addition, performance should only be evaluated based on facts and circumstances that management can control. Organisations should avoid setting KPIs that may have their achievement hindered by external factors, such as market sentiment (Pigatto *et al.*, 2023).

A comprehensive understanding of performance drivers is required (Dissanayake, 2021). Performance should be evaluated based on aligning core activities with long-term goals. By identifying internal drivers of performance (Pigatto *et al.*, 2023), organisations can perform root cause analyses (Latino *et al.*, 2019), allocate appropriate resources to assist in the achievement of the KPI (Stubbs and Higgins, 2014), adapt and correct strategies and performance and predict outcomes (Sobkowiak, 2023). This enhances the organisation's ability to achieve the strategic objectives and drive a culture of continuous improvement based on achievable and measurable outcomes and greater accountability.

2.1.9 I9: Post-implementation review (REV). Evaluating progress against targets by way of a post-implementation review and taking corrective action where required signals an integrated thinking mindset (Dimes and de Villiers, 2023). Post-implementation reviews allow organisations to assess the effectiveness and relevance of their KPIs after they have been implemented. This evaluation helps determine whether the selected KPIs are providing meaningful performance metrics and whether they align with the organisation's overall objectives (Maroun and Atkins, 2021). Feedback from different stakeholders allows for the refinement of KPIs and the identification of aspects of the KPI that need to be amended (Malafronte and Pereira, 2021). This also enables the organisation to provide a balanced report on shortcomings in performance and how these will be addressed in the future as part of a multi-capital business model. How environmental and social practices impact value

creation from the risk, information and strategic perspectives needs to be evaluated by those charged with governance (Wang *et al.*, 2023).

2.1.10 I10: Comparative information (COMP). It is difficult to track progress on KPIs that are not consistent and comparable. In addition, it is difficult for external stakeholders to evaluate the performance of an entity if its KPIs are not comparable with its competitors (Oshika and Saka, 2017). How the organisation reports on KPIs is important to allow stakeholders to evaluate year-on-year performance (IIRC, 2021). This emphasises the need for structured guidance by the organisation on how KPIs should be set, evaluated, amended and disclosed. Given the lack of uniform policies to evaluate and measure integrated thinking (Tweedie and Martinov-Bennie, 2015), comparability between organisations across multiple periods is important to determine the progress of the integrated thinking journey and how management has been addressing a broader outlook on the capitals.

The key indicators of integrated thinking in KPI structures are summarised in Figure 1. By applying the index to a sample of organisations' primary reports, the appropriateness of the index to gauge levels of integrated thinking in performance evaluation can be tested and used to evaluate KPIs that align with the concept of IPIs. Refer to Section 3 for the application of these indicators to the index.

3. Method

3.1 Research approach

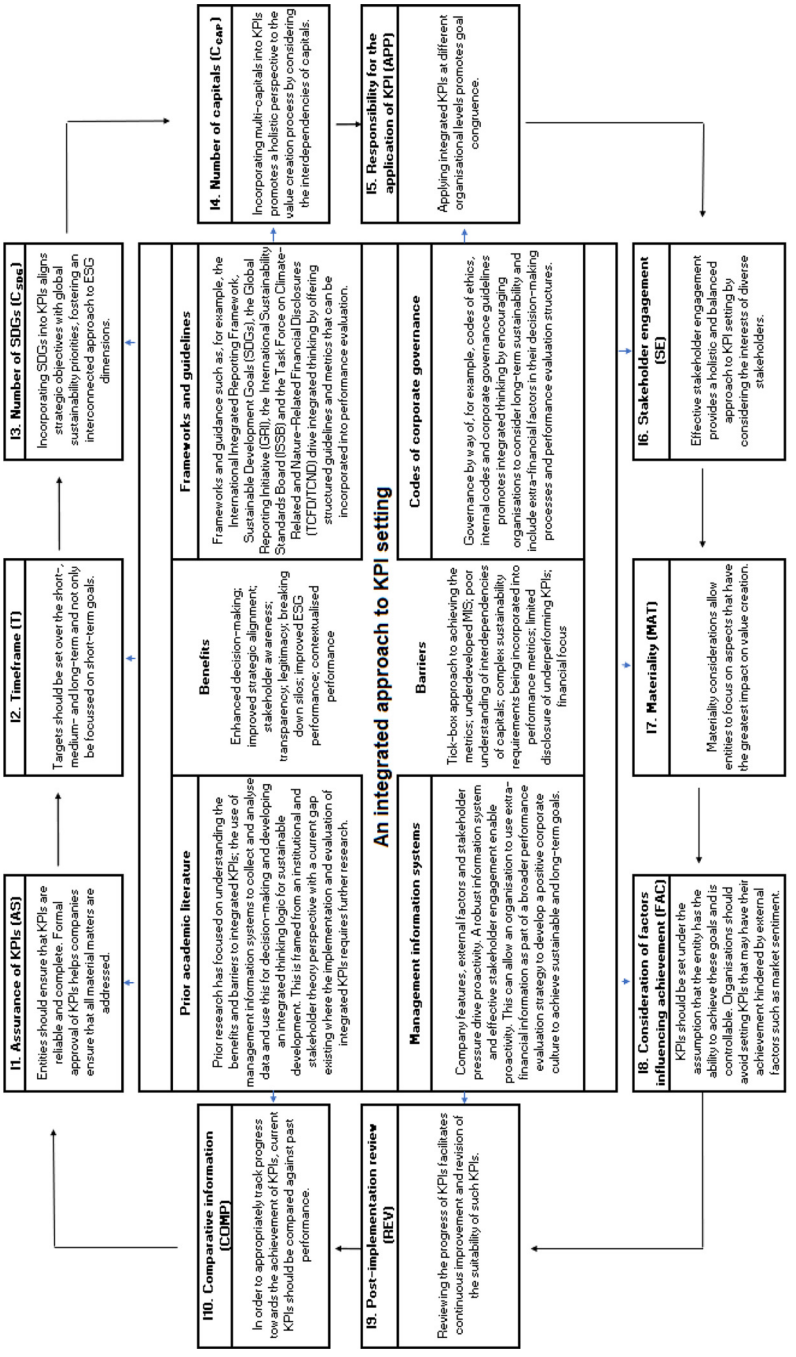
A mixed methods approach is adopted according to a two-stage process. The first stage uses a qualitative content analysis of organisations' extra-financial reports to gain insights into the level of integrated thinking in performance evaluation structures by using the index. The second stage calibrates the index results against well-established integrated thinking proxies to confirm the application of integrated thinking principles.

3.2 Sample

Data are collected from the 40 largest companies listed on the Johannesburg Stock Exchange (JSE) by market capitalisation (as at 01/03/2023) which have prepared primary extra-financial reports. This controls the possibility of a lack of resources or technical expertise to implement robust controls, or a lack of experience in exercising integrated thinking and implementing KPIs (De Villiers and Hsiao, 2017). South African companies are selected because the country has a well-developed reporting environment (Maroun *et al.*, 2014) [7]. The experience with sustainability-related reporting ensures that the selected companies should have the resources, management control systems and accounting infrastructure to manage economic, environmental and social capitals as part of the performance evaluation and strategy (see also du Toit *et al.*, 2017). The sample includes a broad range of industries including finance, insurance and real estate (33%), manufacturing (12%), mining (28%), public administration (5%) and retail and services (22%) ensuring that the findings are broadly applicable to different sectors.

3.3 Selection of reports

Companies' 2013, 2017 and 2021 reports are examined. The origins of integrated thinking and integrated reporting are debatable. Some argue that integrated reporting emerged during the early 2000s when pioneering companies experimented with integrating financial and extra-financial information. The reports prepared by Novo Nordisk during the early 2000s are an example (Dey and Burns, 2010). Others trace the start of integrated reporting to the publication of early discussion papers on the topic (2011–2012) and the publication of the IIRC's first framework in 2013. In South Africa, codes of corporate governance (King III)



Source: Author's own work

Figure 1. Indicators of integrated thinking in KPIs

formally introduced the notion of integrated reporting in 2009 followed by non-authoritative guidance on the topic in 2011 (IOD, 2009). While integrated reporting was not mandated by law, the local stock exchange required listed companies to comply with the provisions of King III, including those dealing with integrated reporting, or to provide reasons for not doing so from 2012. While the IIRC's framework was not formally adopted by South Africa's regulators, it was used in conjunction with King-III and other non-authoritative reporting standards to guide how South African companies prepared their first integrated reports from 2013 onwards (Solomon and Maroun, 2012).

The researchers selected 2021 reports because these cover the first year after the official end of the COVID-19 pandemic in South Africa. The reports were the latest ones available at the time of data collection and were also produced after the formation of the VRF in November 2020. The VRF marked the first step in efforts to consolidate guidance on how to report on financial and extra-financial information according to an integrated thinking logic (VRF, 2021) [8].

A mid-point of 2017 was set. This allowed for approximately four years for each selected company to develop the necessary systems and processes for supporting the preparation of integrated reports and the development of KPIs aligned with an integrated thinking logic. Similarly, companies would have had time to incorporate the SDGs (which were originally referred to as the Millenium Development Goals pre-2015) as part of their strategic, performance management and reporting systems (Adams *et al.*, 2020).

There were no material governance or regulatory developments impacting integrated reporting from 2013 to 2017. The same is true from 2017 to 2021 where prior research finds that the quality of integrated reporting improved, probably because South African companies had the opportunity to refine their understanding and application of integrated thinking (Maroun *et al.*, 2023). The result is two four-year intervals, which are used to investigate KPI disclosures [9].

3.4 Data collection

Following a similar approach to prior studies (Maroun *et al.*, 2023), content analysis is used to analyse companies' primary reports. Content analysis is suitable for dealing with material that is not consistently formatted, while highlighting trends and investigating both text and descriptive statistics (Krippendorff, 2013).

The study uses company-wide KPIs as the unit of account to ensure contextual accuracy. The reports are examined to identify disclosures dealing with KPIs. Each KPI is evaluated based on the presence of indicators provided in Table 1. The coding is based only on the presence or absence of disclosures as per the indicators. No inferences were drawn based on tone, layout or the use of infographics to maintain a focus on the content of KPIs, reducing subjectivity.

To ensure all KPIs were captured, a keyword search was performed for terms including, for example, "key performance indicator", "KPI", "performance evaluation", "metric", "evaluation" and "key performance metrics". The coding per the index was reviewed by two research assistants to ensure the accuracy and completeness of the KPIs captured and the scoring per indicator.

3.5 Analytical strategies

3.5.1 Stage 1: Computing the index. The extent to which KPIs incorporate integrated thinking is described using the following expression:

Table 1. Indicators of integrated thinking in KPIs

Indicator	Specification
I1: Assurance of KPIs (AS)	$AS = \sum_{c=1}^{t=1} (CA + AP + MON) \div 3$ Where AS is the level of assurance for company c in year *t* A score of 1 is applied where each of the following is present: combined assurance over the KPI (CA), formal approval of the KPI (AP) and monitoring of the progress of achievement of the KPI (MON). A score of 0 is applied for the absence of these factors
I2: Timeframe (T)	$T = \sum_{c=1}^{t=1} k \div 3$ where T is the timeframe [11] in which the KPI is measured for company c in year *t* A score of $k = 1$ is awarded for a short, 2 for medium and 3 for a long-term timeframe to achieve the KPI
I3: Number of SDGs addressed (C_{SDG})	$C_{SDG} = \sum_{c=1}^{t=1} (SDG_1 + SDG_2 \ldots + SDG_{17}) \div 17$ where C_{SDG} is the number of SDGs addressed by the KPI. A score of 1 is awarded for each SDG addressed. [a] This test is reperformed by dividing the C_{SDG} score by the SDG industry average to confirm the validity of the results
I4: Number of capitals addressed (C_{CAP})	$C_{CAP} = \sum_{c=1}^{t=1} (CAP_1 + CAP_2 \ldots + CAP_6) \div 6$ where C_{CAP} is the number of capitals addressed by the KPI. A score of 1 is awarded for each capital addressed. This measure is adjusted if the disclosures explicitly state that a particular capital is not material to ensure that organisations are not penalised for disclosing fewer capitals that may not actually be applicable. [a]This test is reperformed by dividing the C_{CAP} score by the capital industry average to confirm the validity of the results
I5: Responsibility for the application of KPI (APP)	$APP = \sum_{c=1}^{t=1} (S + E + Co) \div 3$ where APP is the organisational level at which the KPI applies. A score of 1 is awarded for each horizon covered: staff [12] (S), executives (E) and the company as a whole (Co)

(*continued*)

Table 1. Continued

Indicator	Specification
I6: Stakeholder engagement (SE)	$SE = \sum_{c=1}^{t=1} k \div 2$ where SE is the level of stakeholder engagement performed in setting the KPI. $k = 1$ if there is stakeholder engagement on the remuneration policy and $k = 2$ if there is an explicit statement of SE on both the remuneration policy and the issue that the KPI seeks to address
I7: Materiality (MAT)	$MAT = \sum_{c=1}^{t=1} k$ where MAT is the indicator of whether materiality was considered in setting the KPI. A score of $k = 1$ is awarded where materiality was considered and 0 where it is not mentioned
I8: Consideration of factors influencing achievement of KPI (FAC)	$FAC = \sum_{c=1}^{t=1} k$ where FAC is the nature of factors impacting the achievement of the KPI. A score of $k = 0$ is awarded where external factors exist (which are not subjected to the control of management/ organisation) and a score of $k = 1$ is awarded where internal factors exist which are controllable by management/ organisation
I9: Post-implementation review (REV)	$REV = \sum_{c=1}^{t=1} k$ where REV is evidence of a post-implementation review performed over the KPI. A score of $k = 1$ is awarded where a post-implementation review is performed, and a score of $k = 0$ where it is not
I10: Comparatives provided (COMP)	$COMP = \sum_{c=1}^{t=1} k$ where COMP is an indicator that prior year results were provided for the KPI. A score of $k = 1$ is awarded when comparatives are provided and $k = 0$ when they are not

Notes: Averages have been used to ensure that the data are normalised and standardised across companies of difference size and scale, allow for appropriate benchmarking and trend analysis and for ease of interpretation. It also supports a balanced scorecard approach where each aspect of performance is weighted evenly and evaluated in context
Source: Authors' own work

$$IPI = AS + T + C_{SDG} + C_{CAP} + APP + SE + MAT + FAC + REV + COM$$

To limit subjectivity, each element of the expression is treated as having equal importance. The computation of individual indicators is explained in Table 1.

The indicators, each with an equal weighting, illustrate the application of integrated thinking in an organisation's KPIs. The maximum score on the index is 10. The sum of the elements is the extent to which KPIs are aligned with integrated thinking principles and can be defined as IPIs. An initial pilot test was run on a sample of ten companies to refine the indicators used in Table 1. Preliminary results were presented at two workshops at the researcher's home institution and at an international corporate governance conference to test the completeness of the index and the method used to evaluate each element in Table 1. Each company's index score was then finalised. Data are presented in tabular and graphical format for ease of interpretation in subsections 4.1 and 4.2. Descriptive statistics and non-parametric tests provide additional insights.

3.5.2 Stage 2: Calibration tests. As a calibration check, the scores generated using the index are compared to established integrated thinking proxies. Other research has attempted to develop measures for integrated thinking. As a result, it is useful to determine if the index scores developed by this paper move in tandem with the alternate approaches to gauging integrated thinking on a broader level. The calibration reported in Section 4.3 is used to provide reassurance that the index is providing a reasonable assessment of the underlying integrated thinking at work and to determine the alignment with proxies of integrated thinking which have been developed independently from an analysis of IPIs. These proxies include the integrated report quality (IRQ) scores (EY, 2022) developed by Ernst and Young (Barth *et al.*, 2017) and the Morgan Stanley Capital International (MSCI, 2022) social, environmental and governance pillars (MSCI) (Venter *et al.*, 2017).

The EY Awards assess the quality of integrated reports produced by South African-listed companies based on the implementation of the guiding principles and content elements from the Framework (VRF, 2021), along with the fundamental idea of value creation across the six capitals (EY, 2022). Higher quality integrated reporting can indicate the effectiveness of an organisation's commitment to a multi-capital outlook over a multi-timeframe horizon (refer to subsection 2.1). In other words, the management information system, processes and holistic analysis used to develop high-quality reports may be indicative of an integrated thinking logic (Barth *et al.*, 2017).

The MSCI ratings measure a company's resilience to, and management of, long-term industry material environmental, social and governance (ESG) risks which aligns with an integrated thinking philosophy (Malafronte and Pereira, 2021). This includes the internal management and monitoring of the integration of economic, environmental and social dimensions (MSCI, 2022). This provides an external database to assess whether ESG factors are incorporated into an organisation's strategies, operations and actions and is a reasonable proxy for integrated thinking used in prior studies (Venter *et al.*, 2017).

The correlations among the index, IRQ and MSCI are evaluated using a Spearman rho and Kendal's Tau-B. These results are complemented using Kruskal–Wallis and associated post hoc tests to determine whether the index scores vary among companies grouped according to their IRQ and MSCI results.

This study is an exploratory one, which is not concerned with testing possible drivers of high levels of integrated thinking or establishing a causal model for explaining the index outcomes. This is deferred for future research to provide more conclusive results. A multinomial regression model is, however, used as an additional sensitivity test to control for the effects for the variables, such as, firm size, industry membership and financial

performance on the relationship between the index and either IRQ or MSCI scores. Variable definitions and further details of the tests performed are presented in subsection 4.3.

4. Results and discussion

4.1 General statistics

Table 2 includes the general statistics of the KPIs analysed over the periods 2013, 2017 and 2021.

There was a marginal improvement of 5.44% in the mean index scores from 2013 ($-X = 5.88$) to 2021 ($-X = 6.20$) but the change is not statistically significant ($H = -1.57$, $p > 10\%$). The slow growth in KPIs aligned with integrated thinking may be attributed to organisations having difficulty in operationalising integrated thinking principles, specifically when applied to performance evaluation structures (see also Maroun *et al.*, 2023). Organisations have not yet holistically adopted the ten indicators of integrated thinking in performance evaluation structures. Most organisations focused on financial capital and did not integrate multiple capitals or SDGs into performance evaluation.

Some organisations do, however, have a high score on the index (maximum = 7.97), indicating that they are establishing a sophisticated management information system and incorporating proactivity in performance evaluation over time ($H = -2.06$, $p < 5\%$). Despite this, the difference between the minimum (2021 = 4.1) and maximum (2021 = 7.97) index scores illustrates that while some companies are applying integrated thinking principles in KPI determination, others have not fully adopted them.

KPIs aligned with integrated thinking are, however, being disclosed with increasing prominence in primary reports ($H = -3.09$, $p < 1\%$). This may be due to several factors, such as, increased stakeholder pressure, external influences and company features (Alrazi *et al.*, 2015). As organisations have more time to mature and understand integrated and other sustainability frameworks, including the need to adopt these, progress can be made in integrating this mindset into performance evaluation structures (Dimes and de Villiers, 2023).

Table 2. General statistics

Metric analysed	2013	2017	2021	H-stat 2013–2021	JT-stat 2013–2021
Total number of KPIs analysed [13]	586	611	606	−0.94	0.89
Number of companies with no KPIs disclosed	2	0	3	−0.56	0.46
Minimum index score for a company as a whole [14]	3	2.8	4.1	−1.68*	1.71**
Maximum index score for a company as a whole	7.33	7.97	7.97	−2.06**	2.04**
Mean index score across all 40 sampled entities	5.88	5.96	6.20	−1.57	1.55
Median index score across all 40 sampled entities	6.00	6.10	6.40	−0.05	0.07
Most mentions of KPIs in a report	34	66	82	−3.09***	3.08***
Maximum number of pages of a primary report	348	292	312	0.56	−0.61

Notes: Not all of the data were normally distributed. The Kruskal–Wallis tests are run to determine whether there is a statistically significant difference between the integrated thinking score per factor and the grouping variable under review. The Jonckheere–Terpstra test is used to determine whether there is a significant statistical difference and the direction of the relationship. It predicts how the differences in the dependent variable depend on the ordinal nature of the groups of the independent variable consistent with the prior research in the same field, and to enhance transparency, a 1, 5 and 10% significance threshold is used. Correlations exist at the ***1, **5 and *10% level of significance

Source: Authors' own work

4.2 Specific indicator trends

Table 3 details the statistics per indicator of the index over the periods 2013, 2017 and 2021.

Combined assurance obtained over KPIs increased from 2013 (26.7%) to 2017 (31.99%, $U = 7.02$, $p < 1\%$) but decreased from 2017 to 2021 (29.45%, $U = -4.71$, $p < 1\%$). As part of the combined assurance strategy, 49.35% of KPIs were externally assured in 2021, with a steady increase in efforts to monitor ($H = -5.77$, $p < 1\%$) and formally approve ($H = -10.99$, $p < 1\%$) KPIs from 2013 to 2021. Given that assurance of extra-financial information is still a developing area (Farooq *et al.*, 2024), the formalisation of assurance practices over performance evaluation structures requires more development.

In 2013, almost all KPIs were short-term focused (95.59%) with no long-term KPIs set. This coincides with the financial-centric focus which dominated that time period. A slight shift away from a short-term focus is noted in 2017, however, significant steps were not yet evidenced to develop a multi-timeframe horizon (93.78%; $U = -1.40$, $p > 10\%$). In 2021, short-term KPIs made up 81.54% of the total with medium-term (14.05%; $H = -4.36$, $p < 1\%$; JT $= 4.08$, $p < 1\%$) and long-term (3.92%; $H = -4.87$, $p < 1\%$; JT $= 4.86$, $p < 1\%$) KPIs gaining significance to promote long-term value creation. Because of unforeseen future events, organisations may be exercising prudence by not setting KPIs in the long term for fear of the KPIs being unattainable near the date of realisation (Mans-Kemp and Viviers, 2018). The short-term focus may, however, hinder the ability for organisations to generate value over the long term and may prejudice initiatives aimed at sustainable development (Steenkamp and Roberts, 2022).

The number of SDGs explicitly linked to KPIs has increased over time ($H = -3.38$, $p < 1\%$). Although many SDGs are implicitly linked to ESG-related KPIs, many companies are not explicitly linking performance evaluation to the SDGs. This may be due to a difficulty in aligning supranational objectives at a company level. Despite this, the use of SDGs across performance evaluation structures is encouraging and indicates that organisations are making use of external sustainability guidelines to support the achievement of social and environmental goals (Rendtorff, 2020) [10].

There is still a tension between financial sustainability and social and environmental sustainability and current sustainability-related frameworks, and the targeted harmony aims to address these tensions (Afolabi *et al.*, 2023). However, by incorporating the relevant principles from different frameworks and guidelines, such as the SDGs, organisations will be able to actively implement and monitor the achievement of these principles until they become a more natural part of the organisation (Afolabi *et al.*, 2023; Afolabi *et al.*, 2022).

There is a notable shift away from financially focused KPIs from 2013 to 2021, with a significant decline in the number of KPIs linked only to financial outcomes ($H = 7$, $p < 1\%$; JT $= -7.01$, $p < 1\%$). Financial capital was the dominant KPI focal area in 2013 (57.65%) with only an insignificant downward decline to 2017 (56.79%; $U = 0.23$, $p > 10\%$) before a significant movement in 2021 (37.44%; $U = -6.84$, $p < 1\%$). This may be due to increased stakeholder pressure on organisations to acknowledge the other capitals. Integrated thinking characterises the acknowledgement of the interdependencies of the capitals (Pigatto *et al.*, 2023). Axiomatically, financial capital will still form a significant part of performance metrics for profit-driven companies (La Torre *et al.*, 2019). However, it is encouraging to note the adoption of a more multi-capital approach to KPI setting which suggests that specific targeting of different capitals by organisations is being used to promote value creation and long-term sustainability (Pigatto *et al.*, 2023; Herath *et al.*, 2021).

The presence of natural capital in KPIs has improved in aggregate from 2013 (10.71%) to 2021 (17.73%; $H = -3.73$, $p < 1\%$). Sustainability-related frameworks and guidance, for example, the GRI, the TNFD and the Carbon Disclosure Project (CDP) may have assisted

Table 3. Indicator analysis

Indicator	2013 (%)	2017 (%)	2021 (%)	U-test 2013–2017	U-test 2017–2021	H-test 2013–2021	JT-test 2013–2021
Indicator 1: Percentage of KPIs assured							
• Combined assurance	26.70	31.99	29.45	7.02***	−4.71***	−2.80***	2.51***
• Formal approval	23.28	25.21	32.54	1.28	10.76***	−10.99***	11.82***
• Monitor performance	30.28	32.21	33.59	1.90	4.44***	−5.77***	5.96***
Indicator 2: Timeframe analysis							
• Short-term KPIs	95.59	93.78	81.54	−1.40	−4.77***	6.32***	−5.97***
• Medium-term KPIs	4.07	4.26	14.05	0.16	3.97***	−4.36***	4.08***
• Long-term KPIs	0.00	1.96	3.92	3.42***	2.02	−4.87***	4.86***
Indicator 3: Average number of SDGs explicitly linked to KPIs	0.00	0.08	0.61	0.00	3.09*	−3.38***	2.73***
Indicator 4: Percentage coverage of multi-capitals							
• Financial	57.65	56.79	37.44	−0.23	−6.84***	7.00***	−7.01***
• Natural	10.71	10.47	17.73	−0.12	3.61***	−3.73***	3.61***
• Human	16.67	16.53	19.54	−0.04	1.33	−1.34***	1.33
• Social and relationship	6.80	7.86	14.12	0.72	3.47***	−4.28***	4.11***
• Intellectual	2.21	2.13	4.93	−0.09	2.63***	−2.80***	2.63***
• Manufactured	5.95	6.22	6.24	0.21	−0.01	−0.21	0.21
Indicator 5: Responsibility for the application of KPI							
• Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00
• Executives	2.10	2.43	5.37	0.52	4.73***	−5.47***	5.16***
• Company as a whole	100.00	100.00	100.00	0.00	0.00	0.00	0.00
Indicator 6: Stakeholder engagement							
• On remuneration policy	99.66	100.00	96.90	1.44	−4.39***	4.48***	−3.66***
• On issues addressed by KPI	97.97	92.14	67.16	−4.63*	−10.85***	15.21***	−13.98***
Indicator 7: Percentage of companies considering materiality	95.25	99.02	99.51	3.93*	1.01	−5.22***	4.65***
Indicator 8: Consideration of factors influencing the achievement of KPIs							
• External influences	8.14	9.82	9.97	1.02	0.09	−1.09	1.11
• Internal influences	91.53	91.16	97.55	−0.22	4.83***	−4.22***	4.84***
Indicator 9: Percentage of companies using a post-implementation review	65.25	68.74	82.35	1.28	5.54***	−6.61***	6.75***
Indicator 10: Percentage of companies including comparative information	84.24	84.45	89.05	0.10	2.37	−2.40	2.46***

Notes: ***Correlations exist at the 1% level of significance;* The Mann–Whitney U Test is used to compare two sample means that come from the same population and is used to test whether two sample means are equal or not. The Kruskal–Wallis tests are run to determine if there is a statistically significant difference between the integrated thinking score per factor and the grouping variable under review. The Jonckheere–Terpstra test is used to determine whether there is a significant statistical difference and the direction of the relationship
Source: Authors' own work

companies in incorporating environmental and biodiversity considerations in performance evaluation (FSB, 2021; CDP, 2020). As entities received more guidance on how to account for their environmental performance, they more readily reported on it. As global warming and environmental sustainability have grown in concern over the years (Afolabi *et al.*, 2023), organisations have become more cognisant of their environmental impact and, consequently, report on it as a company-wide and employee-specific KPI.

Human capital considerations in performance evaluation have also increased from 2013 (16.67%) to 2021 (19.54%; $H = -1.34$, $p < 1\%$). The increase may be a consequence of more stakeholder engagement with employees and a growing awareness of taking social issues into account (Rinaldi, 2020).

The integration of social and relationship capital into KPIs has increased from 2013 (6.80%) to 2021 (14.12%; $H = -4.28$, $p < 1\%$). A key challenge in addressing this capital is that stakeholder expectations change over time, requiring organisations to monitor the effectiveness and relevance of the KPIs which address social and relationship capital. An efficient management information system may assist entities in augmenting these KPIs with stakeholder needs that were established from continuous and effective stakeholder engagement (Alrazi *et al.*, 2015).

Intellectual capital considerations as part of KPIs have grown from 2017 (2.13%) to 2021 (4.93%; U = 2.63, $p < 1\%$); however, this remains the smallest component of KPIs from a capital perspective. Companies may be focusing on addressing more pressing issues that are focused on short-term goals. Complexities in evaluating and measuring this capital may contribute to the avoidance of specifically evaluating performance (Vitolla *et al.*, 2020); however, this should still be incorporated into performance metrics to encourage innovation (Ashford and Hall, 2011).

Incorporating manufactured capital as part of the KPI strategy has remained relatively consistent ($H = -0.21$, $p > 10\%$) suggesting that the maintenance of manufactured capital, as part of a performance evaluation strategy, is not a priority. In addition, investing in manufactured capital often requires substantial upfront capital, which is challenging to secure in an emerging economy with a high borrowing rate and may be difficult to attribute to performance evaluation given that it is based on fluctuating organisational needs (Rendtorff, 2020) [10].

Results show an increased alignment between executive and companywide KPIs (2013 = 2.10%, 2021 = 5.37%; $H = -5.47$, $p < 1\%$). Linking the KPIs promotes decision-making which benefits the organisation as a whole, rather than focusing solely on departmental or individual goals. This promotes a firm-wide culture aligned with sustainable development and reduces the risk of impression management in integrated reports (see Haji and Anifowose, 2016; Stubbs and Higgins, 2014).

Stakeholder engagement on the specific issues addressed by the KPI has decreased (2013 = 97.97%; 2021 = 67.16%; $H = 15.21$, $p < 1\%$; JT = −13.98, $p < 1\%$). This may be a result of many KPIs not being post-COVID-19. In response, companies may have refrained from addressing poor performance with stakeholders. However, stakeholder engagement on the remuneration policy is exercised by almost all companies every year. King IV requires organisations to obtain a non-binding advisory vote from shareholders on the remuneration policy (IoDSA, 2016), necessitating stakeholder engagement on the remuneration policy.

The significant improvement in post-implementation reviews (2013 = 65.25%; 2021 = 82.35%; $H = -6.61$, $p < 1\%$; JT = 6.75, $p < 1\%$) is indicative of an enhanced effort from management to assess their progress and performance and implement corrective and remedial action where necessary. Organisations are increasingly assessing KPIs for alignment with strategic objectives, risks and opportunities. A feedback loop could be

forming which ensures that outcomes are being achieved and corrective action is being taken as required.

Finally, indicators 7 (materiality), 8 (factors) and 10 (comparative information) have performed consistently well across all three years, showing that companies have understood these principles well, perhaps as a result of adopting the Framework's principles since its publication.

Figure 2 summarises the information above per indicator of the index over time. This iterates the various components that need to be considered as part of a well-rounded performance evaluation structure that balances financial and extra-financial matters and responds directly to the findings that South African organisations have financially focused performance evaluation structure (Maroun *et al.*, 2023; Herbert and Graham, 2022) and suggests specific areas of improvement.

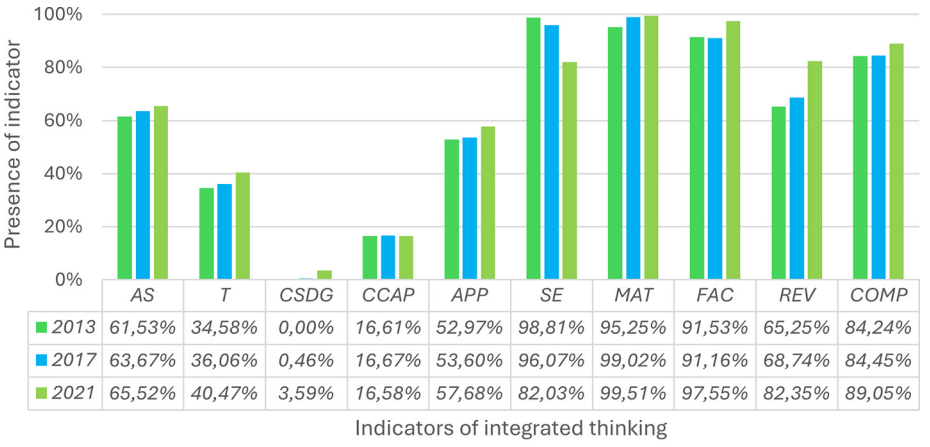
4.3 Calibration tests

Table 4 shows that the index scores are correlated with both the IRQ ($T_b = 0.361$; $r_s = 0.278$, $p < 1\%$) and MSCI ($T_b = 0.241$; $r_s = 0.184$, $p < 1\%$) scores from 2017 onwards.

To test the association between the index scores and alternate integrated thinking proxies, additional tests are performed. Refer to Table 5.

For Test 1 (Model 1), companies are grouped according to their IRQ scores. Differences in KPIs among the resulting five groups are statistically significant ($H = 14.492$, $p < 1\%$). As IRQ increases, so too does the index score (JT $= 3.748$, $p < 1\%$). The same approach is followed to examine the relationship between the index and MSCI (Model 2). As MSCI scores improve, companies report higher index scores ($H = 8.259$; JT $= 2.733$, $p < 5\%$). These findings hold when each of the three years under review are considered separately. The results are confirmed by un-tabulated median tests to contrast median index scores for companies grouped according to their IRQ and MSCI scores.

Testing possible determinants of improved index scores is beyond the scope of the current paper. Nevertheless, a multinomial logistic regression is used to examine how index scores



	AS	T	CSDG	CCAP	APP	SE	MAT	FAC	REV	COMP
2013	61,53%	34,58%	0,00%	16,61%	52,97%	98,81%	95,25%	91,53%	65,25%	84,24%
2017	63,67%	36,06%	0,46%	16,67%	53,60%	96,07%	99,02%	91,16%	68,74%	84,45%
2021	65,52%	40,47%	3,59%	16,58%	57,68%	82,03%	99,51%	97,55%	82,35%	89,05%

Source: Author's own work

Figure 2. Total scores per indicator of integrated thinking

Table 4. Correlation between the index, MSCI and IRQ scores over time

Calibration tests	Index	MSCI	IRQ
2013			
Index	1.000	−0.044	0.074
MSCI	−0.042	1.000	0.648***
IRQ	0.071**	0.526***	1.000
2017			
Index	1.000	0.241***	0.361***
MSCI	0.184***	1.000	0.691***
IRQ	0.278***	0.598***	1.000
2021			
Index	1.000	0.147***	0.336***
MSCI	0.113***	1.000	0.582***
IRQ	0.271***	0.506***	1.000

Notes: ***Correlation is significant at the 1% level (two-tailed); **Correlation is significant at the 5% level (two-tailed); Spearman Rho above the diagonal; Kendal Tau-B below. Non-parametric correlations have been used as data are not distributed normally. Kendal Tau-B is also robust to the effect of smaller sizes
Source: Authors' own work

vary with changes in IRQ (Test 2 Model 1) and MSCI scores (Test 2 Model 2). This is done by adapting models used by prior studies dealing with the determinants of better quality extra-financial reporting (Venter *et al.*, 2017; Malafronte and Pereira, 2021; Maroun *et al.*, 2023).

Companies are organised by industry according to social and environmental impact. Those in the mining and industrial firms were coded 3. Entities in the financial services sector were coded 2 and all other entities were coded 1. Size is measured by the natural log of total assets. Density captures the number of disclosures dealing with KPIs relative to the total number of pages in the respective reports to control for the possibility of companies simply reporting more information. ROA is the ratio of profit after tax to total assets and leverage measures the organisations' debt to equity. THINK is either the IRQ (Model 1) or MSCI (Model 2) result.

Improvements in IRQ ($X^2 = 8.047$, $p < 5\%$) and the MSCI ($X^2 = 13.644$, $p < 5\%$) significantly predict the index results. Parameter estimates for each level of IRQ and MSCI confirm that improvements in these integrated thinking proxies improve the odds of a company also reporting more extensively on its KPIs that are aligned with integrated thinking and transitioning to IPIs. The aim is not to argue that IPIs are exactly equivalent to these alternate measures but to take cognisance of the fact that there is no single method for gauging integrated thinking. IPIs can, however, provide novel insights into the performance evaluation structures in an organisation being aligned with the principles of sustainability and long-term value creation guided by an integrated thinking logic.

5. Conclusion

Given the increased focus on sustainability-related issues and supporting guidelines and standards (ISSB, 2021; FSB, 2022; Afolabi *et al.*, 2023), there is a need for an equal focus on how performance evaluation structures, which address financial and extra-financial dimensions, are implemented and evaluated. In this study, an index is proposed to assist those charged with governance, regulators, policymakers and other stakeholders with

Table 5. Sensitivity analysis

	Grouping variables			
	Model 1: IRQ		Model 2: MSCI	
Test 1:Differences among grouping variables	H stat	J-T stat	H stat	J-T stat
• Total	14.492***	3.748***	8.259**	2.733**
• 2021	11.981***	2.263**	11.768**	2.023**
• 2017	9.181**	1.618*	7.211**	2.070**
• 2013	7.775**	2.097**	0.043**	2.267**
Test 2: Likelihood ratio tests	Model 1: IRQ		Model 2: MSCI	
	Log likelihood	χ^2	Log likelihood	χ^2
INDUSTRY	218.970	14.561**	159.342	42.050***
DENSITY	210.692	6.283	132.291	14.998***
LEVERAGE	218.290	13.881**	125.800	8.507**
ROA	207.779	3.370	120.692	3.400
SIZE	216.729	12.320**	123.307	6.014*
THINK	212.456	8.047**	130.937	13.644**
THINK-parameter estimates	Odds ratio	Wald χ^2	Odds ratio	Wald χ^2
THINK = 1	1.481	4.025**	11.422	18.255***
THINK = 2	2.613	5.153**	4.727	10.680**
THINK = 3	1.018	1.811*	2.449	4.402**
THINK = 4	1.910	2.875**	Reference category	
THINK = 5	Reference category		Not applicable	
Pseudo R^2 (Cox and Snell)	0.504		0.653	
Robust to fixed year effects	Yes		Yes	
Robust to fixed firm effects	Yes		Yes	

Notes: Data are not consistently distributed normally. As a result, differences in the index scores for companies grouped according to IRQ are computed using a Kruskal–Wallis test. Trends in the index scores among the grouped companies are tested using the Jonckheere–Terpstra test. Results for the total groupings are confirmed using an un-tabulated Friedman's ANOVA to control for assumptions about group independence. Multinomial logistic regression results are reported above because IRQ and MSCI are ordinal measures. Findings are confirmed using an un-tabulated OLS regression with fixed year and firm effects and relaxing assumptions about how IRQ and MSCI are measured. VIF scores are less than 3 for each independent and control variable. Collinearity diagnostics show that predictors are not clustered on a single dimension. This suggests that multicollinearity is not having a material effect on the models' predictive power. An un-tabulated scatter plot showed that residual errors were approximately normally distributed and gave no indication of material heteroscedasticity. Results were re-run using robust standard errors and bootstrapped using 1,000 iterations and a bias-corrected and accelerated method. An un-tabulated ANOVA is used to test the null hypothesis that the independent and control variables do not contribute to the predicted outcome. A heteroskedastic regression model with the same dependent, independent and control variables corroborated the results. Finally, standardised measures were used to confirm that the findings are robust to the effect of variables being measured on different scales. ***Significant at the 1% level; **significant at the 5% level; * significant at the 10% level

Source: Authors' own work

evaluating the extent to which KPIs cover the management of extra-financial resources in accordance with an integrated thinking philosophy.

The index is then applied to a sample of JSE-listed entities to illustrate its functionality and the extent to which KPIs are being included in primary reports of organisations for the periods 2013, 2017 and 2021. The results of the index are calibrated against established proxies of integrated thinking to support the robustness of the index.

The current paper's focus is not theory development. It makes a practical contribution by outlining the elements of the index, which can guide the examination of a company's integrated performance evaluation structures. The study is among the first to outline formally the dimensions of integrated thinking and detail an index that can be applied with relatively little effort to evaluate integrated performance evaluation structures.

Overall, there has been an improvement in the level of integrated thinking demonstrated and reported by way of KPI disclosures from 2013 to 2021 as extra-financial performance measurements become more commonplace in organisations and focused on a broader stakeholder logic, incorporating a more comprehensive assessment of the organisation's sub-systems. This is driven primarily by organisations implementing post-implementation reviews, incorporating SDGs in KPI structures and taking a multi-capital approach to the KPI setting. The recognition of interdependencies among different capitals has led to the development of an integrated thinking logic. This logic can be further advanced by investing in a robust information system and enhancing stakeholder engagement. The findings highlight a reduced emphasis on KPIs, signalling a shift towards a multi-capital approach to framing performance and a growing adoption of IPIs. Although natural and human capital is gaining prominence, there is still room for growth in incorporating broader capital objectives as part of performance metrics. To do so, organisations will require investment in education and training programs, adopting sustainability-related frameworks that align with their strategies, operations and legal requirements; enhancing cross-functional working groups; integrating data analytics and software solutions into information systems; and benchmarking against peer companies.

The research responds directly to calls from international standard-setters (such as the ISSB and GRI) for additional research on how best to understand sustainability and implement changes that can be used to effect positive change at the organisational level using performance evaluation structures. Empirically, most of the integrated thinking and corporate reporting research has been conducted in developed economies, such as the USA, the UK and Australia (Ecim and Maroun, 2023). Little is known about how the mechanisms of accountability work in developing economies. This paper addresses this limitation by collecting data from South African case entities and advancing normative recommendations which will be broadly applicable to an international audience.

The current paper only makes use of publicly available information to compute the index score. Details from interviews with management and governing bodies, ethnographies or other sources have not been used. This is an inherent limitation, but it allowed the researchers to collect data on KPIs from a larger sample of organisations rather than running case studies with only a few organisations. Given that stakeholders may not always have access to an organisation's internal information, applying the index to publicly available information also illustrates the practical usefulness of the index (Maroun *et al.*, 2023).

The index can be used in different contexts and jurisdictions. It can be applied to a broad category of reports irrespective of the standard or guidelines used to prepare those reports. This index can inform management, investors and other stakeholders of the key areas that require improvement in the current performance evaluation structures. For example, those charged with governance and management can use the index as a basis for structuring, implementing and evaluating IPIs. Investors can use the index to identify aspects of an organisation's business that

need to be examined more closely and inform questions for management to address during investor engagement meetings. Investors can also use this index to gauge the level of integrated thinking being applied by an organisation and contrast that entity's application of integrated thinking with other firms being considered for investment.

Regulators can use the index for benchmarking organisations, compliance monitoring, identifying gaps between regulatory expectations and corporate behaviour and encouraging the broader adoption of practices promoting integrated thinking. More broadly, the index could be used to promote alignment with sustainable development goals at the national level. IPIs may also be incorporated as part of the refinement of sustainability-related frameworks and guidance to clearly define how performance metrics can be used to enhance the respective objectives and outcomes.

Assurance providers may find the index useful when conducting risk assessments of an organisation, particularly given the increased focus on the assurance of extra-financial information by, for example, the IAASB, GRI, ISO and AA. The principles outlined in this paper can guide the development of criteria for evaluating performance measurement systems in both a financial and non-financial context and offer richer insights into sustainability performance and governance practices. The tool can be used to support data-driven decisions related to the verification of performance metrics and to evaluate whether the management information systems facilitate the collection, analysis and use of integrated performance-related data.

The researchers acknowledge that while the index has been validated using established integrated thinking proxies, there is room for improvement and further research. Expanding the application of the index to different contexts, including the private sector and governmental organisations in various jurisdictions, can offer additional insights into the levels and evolution of integrated thinking in KPI disclosures. This becomes particularly relevant when the index is used in countries that have not explicitly embraced extra-financial reporting for publicly listed companies. The index can also be applied to a larger sample of companies from multiple jurisdictions and over extended time frames to generate more detailed findings. Evaluating determinants of KPI-related disclosures and their value relevance offers an additional avenue for future research.

Notes

1. Extra-financial reporting refers to the disclosures concerning matters related to non-financial aspects, such as social and environmental dimensions. This term is used interchangeably with non-financial reporting, sustainability reporting and integrated reporting for stylistic purposes.
2. Different types of reports deal with extra-financial information and have different naming conventions depending on the jurisdiction. Examples include corporate reports, integrated reports, annual reports, sustainability reports and corporate social responsibility reports. For the purposes of this paper, the report that deals with non-financial reporting with a multi-capital perspective and value generation for a broader stakeholder group will be referred to collectively as primary reports and terms will be used interchangeably. Secondary reports are excluded.
3. The International Integrated Reporting Framework (the Framework) specifically advocates for the application of integrated thinking and approaching business, including performance evaluation, with a holistic mindset that considers the multi-capitals (see VRF, 2022). The six multi-capitals are financial, human, social, relationship, intellectual, natural and manufactured capital (ibid).
4. A systematic inquiry was conducted to identify articles on the Scopus Database that included the terms "key performance indicator"; "performance indicator"; "KPI" or "performance evaluation" in their titles, keywords or abstracts. The filtration criteria included "integrated reporting" and "integrated thinking". The search was initiated from 1 January 2013 to 31 March 2022. This provides

a nine-year period over which to assess the progress and state of research on KPIs. The search yielded 979 documents. The articles were then categorised by theme and used to assess common themes emerging from KPI literature, which were used to support the development of the final indicators.

5. International Standard in Sustainability Assurance (ISSA) 5000.
6. Refer to https://sdgs.un.org/goals
7. Given that integrated reporting by South African listed companies is de facto mandatory, self-selection bias associated with voluntary reporting is reduced.
8. The work of the VRF supports the efforts of the ISSB. For further details see www.valuereportingfoundation.org/
9. A preliminary analysis of a sample of companies during pilot testing reports from 2018 to 2021 has corroborated that KPIs have minimal to no changes on a year-on-year basis. Consequently, it is preferable to investigate potential changes in KPIs using a four-year interval as this will more clearly illustrate changes in performance evaluation practices.
10. The index score was reperformed by calculating the average SDGs and capitals per industry respectively and dividing C_{SDG} and C_{CAP} by the aforementioned average per industry. This ensures a control for companies in industries that do not have as material an impact on social and environmental factors as highly sensitive industries. Un-tabulated results reveal that the overall score as a percentage is not different using the industry average and that C_{SDG} and C_{CAP} still illustrate the same trend from 2013 to 2021 using the industry average.
11. Short-term KPIs are attainable within 12 months of implementation, medium-term ranges between 1 and 5 years and long-term exceeds 5 years.
12. This horizon covers staff, excluding directors and prescribed officers. All horizons are mutually exclusive.
13. In total, five companies did not disclose KPIs at the company level.
14. This statistic does not include scores of 0 obtained by companies that did not disclose KPIs.

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Corresponding author
Dusan Ecim can be contacted at: dusan.ecim@wits.ac.za

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