

Conceptual Framework of a Sustainable Strategic Accounting System¹

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Abstract

The purpose of this paper is to propose a holistic, transdisciplinary, principle-based conceptual framework of a Sustainable Strategic Accounting (SSA) system outlining its components, its lifecycle, and general principles to guide the design, development, implementation, operations and use of an accounting system that integrates sustainability and strategic management concepts and considerations into it. The foundation for the design of the framework is based on the review and study of academic and non-academic literatures in such fields as strategic management, accounting, sustainability, information technology, risk management, and governance to specify, understand, analyze, and synthesize SSA-related definitions, characteristics, components, frameworks, and principles. The above review and study suggest that drivers such as technology, environment, human needs, economic and social issues, and geopolitics have caused the demand and expectation of businesses, regulators, and other stakeholders on the accounting system to change dramatically over the past 10 years, especially in terms of value creation, delivery, preservation, and realization at an acceptable risk and optimized cost, and that the accounting system needs to be transformed to be more responsive to changes. The framework intends to be an enabler to close these expectation gaps which in turn will make the accounting practice and profession to be more sustainable and meaningful throughout the passage of time. This paper also discusses the implications of the framework for future research and application.

Keywords: Sustainable Strategic Accounting, Conceptual Framework, Accounting System

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กรอบแนวคิดระบบบัญชีเชิงกลยุทธ์แบบยั่งยืน

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บทคัดย่อ

บทความนี้มีวัตถุประสงค์เพื่อเสนอกรอบแนวคิดระบบการบัญชีเชิงกลยุทธ์แบบยั่งยืน (SSA) ในแบบองค์รวมที่บูรณาการข้ามศาสตร์และกำหนดหลักการเพื่อใช้อย่างอิง โดยประกอบด้วยองค์ประกอบของระบบ วงจรชีวิตของระบบ และหลักการทั่วไปเพื่อใช้เป็นแนวทางในการออกแบบ การพัฒนา การนำไปใช้งานจริง การปฏิบัติการ และการใช้งาน ระบบบัญชีที่สอดคล้องกับแนวคิดและข้อควรพิจารณาของความยั่งยืนและการจัดการเชิงกลยุทธ์รวมเข้าไว้ด้วยกัน ทั้งนี้หลักการและความรู้พื้นฐานในการจัดทำกรอบแนวคิดการบัญชีเชิงกลยุทธ์แบบยั่งยืนที่เสนอในบทความนี้ มาจากการทบทวนและศึกษาวรรณกรรมทางวิชาการและที่ไม่ใช่ทางวิชาการในศาสตร์ต่าง ๆ เช่น การจัดการเชิงกลยุทธ์ การบัญชี ความยั่งยืน เทคโนโลยีสารสนเทศ การบริหารความเสี่ยง และการกำกับดูแล เพื่อระบุ ทำความเข้าใจ วิเคราะห์ และสังเคราะห์ ความหมาย ลักษณะเฉพาะ องค์ประกอบ และกรอบและหลักการที่เกี่ยวข้องกับ SSA ซึ่งการทบทวนและศึกษาข้างต้นชี้ให้เห็นว่าตัวขับเคลื่อน เช่น เทคโนโลยีสิ่งแวดล้อม ความต้องการของมนุษย์ ประเด็นทางเศรษฐกิจและสังคม และภูมิรัฐศาสตร์ ทำให้ความต้องการและความคาดหวังของธุรกิจ หน่วยงานกำกับดูแล และผู้มีส่วนได้เสียอื่น ๆ ต่อระบบบัญชีได้เปลี่ยนแปลงไปอย่างมากในช่วง 10 ปีที่ผ่านมา โดยเฉพาะอย่างยิ่งในแง่ของการสร้าง การส่งมอบ การรักษา และการรับรู้คุณค่า ในระดับความเสี่ยงที่ยอมรับได้และการใช้ต้นทุนอย่างมีประสิทธิภาพและประสิทธิผล และในแง่การปฏิรูประบบบัญชีให้ตอบสนองต่อการเปลี่ยนแปลงมากขึ้น กรอบแนวคิดการบัญชีเชิงกลยุทธ์แบบยั่งยืนนี้มีจุดมุ่งหมายเพื่อเป็นตัวช่วยในการปิดช่องว่างความคาดหวังเหล่านี้ ซึ่งจะช่วยให้การปฏิบัติงานบัญชีและวิชาชีพบัญชีมีความยั่งยืนและมีความหมายมากขึ้นตลอดกาล นอกจากนี้บทความนี้ยังกล่าวถึงผลกระทบของกรอบแนวคิดการบัญชีเชิงกลยุทธ์แบบยั่งยืนสำหรับการวิจัยและการประยุกต์ใช้ในอนาคตด้วย

คำสำคัญ: การบัญชีเชิงกลยุทธ์แบบยั่งยืน กรอบแนวคิด ระบบบัญชี

1. Introduction

As the world has faced with rapid and unpredictable changes and been disrupted by emerging pandemics, technologies, innovation breakthroughs, social chaos, climate changes, and other high impact issues, the definition and role of accounting needs to be redefined. To make accounting sustainable as a practice and profession, it is crucial that accounting purpose dimensions expand to address not only accounting for accounting and reporting purposes but also strategic and sustainability management purposes. Sustainable strategic accounting (SSA) emerges as a transformative approach to answer this by integrating strategic and sustainability concepts, principles, and considerations into the accounting practice and system. This integration is essential not only for governance and regulatory reasons but also for ensuring long-term business resilience and success.

This paper aims to propose a holistic, transdisciplinary, principle-based conceptual framework of an SSA system, defining its key components, its lifecycle, and the general guiding principles that can be adopted or adapted and applied by organizations and professionals to guide the design, development, implementation, operations and use of an SSA system to ensure that their accounting profession, accounting practice, and accounting system are strategic and sustainable against time and changes.

Following this introduction, the paper describes a literature review on definitions of SSA, components of an SSA system and conceptual frameworks and principles relevant to SSA, and a conceptual framework for an SSA system including the definition, core components, lifecycle, and general guiding principles of an SSA system, explores implications for future research and application, and concludes with the contributions of the proposed framework and principles to the fields of accounting, strategic management, and sustainability.

2. Literature Review

2.1 Definitions of SSA

An understanding of the definition of SSA is necessary for the design, development, implementation, operations, and use of an SSA system to ensure that it is in line with the needs and expectations of an organization and stakeholders. However, nowadays there is still no exact definition of SSA provided in accounting literature or reached by a universal consensus. To define what SSA is about, we, thus, need to go back to the core meaning of the words “accounting”, “strategic accounting” (conventionally referred as “strategic management accounting” or “SMA”), and “sustainable accounting” (interchangeably called with varied interpretations as “green accounting,” “environmental accounting,” “sustainable development accounting,” or “sustainability accounting.”).

2.1.1 Accounting

Accounting and its definition have been continuously evolved and transformed from traditional bookkeeping process to a more sophisticated system providing, not only financial information and reports, but also strategic, non-financial, and relevant sustainability information as well as checks and balances to address such factors as economic disruptions, environmental crisis, social changes, and technology advancement as exemplified below.

- Accounting is the art of recording, classifying, and summarizing in a significant manner and in terms of money, transactions and events which are, in part at least, of financial character and interpreting the results thereof (American Institute of Certified Public Accountants (formerly American Institute of Accountants), 1953).
- Accounting is the process of identifying, measuring, and communicating economic information to permit informed judgments and decisions by users of information (American Institute of Certified Public Accountants (formerly American Institute of Accountants), 1966, as cited in Carnegie et al., 2022).
- Accounting is a service activity of which its function is to provide quantitative information primarily financial in nature about economic entities, that is intended to be useful in making economic decisions (American Institute of Certified Public Accountants (formerly American Institute of Accountants), 1970).
- Accounting is a technical, social, and moral practice concerned with the sustainable utilization of resources and proper accountability to stakeholders to enable the flourishing of organizations, people and nature. It is fundamental to the processes of governance, strategizing, control, and accountability across not only the corporate/for-profit sector but the non-profit sector and the government or public sector (Carnegie et al., 2021a)
- Accounting is the system of recording and summarizing business and financial transactions and analyzing, verifying, and reporting the results (Merriam-Webster, 2024).

In addition, there have been studies and discussions including continuing conferences such that organized by Haskayne School of Business at the University of Calgary & Merves Center for Accounting and Information Technology at the Fox School of Business, Temple University on the convergence of financial accounting and management accounting to improve the overall accounting effectiveness and efficiency both in terms of operations and value delivery through the integration of the underlying data and systems required for strategic, management, and compliance purposes. The convergence is driven by such factors as requirements for more accurate, consistent, timely information for better cost management and decision-makings, the growing momentum and acceptance of integrated reporting, and the advent of enabling technology such as data analytics, blockchain, AI, cloud computing, and real-time, automated processing.

From a context of being a system with holistic and integrative view, a definition could be that an accounting system is a financial and non-financial information management system that supports business operations, risk management, internal controls, data security, corporate governance, and decision-making of executives and key stakeholders, that encompasses key data management activities, i.e., data collection, data entry, data processing and analysis, reporting, data usage, data transfer and communication, data storage and archival, data destruction, and data management monitoring (The Accounting Systematisation Committee (2020-2023) of The Federation of Accounting Professions, 2022).

2.1.2 Strategic Accounting

From past to present, the term is closely associated with management accounting and such characteristics as external and forward-looking focus, risk analysis integration, information aggregation, informed decision-making enablement but there is no common definition and concept specified. Many universities offer it as a separate course under both accounting undergraduate and Master of Business Administration degrees. Areas covered in the course are combination of cost management, planning and budgeting, competitor and customer accounting, strategic planning, and strategic management. Some offered courses also include such topics as mergers and acquisitions, the effects of strategy, technology, and the environment on strategic accounting system design and on planning, control and performance measurement systems, and tools that support successful implementation of organization's strategies. Below provides selected interesting definitions of strategic accounting.

- The provision and analysis of management accounting data about a business and its competition for the use in developing and monitoring the business strategy, particularly relating levels and trends in real costs and prices, volume, market share, cash flow and proportion demanded of a firm total resources (Simmonds, 1981, as cited in Novianty, 2015).
- A method of analyzing financial information about the markets of the enterprise's activity, the structure of costs and tracking the strategy of the enterprise, as well as the strategy of competitors in these markets (Bromwich & Bhimani, 1994, as cited in Rudnicki et al., 2017).
- Strategic accounting goes beyond the internal orientation of traditional management accounting and obtaining information from competitors, determine the relationship between enterprise strategy and application of management accounting, and obtain competitive advantages through the use of methods of reducing costs or increasing the level of differentiation of the enterprise production (Lord, 1996, as cited in Rudnicki et al., 2017).
- A system for providing information for strategic decision making at an enterprise (Innes, 1998, as cited in Rudnicki et al., 2017).
- The process of identifying, gathering, choosing, and analyzing accounting data for helping the management team to make strategic decisions and to assess organizational effectiveness (Hoque, 2003).

- A method of displaying financial and accounting problems of the enterprise. Strategic accounting is a combination of management accounting and financial reporting system focused on strategic decision making (Rudnicki et al., 2017).
- SMA is not a theory or a field, but a term used to describe a collection of techniques, approaches, tools, and applications that are essential in analyzing competitor data and developing relevant workable strategies (Abdullah et al., 2020; Langfield-Smith & Parker, 2008).

Giving due consideration to the above-mentioned studies on the convergence of financial accounting and management accounting and various strategic accounting definitions above, strategic accounting could be defined as part of a whole accounting system which provides approaches, methods, techniques, tools, and applications that are necessary for analyzing competitor, customer, strategic costing, control and performance management data, especially forward-looking data, in various forms and from both internal and external sources for use in developing and monitoring enterprise and business strategies, in supporting strategic, informed decision making, and in assessing organizational effectiveness.

2.1.3 Sustainable Accounting

During recent years, sustainable accounting definition has evolved and become more specific and precise, especially for the sustainability reporting purpose. Selected definitions are listed below.

- Sustainability accounting entails systems, methods, and processes of creating sustainability information for transparency, accountability, and decision-making purposes (Zvezdov & Schaltegger, 2013).
- Accounting for sustainability involves linking sustainability initiatives to company strategy, evaluating risks and opportunities, and providing measurement, accounting, and performance management skills to ensure that sustainability is embedded into the day-to-day operations of the company (AICPA website, 2016, as cited in Pandit, 2016)
- The measurement, management, and reporting of corporate activities that maintain or enhance the ability of the company to create value over the long term and reflects the management of a corporation's environmental and social impacts arising from production of goods and services, as well as its management of the environmental and social capitals necessary to create long-term value. It also includes the impacts that sustainability challenges have on innovation, business models, and corporate governance and vice versa (SASB, 2017)
- The practice of measuring, analyzing, and reporting a company's social and environmental impacts (Keddie, 2021).

From an integrated view, sustainable accounting is a holistic system consisting of people, methods, processes and controls, practices and activities, culture, governance, risk management, sustainability-relevant data and information both financial and non-financial, and enabling technology that are interconnected and interact with each other and with its environment along the system

lifecycle, to ensure transparency and explainability, accountability, human rights, fairness, value, and well-being, robustness and security, and economic decision-making which drives and enables an organization, accounting profession and professionals, and the society to be more sustainable.

2.2 Characteristics of an SSA System

No description of SSA system characteristics was noted from the literature review. In this regard it is necessary to obtain sufficient understanding of the current and future accounting system characteristics before identifying key SSA system characteristics. From a study of current accounting system characteristics, global trends, and business issues, key drivers that will shape the characteristics of future-ready accounting systems include, but not limited to, technology advancement which enables being digital and automation across end-to-end operations in a more collaborated and integrated manner, proactive and innovative regulatory compliance, especially on sustainability, data protection and cybersecurity, workforce skill gaps, and customer value-driven instead of cost-driven to meet customer expectations, strong demands for trust, transparency, fairness and environmental and social governance (IFAC, 1998, as cited in Abdel-Kader et al., 2006, Trinskjær, 2009, Rudnicki et al., 2017, CSIRO, 2022 and WEF, 2024). Table 1 below provides a summary of key characteristics of current and future-ready accounting systems as derived from the analysis and synthesis of what described in the above-mentioned references. The nature and characteristics of the future-ready accounting systems provides a frame of reference to determine the definition, characteristics, and general guiding principles of an SSA system as described in Sections 3.2 and 3.3 of this paper. In addition, the comparison between the two enables us to identify the gaps for improving a current system to become a future-ready system.

Table 1 Key Characteristics of Current and Future-Ready Accounting Systems

Current Accounting Systems	Future-Ready Accounting Systems
Historical with limited forward-looking focus	Historical and forward-looking
Mostly introspective orientation	Introspective and outward looking orientations
Mainly text-based financial data and information	All forms of financial and non-financial data and information
Limited relationship with enterprise purpose and strategy	Alignment and integration with enterprise purpose and strategy
Reactive to changes and new requirements	Proactive and robust to changes and new requirements

Table 1 Key Characteristics of Current and Future-Ready Accounting Systems (Cont.)

Current Accounting Systems	Future-Ready Accounting Systems
Limited integration with other non-financial systems and ecosystem	More holistic, end-to-end integration and collaboration with other non-financial systems and ecosystem
Limited consideration on impact to human and stakeholders	Human-centric and customer experience focus
Mainly focus on reporting and compliance purposes	Focus on strategic, sustainable, and value delivery purposes
Embedded sustainability, privacy, controls, security, trustworthiness only by request	Embedded sustainability, privacy, controls, security, trustworthiness by default and by design
Mainly monolithic architecture for the core accounting system, i.e., an individual application designed as a single, self-contained unit operating on a single server or platform which cannot be broken down into smaller units or applications to achieve seamless integration of all modules providing all the application functionalities	Technology independent and user-friendly system leveraging emerging technologies and innovation such as DevOps and agile approaches, low code or no code methods, collaboration portal or hub, microservices architecture, cloud-based applications, AI, and data analytics at the right cost and acceptable risk
Unintegrated systems and databases for financial accounting and management accounting with application centricity principle	Convergence of financial accounting and management accounting into one whole accounting system supported by a well-integrated data repository under the enterprise’s data management and governance framework, policy, and such principles as data centricity

2.3 Components of an SSA system

There was no description of SSA system components noted from the literature review. In this regard, a study of common components of a system, an accounting system, an information system, an accounting information system, and organizational system was conducted as a starting point for further analysis by taking into consideration an understanding of the SSA definition to identify and propose key components of an SSA system and their relationships.

Traditionally, common components of any system are Input, Process, and Output with sequential and dependent relationships among them. Applying Leavitt’s Diamond model or the People, Process, Technology (PPT) framework which provides a holistic approach to managing change to enhance organizational performance and resilience (Leavitt, H. J., 1962, as cited in Penn, 2021), an organizational system including accounting systems consists of three high-level components, i.e., (1) People, (2) Processes composed of governance, policies, business rules, controls, operations

and risk management methods, practices, and activities and (3) Technology. Integrating the typical system components and the PPT organizational system framework with consideration on increased demands for data quality and security, rapid technology advancements, and significant changes in business and regulatory landscapes, an SSA system needs also account for, at a minimum, People, Process, Technology, Data and Information, and Ecosystem and Environment components that are interconnected and interact with each other to meet the purpose of the system as described in Sections 3.1 and 3.4 of this paper

2.4 Relevant Frameworks and Principles

The section lists frameworks and principles relevant to SSA's key purpose dimensions, i.e., accounting for accounting and reporting purposes, accounting for strategic purposes, and accounting for sustainable purposes, and explores how they could be applied to integrate strategic and sustainable impacts into the accounting system and practice. Listed below are the frameworks and principles internationally accepted among many countries specifically for financial and sustainability reporting purposes.

- The International Accounting Standards Board (IASB) conceptual framework and principles for financial reporting
- The International Accounting Standards Board (IASB) and The International Sustainability Standards Board (ISSB) International Integrated Reporting Framework and Integrated Thinking Principles

In addition, there are other well-recognized frameworks and principles on strategy setting, governance, control system, risk management, and sustainability such as the following which provide complementary guidance for the design of the conceptual framework of an SSA system as well as for its implementation, operations, and application.

- The Committee of Sponsoring Organizations (COSO) Internal Control – Integrated Framework (COSO, 2013)
- The Committee of Sponsoring Organizations (COSO) Enterprise Risk Management - Integrating with Strategy and Performance (COSO, 2017)
- The Committee of Sponsoring Organizations (COSO) Enterprise Risk Management - Applying Enterprise Risk Management to Environmental, Social and Governance-related Risks (COSO, 2018)
- Information Systems Audit and Control Association (ISACA) Control Objectives for Information and Related Technologies (COBIT) 2019 Framework and Guidance (ISACA, 2018)
- The Open Group Architecture Framework (TOGAF) Framework for Enterprise Architecture (TOGAF, 2022a)
- National Institute of Standards and Technology (NIST) Artificial Intelligence Risk Management Framework (AI RMF) (NIST, 2023)

- National Institute of Standards and Technology (NIST) Cybersecurity Framework (CSF) (NIST, 2024)
- The United Nations Sustainable Development Goals (SDGs) Framework (UN, 2023)
- OECD Guiding Principles on Managing for Sustainable Development Results (OECD, 2019a)
- OECD AI Governance Framework and Principles (OECD, 2024 and OECD, 2019b)

3. A Proposed SSA System Conceptual Framework

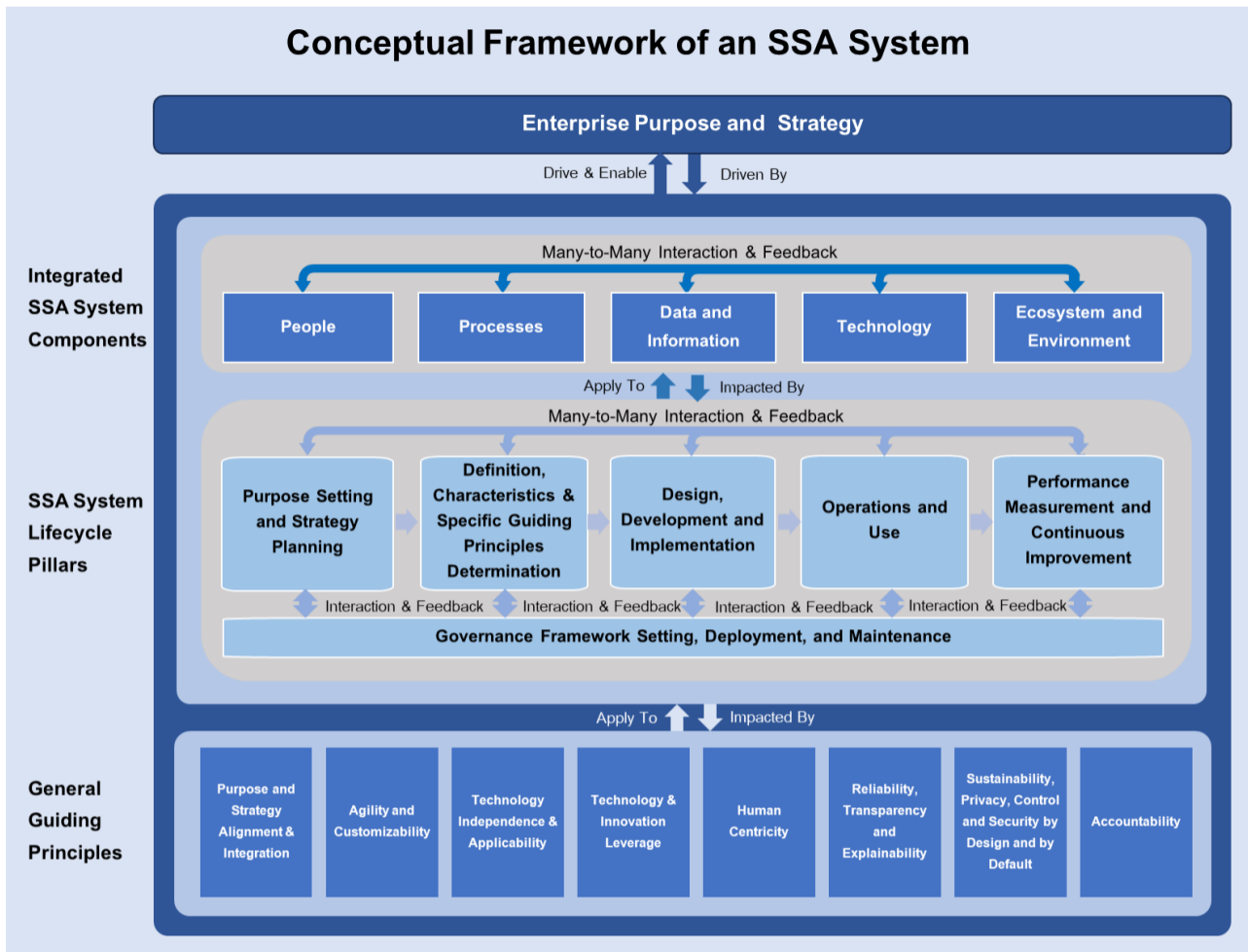
3.1 Defining the SSA System Conceptual Framework

The following principles guide the development of the SSA system conceptual framework described in this paper:

1. A conceptual SSA system framework should be based on a holistic, transdisciplinary, integrative, and comprehensive model describing core system components and lifecycle together with the relationships among them and general guiding principles.
2. A conceptual SSA system framework should be scalable and generic for all sizes and sectors but specific enough to guide the design, development, implementation, operations, and use of an SSA system to support and drive enterprise purpose and strategy.
3. A conceptual SSA system framework should be robust and resilient to respond to emerging technologies, innovations, new threats, and new opportunities.
4. A conceptual SSA system framework should align with leading concepts and approaches, e.g., value creating, preserving, and realizing at an acceptable risk and optimized cost, materiality of issues to stakeholders and financial performance, sustainability, trustworthiness, positive design approach and with regulations and leading standards and practices.

Below depicts the conceptual framework of an SSA system as the outcome from applying the above principles. The framework is structured into three domains, i.e., integrated SSA system components, SSA system lifecycle pillars, and general guiding principles. The framework also specifies integrated relationships between enterprise purpose and strategy and the whole SSA system, those among system domains, and those among elements within each domain.

This framework does not provide specific guiding principles for the whole SSA system, its components and its system lifecycle pillars because they need to be determined in alignment with enterprise and system purposes and strategy, business context, people context, enterprise and system ecosystem and environment. In addition, there are leading frameworks and principles that can be referred to such as Agile Manifesto Principles founded by the Snowbird 17 Team, COBIT 2019 framework and design and implementation guides, TOGAF Architecture principles, COSO internal control and enterprise risk management frameworks and principles, ISO standards, EU General Data Protection principles, SASB Conceptual Framework, IASB & ISSB IR Framework & Integrated Thinking Principles, UN SDGs, OECD Guiding Principles on Managing for SD Results. Specific guiding principles include those variation from the general guiding principles, e.g., applications and data are independent



from any specific technology choices except for the need to comply with laws and regulations, all routine transactions are automated except for social and security purposes and special focus areas e.g., AI, open-source software, and open data must not be used without an approval from business, legal, and risk management executives, and remote and agile working is allowed only when there is no threats to security and customer experience.

Implication and sample application of the framework principles on the data and information component is presented in Table 2 below.

Table 2 Implication and Sample Application of the Framework Principles

Framework Principles	Implication and Sample Application on the Data and Information Component
<p>Based on a holistic, transdisciplinary, integrative, and comprehensive model</p>	<ul style="list-style-type: none"> • From a holistic and integrative perspective, the SSA system incorporates data and information as a separate but integrated component. The enterprise and system purposes and strategies and the general guiding principles drive the management, governance, and general guiding principles of the data and information component, and vice versa to the extent that data and information component may trigger a change of the enterprise’s purpose and strategy, e.g., a change of business model and/or operating model while a change of the enterprise’s purpose and strategy may require a change to the SSA system purpose and strategy which may impact the management and governance of the data and information component. • The component has interconnected, integrated, and interacting relationships with other SSA system components to enable an SSA system to meet its purpose in alignment with the enterprise purpose and strategy. • The component is managed and governed throughout its lifecycle, i.e., capture or creation, processing, storage, use, sharing, archival, and destruction, as part of the SSA system lifecycle. • The interconnected and integrative relationships among domains and components allow data and information of the system to come from various sources such as those generated by other system components and those existing in the ecosystem and environment, those transferred and used within the end-to-end processes and flowing across functions using innovations and such technologies as APIs, data integration platforms and cloud-based solutions. The application of transdisciplinary approach in a comprehensive manner provides a means to achieve this because the approach engages specialists and stakeholders with various backgrounds, experiences, knowledge, skills and expertise to work collaboratively throughout the system and data and information lifecycles from purpose setting and strategy planning to performance measurement and continuous improvement without placing emphasis or adhering to a specific discipline or contribution from a specific team member to develop and implement new and holistic solutions instead of piecemeal or siloed solutions.

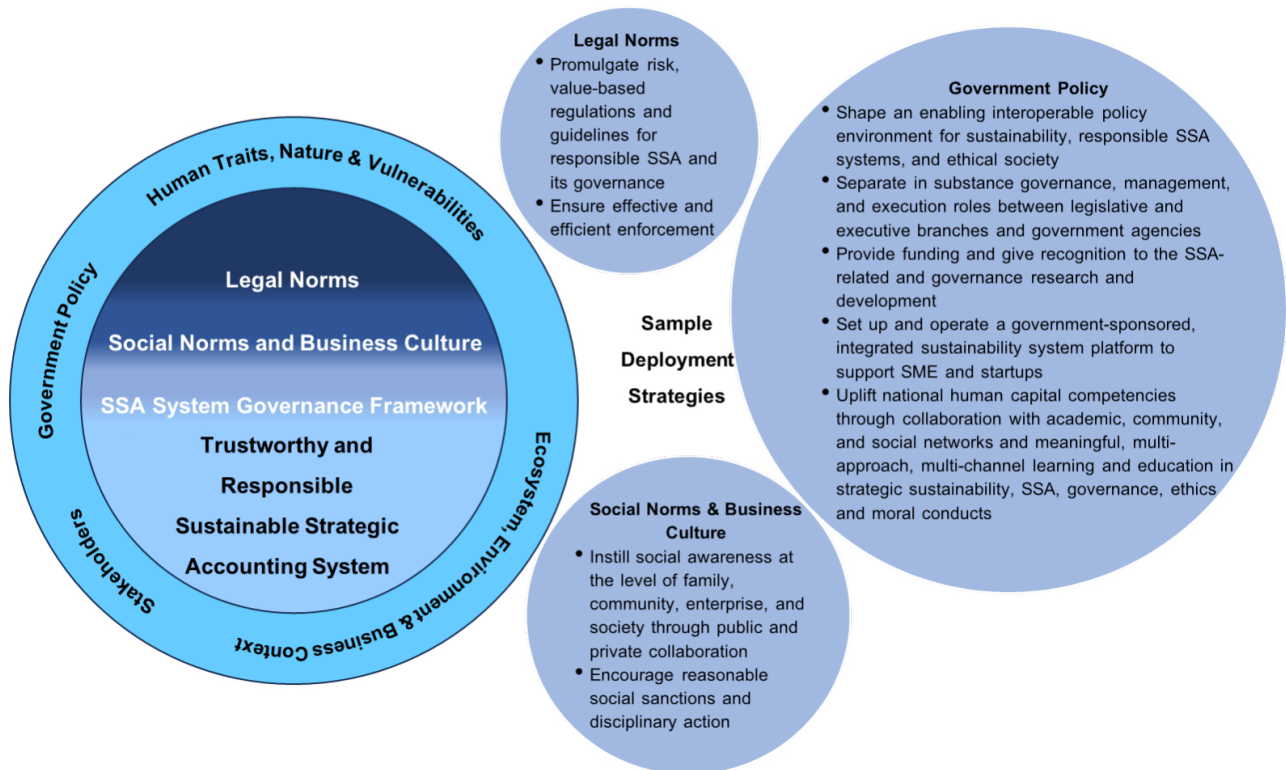
Table 2 Implication and Sample Application of the Framework Principles (Cont.)

Framework Principles	Implication and Sample Application on the Data and Information Component
Scalable and generic but specific enough to guide the design, development, implementation, operations, and use of an SSA system to support and drive enterprise purpose and strategy	<ul style="list-style-type: none"> The principle-based approach of the framework in the form of general guiding principles allows an enterprise to tailor scope, characteristics, management and governance of data and information of the SSA system in accordance with the specified enterprise purpose and strategy.
Robust and resilient to respond to emerging technologies, innovations, new threats, and new opportunities	<ul style="list-style-type: none"> The interaction among system domains, system components, and system lifecycle pillars in the form of many-to-many relationships also contains feedback pertaining to expectation and performance gaps, emerging technologies, innovations, new threats, and new opportunities. This input plays a critical role in prompting needed responses which enables the robustness and resilience of the system.
Align with leading concepts and approaches and with regulations and leading standards and practices	<ul style="list-style-type: none"> The system effectively and efficiently manages, processes, and analyzes data and information in alignment with leading concepts and approaches and with regulations and leading standards and practices specified as general guiding principles such as purpose and strategy alignment, data centricity, human-centricity, to provide valuable, trustworthy, and easily accessible insights to support strategic and operational decision-making and prevent harms to other interconnected system components and stakeholders and negative environmental, social, economic, and legal impact.

Another implication and sample application of the framework principles is on the governance framework setting, deployment, and maintenance pillar of the SSA system lifecycle. According to a holistic and integrative approach, the system lifecycle pillars are processes embedded within the SSA system to govern and manage each system component consistently with the general guiding principles and obtain feedback from each other and from each component to enable the system to meet both its purpose and consequently the enterprise purpose. The SSA system governance framework provides structure, principles, processes, rules, and guidelines for directing and overseeing the SSA system and its components along their lifecycles in alignment with leading concepts, approaches, standards, and practices and regulations and taking into consideration the input and feedback from each system component and each governance and management process within the system lifecycle. Generally, governance includes ethics and moral conducts, risk management, and compliance and embrace such principles as diversity, equitability, inclusiveness, accountability, integrity and

transparency, responsiveness, effectiveness and efficiency, and regulatory compliance. It is applied for various contexts ranging from an enterprise level to an area of focus level, e.g., board, system, process, technology, information, data, and security. Considering the people component and the ecosystem and environment component of the system to support and enhance the system governance effectiveness and efficiency, designing and setting an SSA system governance framework requires to account for not only human factors, stakeholders, SSA system ecosystem, system environment, and business context and culture, but also external-driven factors such as legal norms, social norms, and government policy that promote and make happen ethical and moral conducts and sustainability awareness, adoption, and engagement at the ground root of society, i.e., every people throughout the human lifecycle as presented below. Unfavorable external factors can have tremendous impact on the SSA system governance framework setting and deployment of each enterprise to the extent that more extensive, intensive, and comprehensive set of policies and measures in line with the defined SSA system purposes, definition, and characteristics and with the laws and regulations is required to close the governance issues and gaps. Favorable external factors, on the other hand, can reduce resource utilization and enhance people’s well-being and safety which directly helps fulfilling the sustainability goals at both national and organizational levels.

Implication and Sample Application of Framework Principles to the Governance Framework Element of the SSA System Lifecycle Pillars



3.2 Purpose, Definition, and Characteristics of an SSA System

From the study and analysis of SSA-related definitions, SSA could be defined as a practice with an underlying system consisting of its interconnected and interacting components, processes, and principles holistically and integratively designed to serve financial, strategic, and sustainable accounting and reporting purposes as well as to drive and enable strategic direction, decision-making, and aligned actions to ensure sustainable enterprise growth and performance without jeopardizing people and our planet.

In the context of the proposed conceptual framework, an SSA system is accordingly defined as an accounting system consisting of holistic, interconnected components which integratively interact with each other throughout the system and their lifecycles, from purpose setting and strategy planning and alignment, definition and characteristics determination, design, development, and implementation, operations and use to performance assessment and continuous improvement, and a set of general guiding principles to serve financial, strategic, and sustainable accounting and reporting purposes as well as to drive and enable enterprise purpose and strategic direction, decision-making, and aligned actions to ensure sustainable enterprise growth and performance without jeopardizing people and our planet. The purpose and characteristics of an SSA system needs to be scaled and tailored in accordance with the purpose and strategy of each enterprise as well as other drivers such as technology advancements, innovations, business and regulatory landscapes, emerging threats and opportunities, economic and global issues, and human and social factors. Generally, the SSA system should possess the characteristics of future-ready accounting systems as mentioned in Section 2.2 except for those irrelevant to the system's purpose and unjustified in terms of benefits, risk, and cost.

3.3 General Guiding Principles of an SSA System

The objective of these principles is to guide the design, development, implementation, operations, and use of an SSA system to enable the SSA system to function and operate in an integrated, reliable, and responsible manner. They are derived from aggregating, analyzing, and synthesizing the future-led accounting system characteristics, accounting and technology trends, and leading concepts and principles in sustainability, integrated reporting, internal control system, enterprise risk management, information and technology governance, enterprise architecture, cybersecurity, and trustworthy and responsible AI system. They apply to both SSA system components and SSA system lifecycle pillars. The following presents these principles.

1. Purpose and Strategy Alignment and Integration emphasizes the alignment of the SSA system purpose and strategy with the enterprise purpose and strategy as well as relevant cross-functional and cross-system purposes and strategies and the integration of the SSA system to drive and enable the enterprise purpose setting and strategic planning.

2. Agility and Customizability addresses the agility and customizability of the SSA system to suit enterprise needs and timely respond to both expected and unplanned changes and high-impact incidents.

3. Technology Independence and Applicability means the SSA system is independent of any specific technology solutions and the organization can select the most appropriate, applicable, and suitable technology to its short and long terms needs and requirements.

4. Technology and Innovation Leverage requires the SSA system to leverage technology and innovation such as artificial intelligence, robotic process automation, data centrality, data analytics, cloud computing, internet of things, mobile technology, and cybersecurity to drive and enable value creating, preserving, and realizing at an acceptable risk and optimized cost.

5. Human Centricity requires the design, development, implementation, operations, and use of the SSA system to foster human value, growth, well-being, and positive experience such as inclusiveness of stakeholders, fair and unbiased business rules employed by the system, ease of use and understand, and adequate protection of personal data.

6. Reliability, Transparency and Explainability means the SSA system performs its functions without failure and the data and information within the system and those provided to its users are fit for purpose and meet such quality criteria as valid, accurate, complete, relevant, unbiased, current, consistent, secured, transparent, and timely available and the system's goals, principles, practices, and outcomes are transparent and explainable.

7. Sustainability, Privacy, Control and Security by Design and by Default means sustainability, privacy, control and security requirements are considered from the design phase and embedded into the system accordingly without additional configuration or modification needed afterwards to ensure that the SSA system will operate within defined risk appetite even when there are such incidents as human errors, infrastructure or system failures, cybercrimes, and attacks.

8. Accountability requires clear division of roles and responsibilities of actions, decisions, and outcomes and demonstration that the organization has put in place appropriate technical and organizational measures and business culture to ensure the trustworthiness, transparency, and effectiveness of the system and of what the organization has done when questioned.

3.4 Integrated Components of an SSA System

The proposed framework includes five integrated components as described below.

People	Individuals and groups that interact with or are impacted by an SSA system throughout the system lifecycle such as system developers, system analysts, system operators, system integrators, data administrators, users, and impacted stakeholder and represent a key driver for human-centric and trustworthiness of an SSA system.
Processes	Activities or actions including control activities taken by applying tools, methods, processing logics, accounting and business rules, model, and algorithms to transform the input into a desired outcome or result which support the achievement of the system and enterprise purposes at an acceptable risk and optimized cost.
Data and Information	Data and information that exist throughout the system lifecycle, their sources, structure and format, and properties along their lifecycle. This component and associated governance and management to ensure its availability, confidentiality, integrity, and quality are critical to the success of high priority corporate agenda such as personal data protection compliance, data analytics for informed decision-making, sustainability reporting, strategic, value-driven sustainability program.
Technology	IT Infrastructure, middleware, workstations, user devices, applications, and other digital tools and technologies providing services to the SSA system and/or utilized by its actors and users.
Ecosystem and Environment	Ecosystem and environment of an SSA system. Ecosystem describes the connection and interdependence between the SSA system and other application systems and platforms and between the SSA system to devices, processes, practices, and people regardless of organizational boundary on the principle that an application system does not exist and function as a self-reliant unit but as part of an ecosystem that directly or indirectly supports each other to achieve their objectives. Environment, on the other hand, consists of the circumstances, objects, or conditions surrounding an SSA system and its ecosystem, e.g., business context and culture, enterprise's business, application, data, and technology architectures, legal and social landscapes, and technology trends.

3.5 SSA System Lifecycle Pillars

The SSA system lifecycle is structured along six key pillars by applying the traditional system lifecycle, iterative process model, business process management lifecycle, and COSO ERM framework. Each pillar represents a process and activities to embed strategic and sustainability facets into the accounting processes.

Purpose Setting and Strategy Planning	Setting the SSA system’s purpose and strategy and identifying its goals and objectives in alignment with the enterprise purpose and strategy.
Definition, Characteristics, and Specific Guiding Principles Determination	Determining the SSA system’s definition, characteristics, and specific guiding principles, if any, by considering global, business, and accounting trends, accounting system trends and issues, general guiding principles and relevant drivers to satisfy the SSA system’s purpose, goals, and objectives.
Design, Development, and Implementation	Designing, developing, and implementing the SSA system in accordance with the specified definition, characteristics, and general and specific guiding principles to ensure that the system is trustworthy and responsible such as adopting agile methodology and design thinking approaches to better address human centricity, transparency, and agility.
Operations and Use	Operating and using the SSA system in alignment with general and specific guiding principles such as granting access only on a need-to-know, need-to-use basis, timely monitoring adherence to the established policies and standards, clear user roles responsibilities on security, and effective administrator and user training. The operations of the SSA system include system management, monitoring, and maintenance to enable it to execute its functions and provide accounting-related services for utilizing by intended users in a governed manner through interoperability among system components and integrated processes in accordance with the general and specific guiding principles.
Performance Measurement and Continuous Improvement	Measuring the SSA system performance and continuously improving the system consistently with general and specific guiding principles to ensure that the system could continuingly meet its purpose, e.g., automated mechanism implemented to timely capture, analyze, and respond to feedback from each system component and system life cycle processes.

Governance Framework Setting, Deployment, and Maintenance	Setting, deploying, and maintaining governance framework of the SSA system to direct and govern each SSA system management pillars of the system lifecycle to ensure adherence to general and specific guiding principles and associated policies, standards, and regulations. The governance framework should be consistent with the enterprise governance and includes not only enterprise and system context, but also process, technology, information, data, security, and others as considered critical for the organization so the system meets enterprise and its purposes.
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4. Implications for Future Research and Application

IFAC's conception of the evolution of management accounting describes four stages of the management accounting evolution, i.e., Stage 1 – cost determination and financial control (pre 1950), Stage 2 – information for management planning and control (by 1965), State 3 – reduction of resource waste in business processes (by 1985) and State 4 – creation of value through effective resources use (by 1995) driven by uncertainty of business environment, global competition, and technology advancement (IFAC, 1998, as cited in Abdel-Kader et al., 2006). These stages are not mutually exclusive to the extent that each successive stage encompasses the concepts of the previous stage and incorporates additional ones in accordance with a new set of conditions (Abdel-Kader et al., 2006). The framework is still applicable for understanding management accounting evolution and guiding the future development of the accounting practice on the condition that the enterprise's accounting system should be evolved and viewed in a more holistic and integrated manner and become an SSA system, instead of islands of accounting systems. Furthermore, the enterprise's accounting system is one critical factor affecting the application of sustainable accounting, and an essential information tool for sustainable development in enterprises (Nguyen et al., 2022).

SSA is such a new practice and thus there are a lot of opportunities for further research and study. The proposed framework could assist practitioners and educators in treading the complexities of integrating strategic and sustainable contexts into accounting, in applying transdisciplinary concepts, frameworks, leading practices, and regulations in the design, development, implementation, operations and use of an enterprise's SSA system, and in preparing current and future accountants for competencies required to cope with a strategic-driven, sustainability-conscious business environment. Below presents a list of potential research and application study topics relevant to the SSA System Conceptual Framework.

- Validity and practicality assessment of the proposed SSA System Conceptual Framework
- Effectiveness of the proposed SSA System Conceptual Framework to enhance decision-making and corporate reporting
- Strategy, approach and methodology to integrate SSA and the proposed SSA System Conceptual Framework into the accounting curriculum

- Guidance to implement the proposed SSA System Conceptual Framework
- Approach and methodology to define specific guiding principles of an SSA system
- Effects of external-driven factors on the adoption and use of an integrated SSA system

5. Conclusion

Sustainable strategic accounting is a rapidly evolving field that addresses how environmental, social, and governance (ESG) and strategic considerations can be integrated into traditional accounting practices. The proposed conceptual framework and principles for an SSA system represent a step forward to integrate sustainability and strategy management within accounting, gain a common understanding of an SSA system, how to embed governance into the design, development, implementation, operations and use of an SSA system to come up with a trustworthy and responsible SSA system. By adhering to the principles, organizations can better align their accounting practices with the enterprise and sustainable development goals. Through an integrative conceptual model, an SSA system plays a crucial role in supporting organizations towards more responsible and long-term strategies that are not only matter to enterprise's profitability, but also beneficial to society and the environment.

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