CASC ACCS

CASC Research Task Force

An External Scan of Informal Science Learning Sector, its Focus Areas and Measurement[1]

CANADIAN ASSOCIATION OF SCIENCE CENTRES
ASSOCIATION CANADIENNE DES CENTRES DE SCIENCES

1 This external report is based on ideas developed by Dr. Julia Lalande, with research and writing conducted by Averyl Bender. For constructive feedback, we thank Dr. Chantal Barriault, Katrina Pisani, and Dr. Marianne Mader.

1. Introduction

The CASC Research Task Force was established in 2025 to evaluate and highlight the social and economic contributions of the informal STEM learning (ISL) sector. Its overarching goal is to leverage collective impact to strengthen the ISL ecosystem and build a more compelling case for funding and long-term resiliency. Collective impact is an approach where organizations commit to a common agenda, shared measurements, and mutually beneficial activities, all with the support of a backbone organization that facilitates continuous communication[2]. As a National Association, the Canadian Association of Science Centres (CASC) can serve as such a backbone support and facilitator. Central to this work is a shift away from a scarcity mindset, which often focuses on competing for limited resources, towards an abundance mindset that emphasizes shared access, stability, and network strength. Through sector-wide participation and knowledge sharing, this collaboration aims to shape the future of the ISL sector in Canada and reinforce its value in Canadian society.

During its initial research stage, the task force is focused on defining key foundational elements to guide its objectives and future initiatives. As part of its early work, the task force conducted an external scan of publicly available information from CASC members, including an analysis of existing vision, mission, and values statements as well as key performance indicators (KPIs) in public reporting. The purpose of this preliminary report is to determine whether CASC members share common values, definitions, and measurements to identify synergies within the network, but also to shed light on any gaps that might be uncovered. We aim to explore whether themes could serve as a framework for alignment and assess if the network is collectively focused on future development. The results presented below are based on publicly available data and reports from CASC members. In the future, we hope to deepen this research by incorporating internal insights from CASC members through tools such as surveys, interviews or focus groups.

2. Background

Research on the ISL ecosystem within Canada is limited. After conducting a review of the existing literature and studies, we found that none examine the common values, definitions or measurement practices in Canada. As such, there is a clear gap within the literature, which highlights the need for CASC members and the Canadian ISL sector to work on shared goals and frameworks.

2 Tamarack Institute. *Tamarack's Collective Impact Toolkit* [Internet]. 2025 [cited 2025 Dec 24]. Available from: https://www.tamarackcommunity.ca/collective-impact-toolkit

Previous research on museum impact indicators has found no shortage of data, but a shortage of a shared framework. *Measuring Museum Impact and Performance: Theory and Practice* written by John W. Jacobsen summarizes this as "the field needs to adopt a shared framework and language because we still lack an accepted way to measure our impact."[3] This book and its accompanying list of indicators served as the basis for an initial analysis of all the potential indicators available to the sector. Building on this work, the CASC Taskforce Chair Dr. Julia Lalande, in collaboration with colleagues Dr. Ryan Auster, Ashley Larose, Constance Scarlett, Mikko Myllykoski and others[4], created a set of five KPI areas to help guide conversations about KPIs use at three international conferences.

Table 1. Five KPI Areas

Operational Efficiency	The ability of an organization to deliver products and services in a cost-effective manner while maintaining high quality.
Financial Health	The overall stability and well-being of an organizational financial situation and the ability to handle unexpected financial challenges.
Visitor Engagement	The level of interaction that visitors have with an exhibit, app or program and the level of satisfaction that visitors feel.
Social Impact	The effect that a museum or science centre has on the well-being of its surrounding community and society at large, including community, environment, and economy.
STEM Equity	Fair and inclusive access to STEM learning and engagement regardless of background, gender, race, and SES.

In the exploratory stage of the Taskforce, the teams presented the five KPI areas and a list of 40 related indicators at three major conferences: the European Association of Science Centres and Museums (ECSITE) Conference in Warsaw (June 2025), the Annual Canadian Association of Science Centres (CASC) Conference in St. John's (June 2025), and the Association of Science and Technology Centers (ASTC) Annual Conference in San Francisco (September 2025). The sessions were held as WorldCafe-style discussions that engaged audiences in important questions: How do we measure our progress in our own organizations? Are there areas where we would like to dive deeper? What are some of the barriers to measuring progress within organizations? Through discussions and polling questions, the sessions helped validate the five categories and where participants saw an opportunity to focus.

3 Jacobsen JW. *Measuring Museum Impact and Performance: Theory and Practice*. Lanham (MD): Rowman & Littlefield (imprint of Bloomsbury); 2016.

4 All contributors: Agnes Bertocci-Ruiz, Ashley Larose, Constance Scarlett, Debbie Donohue, Heather Fanworth, Hélène Wang, Dr. Julia Lalande, Mikko Myllykoski, Pauline Dolovich, Rose Hendricks, & Dr. Ryan Auster.

Figure 1. Percentage Distribution of Votes Across Organizations

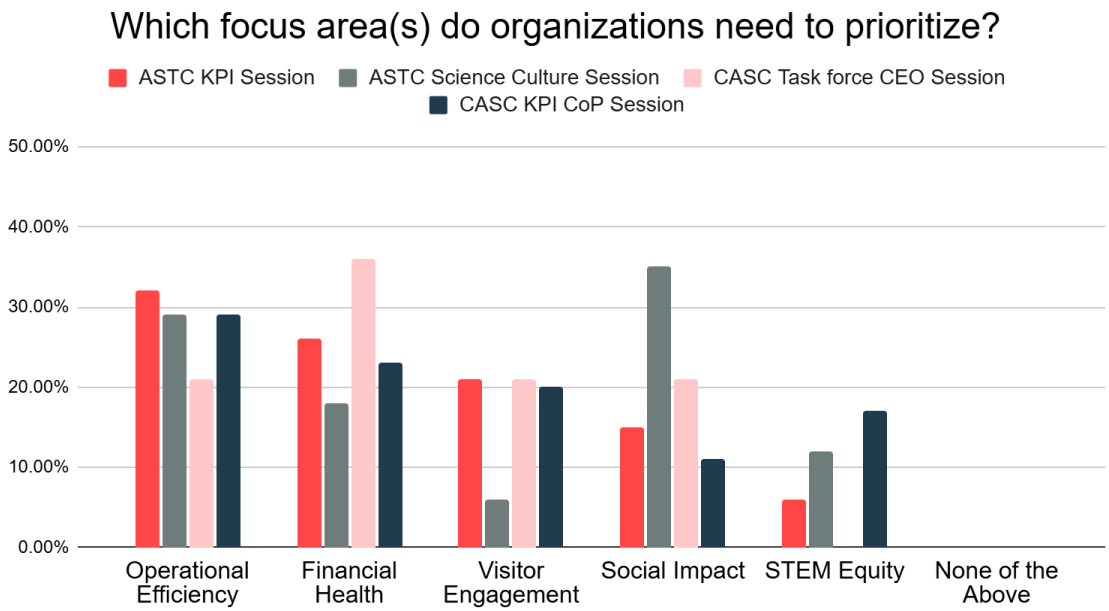


Figure 2. KPI Areas (Cumulative) Organizations

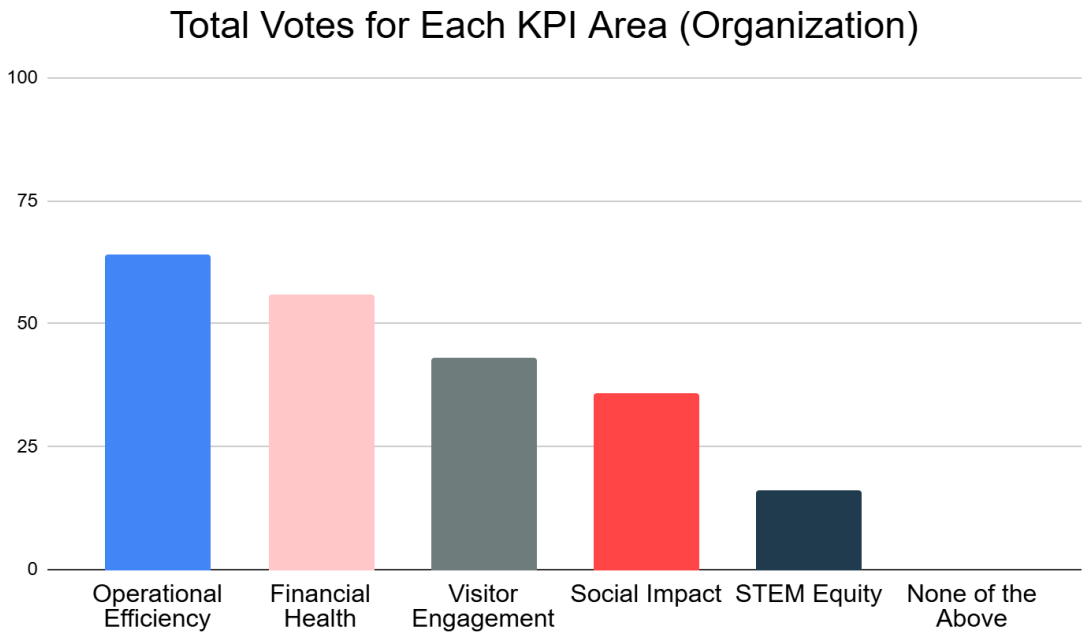


Figure 3. Percentage Distribution of Votes Across Networks

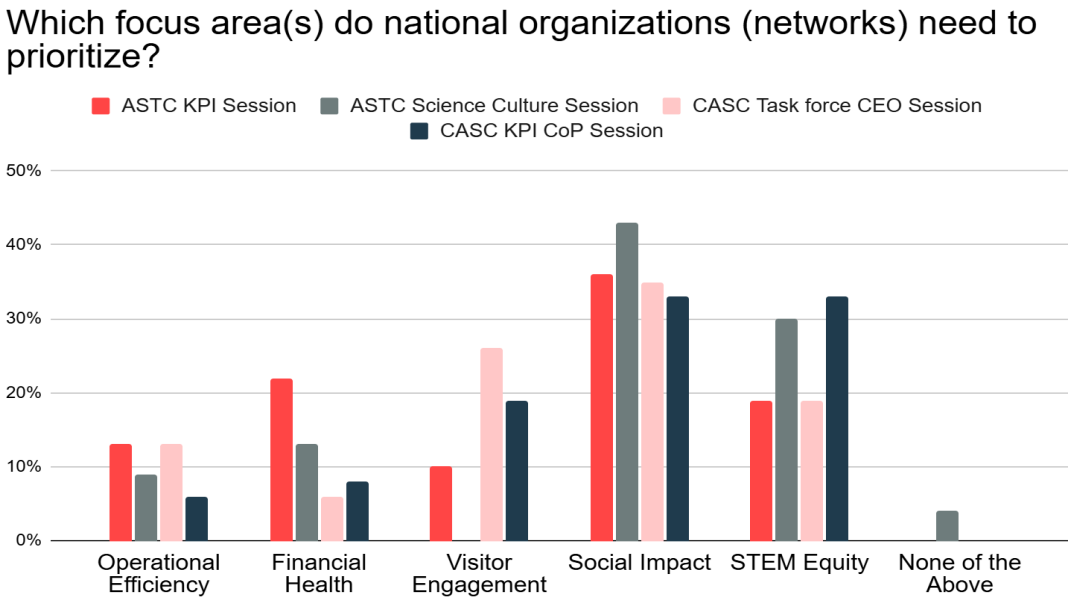
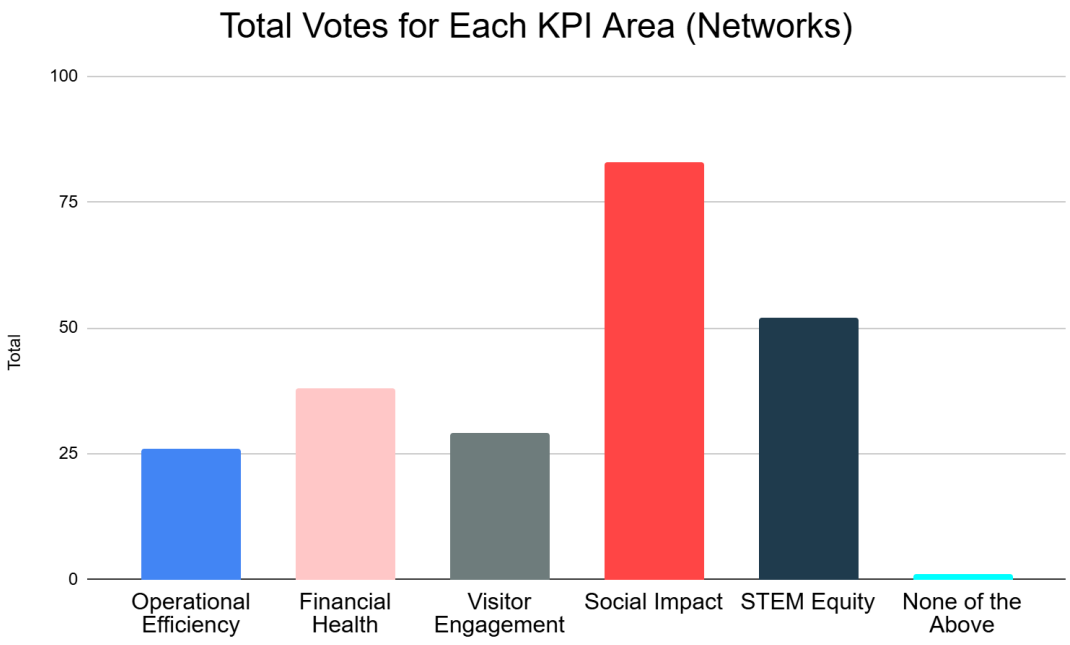


Figure 4. KPI Areas (Cumulative) Networks



The feedback from these sessions aligned with our initial assumptions: participants felt that their individual organizations should focus their efforts on tracking and improving Operational Efficiency and Financial Health, where the networks (such as CASC or ASTC) should prioritize measuring and communicating Social Impact or STEM equity. This stresses the timeliness of the creation of the Research Taskforce - a national effort to align Information STEM Learning organizations around a common goal: to better measure and communicate the impact that we have - and want to have - on Canadians across the country.

3. Research Questions & Objectives

The following broad research question has guided the development of this report:

- What does the network publicly report as the impact of the ISL sector?

More specific sub-questions include:

- To what extent do CASC members' vision, mission, and values overlap?
    - Is there a shared understanding of the intended impact?
- Which KPI areas are most reported by CASC members?
- Which KPIs show promise to shed light on previously underreported areas? Where are the gaps that could be filled through work that goes beyond KPIs?

4. Methods

All 43 CASC members listed as STEM Engagement Organizations (excluding industry members) were included in this research. Vision, mission, and values statements were collected from members' annual reports or, when absent, retrieved from their official websites. These statements were then compiled into a centralized document which serves as a repository for information on vision, mission, values, KPIs, and strategic plans.

After gathering all available vision, mission, and values statements, they were transferred to a separate document for documentation and analysis. The statements were cleaned and standardized (e.g. removing filler words and consolidating similar words such as 'creative' and 'creativity') and word clouds were generated using Microsoft CoPilot to help visualize content analysis by counting word frequency. To ensure robustness, thematic coding was also conducted manually by grouping similar statements to identify common themes omitted in the content analysis.

The annual reports of CASC members were also reviewed to extract all KPIs into a summary document. 25 CASC members had annual/impact reports that included KPI data. Using trend analysis on this sample, any KPI appearing more than six times was flagged as an industry-leading KPI [5]. Unique KPIs reported by some

5 Mason J. Mixing methods in a qualitative driven way. Qual Quant [Internet]. 2015;49(6): 1–14. Available from: https://www.tandfonline.com/doi/full/10.1080/13645579.2015.1005453

members, particularly in more data-scarce areas such as Social Impact or STEM Equity, were highlighted for potential future usage. KPIs were also mapped against ASTC Annual Statistical Survey questions to see if there is commonality between the KPIs CASC members measure and those reported by ASTC. Recognizing that not all indicators would appear in annual or impact reports, the websites of members were also reviewed for additional program information. The overlap between the ASTC survey prompts and the identified KPIs was documented.

ASTC also uses performance ratios, such as onsite visits per square footage or earned revenue per onsite visit. These metrics can be useful for a diverse field like ours, where some CASC members welcome more than 200,000 visitors annually, and others operate on a significantly smaller scale. However, prior to endorsing these ratios as useful benchmarks, they need to be carefully considered. For instance, a large science centre located in a remote area may attract fewer visitors due to a smaller population size, yet its performance relative to its regional context is still quite strong. This can be integrated into an upcoming benchmarking discussion with different institutions.

During the review of annual reports, several funding sources were identified. These funders and their programs were researched with the goal of (a) understanding what funders expect from ISL organizations, and (b) acting as a 'funders bank' to help CASC members identify potential funding opportunities for a future project or program. A deeper analysis and more research on this topic will be part of the second phase of this project.

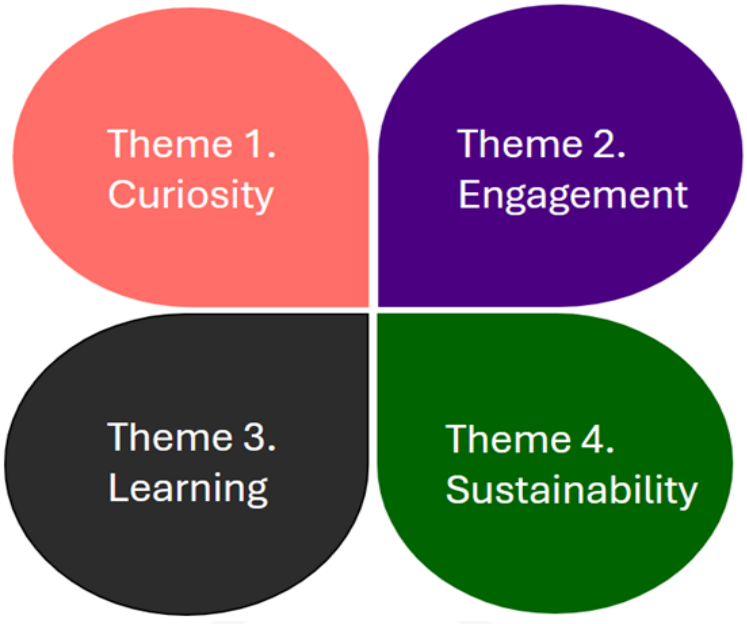
5. Results

5.1 Vision

Content analysis of the vision statements of CASC members found that the most common words were curious (6), inspire (6), and engage (5). The word cloud also shares similarities to the suggested themes from the thematic coding:

Figure 5. Word Cloud of Vision Statements

Figure 6. Themes of Vision Statements



Curiosity is the driving force that sparks exploration and innovation—the desire to discover, be in awe of science and ignite inspiration from wonder. Examples of this theme include:

- *To create a world of possibilities by igniting lifelong curiosity through science*[6].
- *To awaken scientific curiosity related to the earth sciences*[7].

Engagement emphasizes building meaningful connections and partnerships with diverse and local communities, creating a welcoming and inclusive space. Examples of this theme include:

- *A landmark site to congregate, create, and strengthen links between diverse communities in the region, an active presence in the community that supports the local economy, spurs partnerships, and regenerates tourism*[8].
- *We are the trusted hub of science engagement for all, pushing boundaries and igniting curiosity*[9].

Learning focuses on knowledge mobilization through evidence-based approaches, fostering critical-thinking, strengthening STEM literacy, and broadening perspectives. Examples of this theme include:

- *The London Children's Museum curates powerful play experiences... advocating for unique perspectives and ways of learning*[10].
- *To shape Manitoba's future by expanding knowledge, sharing stories, and encouraging discovery*[11].

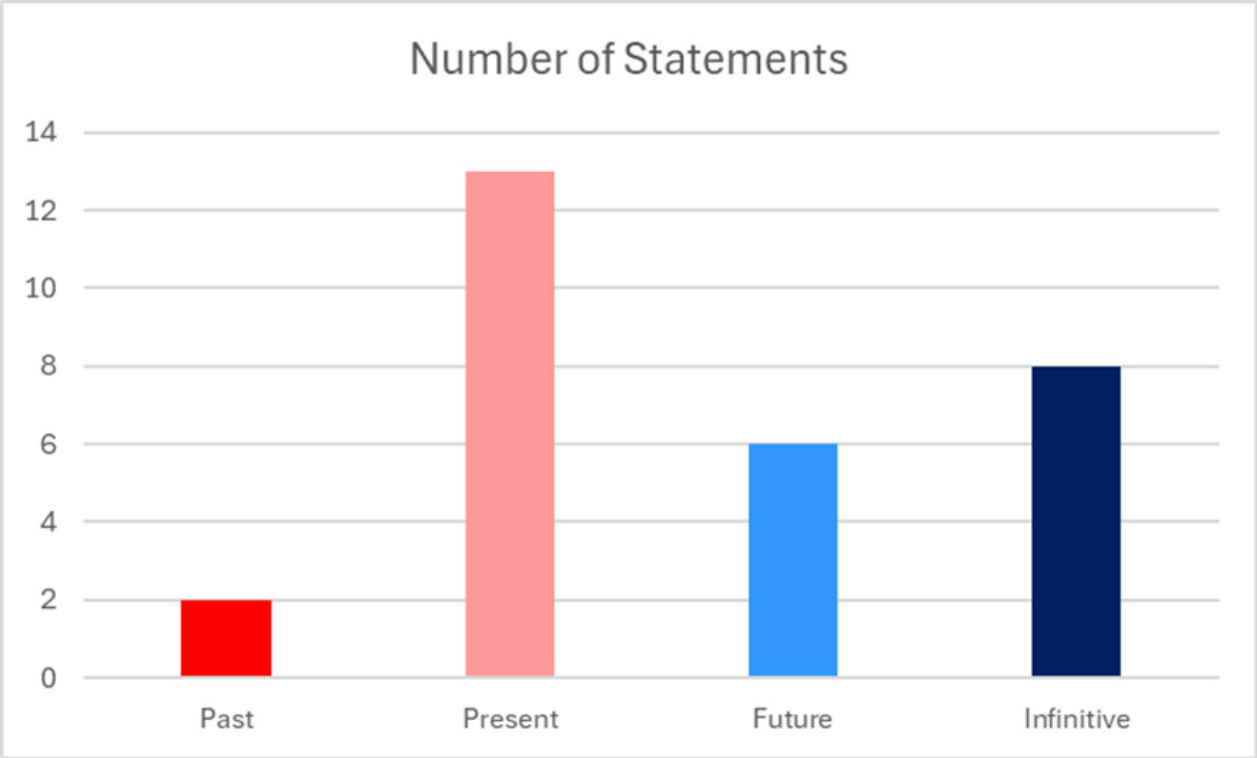
Sustainability centres on protecting and appreciating the environment, ensuring responsible resource use for long-term ecological health. Examples of this theme include:

- *Promote the protection and responsible use of water*[12].
- *A world where wildlife and wild spaces thrive*[13].

6 Science North
7 Minéro – Musée de Thetford | KB3
8 Rossland Museum & Discovery Centre
9 TELUS World of Science
10 London Children's Museum
11 Manitoba Museum
12 Centre d'interprétation de l'eau de Laval
13 Toronto Zoo

The tense of vision statements was analyzed to determine whether ISL organizations emphasize the future or the present. Nearly half of all statements - 44% - are written in the present tense. This trend suggests the sector prioritizes current contexts over envisioning an aspirational future science culture in Canada.

Figure 7. Bar Graph of Vision Statement Tenses

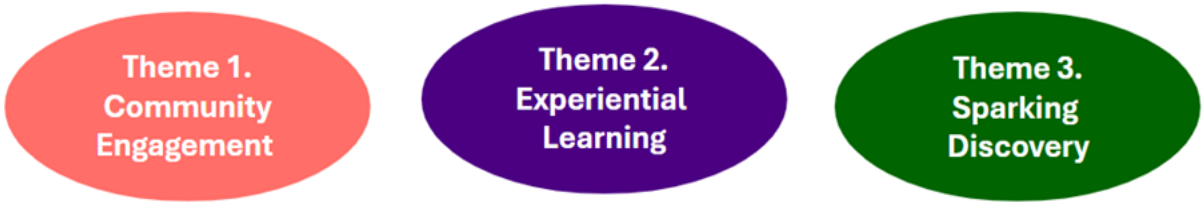


5.2 Mission

Mission statements had a greater diversity of words used when compared to vision statements. This could be explained as organizations have different ideas of what actions can be taken to achieve their vision. The most common words used were inspiration (13), community (11), discovery (8), and learning (7). These recurring concepts informed the development of the themes presented below, which represent an amalgamation of the statements analyzed.

Figure 8. Word Cloud of Mission Statements

Figure 9. Themes of Mission Statements



Community engagement is about creating a vibrant and inclusive network that connects and empowers diverse voices to strengthen relationships and create a sense of belonging. This theme emphasizes relationships to bring communities together.

- *To bring together the many voices and stories of the Fraser, to discover, celebrate, and inspire passionate stewards of the river*[14].

Experiential learning emphasizes the continuous pursuit of knowledge beyond formal education through accessible and engaging experiences, reinforcing STEM learning as a lifelong journey, and thereby overlapping with the vision statement category.

- *We deliver interactive science experiences and champion science education as we engage people of all ages*[15].

Sparking discovery reflects creating spaces that spark a desire to explore, play, and discover. This aims to turn passive interest into active engagement.

- *Ingenium is a catalyst for unlocking the curious and creative minds of a nation of innovators*[16].

There are notable differences between vision and mission statements, alongside some important similarities. As outlined in the definitions (see Appendix), vision sets the destination, where the mission creates a road map. This is true in our analysis, vision statements focused on future-oriented language with common words like curious and inspire. However, there were fewer words in the vision statements and fewer vision statements in general, leading to a lower ‘n’ (i.e. curious came up six times). In contrast, mission statements used a more diverse vocabulary, more words in general and were often action-focused. Both visions and missions share broad conceptual themes, but the framing is different: vision statements present them as overarching ideals, where mission statements attempt to translate them into actionable strategies.

14 Fraser River Discovery Centre
15 Big Little Science Centre
16 Ingenium

5.3 Values

Values demonstrated strong alignment with vision and mission statements, emphasizing sustainability (7), curiosity (7), and collaboration (7). A notable distinction was the prominence of DEI (14), and accessibility (5). As values help define what makes organizations unique, the focus on inclusivity is expected. No thematic analysis was conducted on value statements because they often were composed of singular words, rather than complete sentences.

Figure 10. Word Cloud of Values

While there are significant connections between the vision, mission, and values (an engaged, curious, accessible, and sustainable world) of the analyzed organizations, there is a lack of emphasis on future-oriented thinking. This is particularly clear within vision statements. Approximately half of the vision statements are written in the present tense, suggesting an opportunity to collectively shift towards a more aspirational, forward-looking language that reflects the evolving ecosystem.

5.4 KPIs

Looking at the KPIs measured by CASC members, the following were mentioned by more than 6 organizations and are associated with the following KPI areas:

Table 2. Industry- Leading KPIs

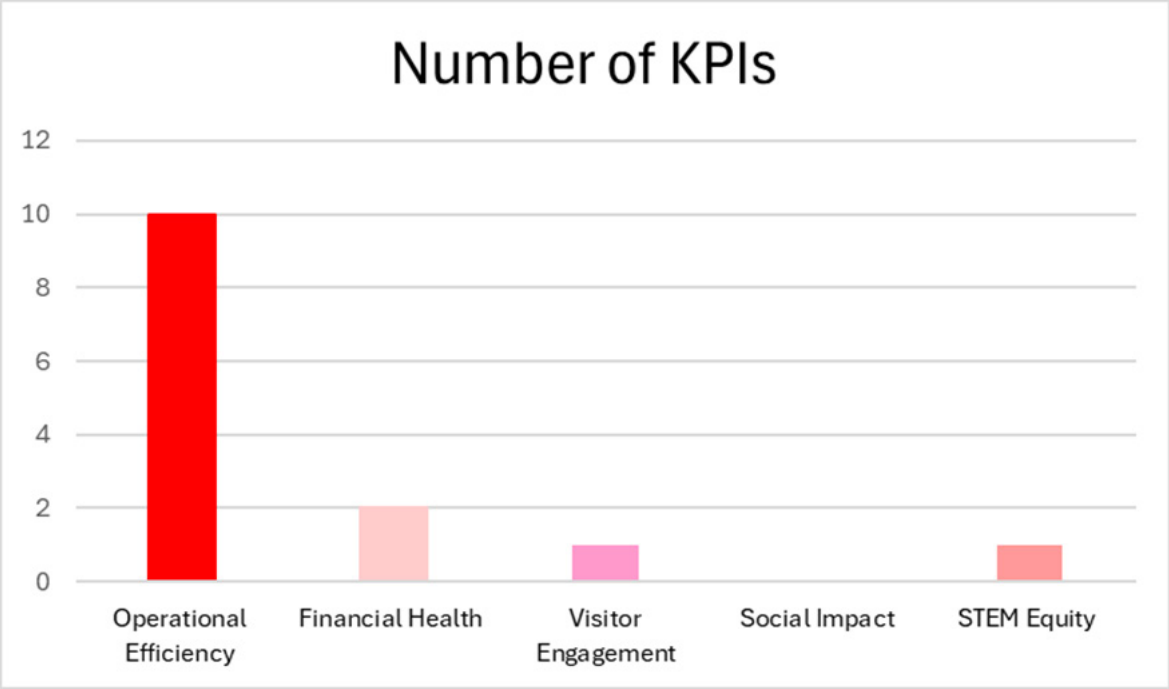
Indicator	% of Members	Area
Number of visitors (onsite)	72%	Operational Efficiency
Number of members	48%	Operational Efficiency
Number of visitors on free days	44%	STEM Equity
Number of people reached through social media[17]	44%	Visitor Engagement
Number of students (onsite)	44%	Operational Efficiency
Number of volunteers	36%	Operational Efficiency
Funds raised from events	36%	Financial Health
Number of summer campers	36%	Operational Efficiency
Total revenue	32%	Financial Health
Number of students offsite/ reached in classrooms	32%	Operational Efficiency
Percentage increase in visitors from 2023-2024	28%	Operational Efficiency
Number of visitors to specific exhibits	24%	Operational Efficiency
Number of visitors (offsite)	24%	Operational Efficiency
Number of rentals or corporate events	24%	Operational Efficiency

Referring to the five KPI areas identified earlier, we mapped the industry-leading KPIs onto these areas to determine which categories are most and least represented, thereby helping to better understand current sector priorities and identify gaps. The graph below shows significant strength in measuring/tracking operational efficiency, as 71% of industry leading KPIs fall into this category. Notably, there were significantly low amounts of KPIs recorded for visitor engagement and STEM equity, with also none recorded for social impact.

Rows highlighted in blue means the indicator appeared in 2024 ASTC Annual Statistical Survey.

17 People reached through social media had a variety of different metrics (# subscribers, # page views, etc.)

Figure 11. Bar Graph of KPI Areas for Industry-Leading KPIs



Our sector excels at tracking operational efficiency metrics (e.g., visitor numbers, volunteer numbers), which are often fundamental indicators of success in ISL and crucial information for the administration. However, despite strong operation efficiency indicators, there is a need for common definitions and language for these indicators. 72% of CASC members tracked onsite visits, whereas only 24% tracked offsite visits. This illustrates the need for a sector-wide investigation to identify barriers and confirm whether the challenges of measuring offsite visitors stem from limited resources for community outreach or from the absence of standardized metrics to capture offsite engagement (e.g., pop-ups, science fairs), or both. Establishing common definitions will improve consistency in measurements and collectively strengthen the sector's ability to demonstrate community impact to funders and stakeholders.

When comparing KPIs used by CASC organizations to the ASTC Statistical Survey, it becomes clear that many of their measurements also focus heavily on operational efficiency. While there is considerable overlap between our common KPIs and those on the ASTC survey, we encourage all CASC members to take part in the ASTC survey to help benchmark our sector more effectively. Furthermore, through collective action, CASC members have the opportunity to determine measurements that might be indicative of the impact they want to have and potentially influence ASTC in the future to broaden its data collection framework to encompass social impact, visitor engagement, and STEM equity. Incorporating these dimensions would provide a more holistic understanding of sector performance beyond operational metrics.

Our sector collectively struggles in assessing/measuring three areas: STEM equity, visitor engagement, and social impact. This resonates when considering the initial polling that highlighted that organizations are looking to networks for support in measuring and communicating outcomes in these areas. While examining emerging KPIs (measured by fewer than 6 members), there is a notable presence of STEM equity measurements that should be recognized and systematically collected. These metrics could easily be reported externally and shared with funders to demonstrate initial impact.

Visitor engagement metrics, those that look at visitor interaction and satisfaction, such as net promoter score (NPS) or sweep rate index (SRI) are scarce. This may be the result of organizations utilizing such indicators for internal reporting only or a lack of established structures to identify visitor engagement metrics. Nonetheless, it's important to identify, track and publish these metrics for the collective benefit of organizations; benchmarking against one another creates opportunity for improvement and innovation.

While organizing the KPIs into the five areas, we found a small number of institutions, often just 1 or 2, that reported externally on indicators related to social impact, visitor engagement, and STEM equity. These indicators are highlighted in the table below.

Table 3. Emerging KPIs

Indicator	Organization(s)	Area
Number of Indigenous students working	Big Little Science Centre, Canadian Museum of Nature	STEM Equity
Number of student employees	Canadian Museum of Nature	Social Impact
Number of languages services offered	Canadian Bushplane Heritage Centre	STEM Equity
Camper demographics (examples: gender, DOB)	Cosmodome	Visitor Engagement
Number of paraphernalia distributed (example: solar eclipse glasses)	Discovery Centre, La Maison Léon-Provancher, Musée de l'ingéniosité J. Armand Bombardier	STEM Equity
Number of youth participants in STEAM learning	Ingenium	STEM Equity
Number of capacity building initiatives among partners	Ingenium	Social Impact
Percentage of audience trust	Ingenium	Social Impact
Percentage of audience confidence in engaging with key issues	Ingenium	Social Impact

Indicator	Organization(s)	Area
Percentage of audience exhibiting innovative tendencies	Ingenium	Social Impact
Percentage of audience inspired by knowledge of Canadian innovations/innovators	Ingenium	Social Impact
Percentage sense of belonging among audiences from diverse communities	Ingenium	STEM Equity
Number of research sharing opportunities	Ingenium	Social Impact
% audiences' perception of accessibility of Ingenium's sites and programs	Ingenium	STEM Equity
Number of leadership opportunities for youth	London Children's Museum	Social Impact
Number of hours engaged with youth	TELUS World of Science	Social Impact
Number of rural communities served	TELUS World of Science	Social Impact
Number of employees supporting Indigenous or underrepresented group organizations	Centre des sciences de Montréal	STEM Equity
Number of attendees to speaker events	Rossland Discovery Centre	Social Impact
Number of new audiences reached	Science North	STEM Equity
Number of times Northeast Indigenous Advisory Committees met	Science North	STEM Equity
Number of knowledge-gathering circles	Science North	STEM Equity
Number of student and teacher outreach (northeastern/western & First Nations Communities)	Science North	STEM Equity

Highlighting these indicators provides examples of metrics our sector can adopt to better understand and communicate the overall impact of our work, emphasizing the relevance of all three of these more qualitative indicators.

Although there is limited information on indicators in these three areas, social impact appears to be one of the most difficult to measure accurately, partially due to the ambiguity of the term. Impact is inherently difficult to define and often requires longitudinal data to be assessed effectively. Identifying this gap aligns with feedback we have received during a recent CASC CEO session where we shared initial findings of the research, reinforcing the need for network weavers to focus on defining and standardizing social impact measures. To address this, we have begun exploring academic perspectives on evaluating the learning and science identity impact of science centres, which will be covered in a subsequent report.

6. Summary

This research scan provides a baseline for understanding the current state of the ISL sector in Canada. The analysis of the vision, mission, and values statements shows strong alignment in beliefs and aspirations across the network. However, we need to strengthen future-oriented thinking, particularly for our sector's contribution to Canada's science culture. This shift requires adopting an abundance mindset and shifting away from a scarcity-driven perspective.

Regarding publicly available KPIs, the sector performs well on reporting operational efficiency, but shows significant gaps in reporting on the other four areas, especially around social impact. After reviewing all KPIs found in impact and annual reports, we identified those that most fit into the categories of social impact, visitor engagement, and STEM equity. These indicators illustrate potential standard measures that could be implemented sector-wide to track these areas.

Moving forward, the taskforce will focus on two immediate priorities: (1) identifying evaluation metrics that capture the learning and science identity impact of science centres through a literature review, and (2) building on this initial report by engaging CASC members in discussions regarding data verification and insights into the reasons some organizations didn't publicly report their KPIs as well as the rationale for KPIs chosen. We hope these steps will help position the sector for greater impact and sustainability.

Appendix A

Vision—Aspirations of what the organization hopes to achieve or embody[18].

Mission—What does the organization need to do to achieve its vision[18].

Values—What the organization believes in[18].

Scarcity Mindset—the belief that resources are limited and finite. If one organization gets resources, there are less left for others[19].

Abundance Mindset—the belief that resources and opportunities are plentiful. Reflects a "win-win" approach where your organization's success does not diminish or threaten the success of others in the network[19].

Appendix B

The ASTC Annual Statistics Survey is a "comparative study on the science center and museum field, aimed at providing an understanding of the structure, functions, and impacts of science engagement organizations around the world."

Canadian institutions made up 11% of all ASTC 2024 Annual Statistics Survey respondents (17/155). All but 1 are CASC members, including some industry members (which were not included in this research report).

The survey is broken down into 9 large sections, with examples provided from each below:

- Baseline Institution Information (year opened, main governing authority)
- Workforce (total FTE employees, minimum hours full time staff)
- Facilities (gross building m^2 and f^2, early childhood education area Y/N)
- Membership and Admissions (paid active members, membership renewal rate)
- Attendance (onsite attendance recent & previous FY, paid onsite attendance recent & previous FY)
- Programs (youth afterschool programs Y/N, adult research events Y/N)
- Finance (total earned income USD, private foundation funds USD)

18 Foster, D. (2024, May 3). Vision, mission and values: How they differ and why they matter. Forbes. https://www.forbes.com/councils/forbesagencycouncil/2024/05/03/vision-mission-and-values-how-they-differ-and-why-they-matter/

19 University of Florida. (n.d.). Cultivating an abundance mindset. UF Training & Organizational Development. https://training.hr.ufl.edu/instructionguides/keepgrowing/cultivatinganabundancemindset.pdf

- Field-wide Considerations (partnerships) (partnerships with public libraries Y/N, partnerships focusing on nutrition Y/N

ASTC also used performance ratios from data provided from respondents:

- Onsite Visits per Interior Exhibit Square Foot and Square Metre (median)
- Onsite Visits per FTE Employee (median)
- Operating Expenses per Onsite Visit (median)
- Operating Expenses per Interior Exhibit Square Foot (median)
- Operating Expenses per Interior Exhibit Square Metre (median)
- Earned Revenue per Onsite Visit (median)