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Defining social innovation for post-secondary educational institutions: a concept analysis

K. M. Benzies ^{1✉}, D. B. Nicholas¹, K. A. Hayden¹, T. Barnas¹, A. de Koning¹, A. Bharwani ¹, J. Armstrong¹ & J. Day¹

Education, research, and contribution to society through innovation are the three missions of post-secondary educational institutions. There is a gap in understanding the concept of social innovation for post-second educational institutions. A clear definition would: (a) guide institutional strategic direction and supports, (b) recognize and reward academic research in social innovation, and (c) enable accurate measurement of outcomes and impact of social innovation activities. To redress the definitional imprecision, Walker and Avant's method was used to conduct a concept analysis of social innovation. Four multi-disciplinary databases were searched to identify 1830 records. Antecedents, defining attributes, and consequences of social innovation were extracted from 272 of these articles. Defining attributes were reconstructed to develop a new definition. For post-secondary educational institutions, *social innovation* was defined as the intentional implementation of a transdisciplinary initiative to address a social challenge enabled through collaborative action leading to new or improved capabilities and relationships with community to generate evidence-informed solutions that are more effective, efficient, just, and sustainable. With greater clarity about the definition of social innovation, post-secondary educational institutions can create strategic plans and allocate resources to fulfil the Third Mission. With an evidence-informed definition, post-secondary educational institutions can develop a measurement framework to demonstrate outcomes and impacts of social innovation.

¹University of Calgary, Calgary, Alberta T2N 1N4, Canada. ✉email: benzies@UCalgary.ca

Introduction

Education and research are hallmarks of post-secondary educational institutions (PSEIs) (Johnson et al., 2023). More recently, contribution to society has been recognized as the Third Mission (Compagnucci and Spigarelli, 2020) because PSEIs are increasingly encouraged to undertake innovative initiatives with potential societal impact (Kohl et al., 2022). The Third Mission is generally interpreted as research and innovation to develop and commercialize tangible technical products that benefit to PSEIs (Benneworth et al., 2020). Typically, systems to commercialize innovation at PSEIs are competitive with well-developed technology transfer offices that may be organizationally and operationally disconnected from more collaborative, intangible, and complex social innovation (SI) activities (Johnson et al., 2023). This may result in SI initiatives becoming marginalized in favour of commercialization (Caroli et al., 2018). SI can be a product, process, or technology (Phills et al., 2008), or a principle, an idea, a piece of legislation, a social movement, an intervention, or some combination thereof (Phills et al., 2008). In alignment with Westley and Antadze (2010), others have focused their SI definition on values, inclusivity, and processes (Surman, 2018). SI has considerable conceptual alignment with social enterprise (SE), which has an interest in economic return accruing to one or more individuals or an organization to sustain growth or various non-profit activities (Lettice and Parekh, 2010; White et al., 2022). That is not to say that social good does not come from social enterprise; rather, the intent is different. In addition, SI may be undervalued for academic researchers because traditional research assessment, advancement, and remuneration structures at PSEIs privilege countable publications and research grants as currency rather than the more difficult-to-measure social impact (Aubert Bonn and Bouter, 2023). Such overt and covert differences in ideological perspectives and motivations may discourage researchers and their students from engaging in SI (Duval-Couetil et al., 2023). Nevertheless, PSEIs globally have embraced SI as part of their Third Mission (Compagnucci and Spigarelli, 2020; McDonnell-Naughton and Păunescu, 2022), and academic researchers are encouraged and, in some countries e.g., Research Excellence Framework (2022), supported in their efforts to achieve an impact on society (Penfield et al., 2013). Yet, the relationship between SI and PSEIs remains unclear, and there is an urgent need to explore the antecedents of social innovation in PSEIs (Wu et al., 2023). Similarly, there is limited guidance about impact measurement, resource allocations, infrastructure to accelerate SI, and frameworks for meaningful collaboration (Wu et al., 2023).

PSEIs are inherently multi-disciplinary. However, there is a disconnect between (a) enthusiastic PSEI leaders who support SI, (b) academic researchers who are looking to SI to sustain their research programs, and (c) existing institutional culture, structures, and processes to accommodate SI (Benneworth et al., 2022). Even with this disconnect, there may be considerable overlap in institutional structures and operational processes to support commercial innovation and SI (Benneworth et al., 2020). If PSEIs could clearly understand and capitalize on the synergistic effects of this overlap, SI holds great promise for the Third Mission to address the most pressing societal challenges (Bayuo et al., 2020). For this paper, we define a ‘societal challenge’ as a multi-level, multi-dimensional social need (situation) that requires determined effort (response) by various actors to address it successfully. The driver for global social change is the United Nations Sustainable Development Goals (SDGs), which include five pillars: People, Prosperity, Peace, Partnerships, and Planet with 17 specific goals (Beynaghi et al., 2016).

The concept of SI has various definitions across disciplines and sectors (Eichler and Schwarz, 2019; Benneworth and Cunha, 2015), which risks a lack of clarity relative to PSEI’s strategic

approaches and measurement of outcomes and impact on society. In their systematic review of the concept, Eichler and Schwarz (2019) identified 222 definitions of SI with five key elements: (a) addresses a social need, (b) is innovative, (c) has implementation and execution, (d) identifies improvement, and (e) identifies relationships and collaborations. However, these elements are applied to definitions generally and are not specific to PSEI. This generality presupposes that the meaning and operationalisation of SI are agnostic to the setting. Furthermore, Eichler and Schwarz (2019) used a thematic approach to identify the elements of SI rather than a well-established concept analysis method. In their literature review, (Benneworth and Cunha, 2015) recommended four dimensions of SI: (a) developing novel solutions, (b) creating social value by promoting community development, (c) forming wider collaborative networks, and (d) challenging existing social institutions through collaborative action. Thus, there is concern that the concept needs greater definitional precision and meaningfulness in PSEI structure, culture, and praxis. Imprecise definitions prevent researchers from self-identifying as social innovators partly because they lack a common frame of reference of ‘what is social innovation’ to define themselves and their work for their peers and leaders (Benneworth et al., 2020). Aligned with Benneworth et al. (2020), we assumed that a clear understanding of SI among major actors (government, business, civil society, and academia; Carayannis et al., 2018) was required to frame how an organization interacts with external partners (institutional logics) to strengthen partnerships to improve quality of life, well-being, and prosperity for society. Finally, in his seminal work, Nunnally and Bernstein (1994) argued that a clear conceptual understanding of a construct is necessary for effective measurement. Thus, a concept analysis was needed to develop a clear definition to: (a) guide institutional strategic direction and supports, (b) recognize and reward academic research in SI, and (c) accurately measure outcomes and impact of SI. The purpose of this concept analysis was to redress the definitional imprecision of SI by creating clarity across academic disciplines and sectors with the intent of application to PSEI. The research question was: What is the underlying structure of the concept of SI for PSEI? We aimed to develop an empirically derived definition of SI that has application for PSEI. This definition was critical to facilitate a transdisciplinary understanding of the concept and provide a foundation for coherence in measuring outputs, outcomes, and impacts of efforts labeled as SI at PSEI.

Methods

We employed Walker and Avant’s (2019) concept analysis procedure, a systematic approach to develop a definition to align understanding and create opportunities for precise measurement. For this study, we identified (a) the uses of SI in PSEI, (b) its defining attributes, (c) model, borderline, and related cases, (d) antecedents and consequences, and (e) empirical referents (Walker and Avant, 2019). To reflect the diversity of disciplines at PSEI, we used a multi-disciplinary approach to review the literature for scientific and common uses of the concept. Since we could not identify reporting guidelines for a concept analysis, we used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2015) to search, retrieve, and analyse the literature. With support of an academic librarian (KAH), we conducted a preliminary exploratory search to refine and pilot test the search strategy for each database. Initial search terms failed to result in broad representation from various disciplines, so we refined the search criteria and reviewed 100 articles, indicating that the revised search criteria were successful. With consensus on the final search

Table 1 Article inclusion and exclusion criteria according to the Setting, Perspective, Intervention, Comparison, and Evaluation (SPICE) framework (Booth 2006).

SPICE	Inclusion criteria	Exclusion criteria
Setting	Post-secondary educational institutions	Business enterprises only, community only, secondary educational institutions
Perspective	Societal/public, post-secondary educational administration, faculty, students, staff	Business owners, community leaders
Intervention	Social innovation	Social enterprise, corporate social responsibility.
Comparison	No social innovation	No social enterprise, no corporate social responsibility.
Evaluation	Outputs, outcomes, impact aimed at improving social good. <i>How is social innovation measured, recognized, and rewarded?</i>	Output, outcomes, and impact aimed at profit for shareholders, company.

(Booth 2006).

strategy, KAH systematically searched five multi-disciplinary and education databases with no time limits: (a) Academic Search Complete (EBSCO), (b) SCOPUS (Elsevier), (c) Web of Science Core Collection (Clarivate), (d) ERIC (EBSCO) and (e) Education Research Complete (EBSCO) with three main concepts: social innovation, models/frameworks, and post-secondary institutions. Keywords were the same for all databases, and relevant subject headings were used when available in a database. Both proximity searching and truncation were used to expand the keyword possibilities. To enable replication, see supplementary files for complete search strategies.

We included records if they met the following criteria: (a) published in English, (b) literature review or conceptual paper, and (c) the title, abstract, or keywords included SI or SE, and (d) addressed higher education, university/college, or PSEI. We excluded records if they (a) were unavailable in English, (b) were editorials, letters, books, conference abstracts, or dissertations/theses, and (c) focused on SI or SE solely in communities or corporate entities and did not involve PSEI. See Table 1.

We reviewed 100 sample records for inter-rater agreement to screen titles and abstracts. KB screened all sample records; two research assistants independently screened 50% each with an inter-rater agreement (Fleiss' kappa) of 94%. We resolved disagreements by consensus. We used Covidence (Covidence systematic review software. Veritas Health Innovation) to manage retrieval and screening processes. Covidence de-duplicated most records automatically; however, we manually de-duplicated a small portion of records (34/1830; 1.8%) in Covidence because of differences in titles across databases.

Screening was a two-step process, starting with titles and abstracts, then full text. For both steps, KB independently screened 100% of the records; two research assistants independently screened 50% each. If there was insufficient information to determine inclusion, we included the record.

We used an investigator-designed database (Airtable Workflow Management System, 2023) software to extract author, year, country, type of record, research method, concept, definition of concept, use of concept, discipline, theory, antecedents, and consequences. Critical appraisal was irrelevant because the aim was to understand the concept rather than assess the scientific rigor of a study. For included records, we deconstructed each definition by color-coding terms according to the five elements identified by Eichler and Schwarz (2019). We then reconstructed the words to create a definition of SI for PSEI. In two workshops, the research team discussed and achieved consensus about coding terms that we could not categorize into one of the five elements.

Results

We identified 2776 records, of which 946 were duplicates. We screened 1830 titles and abstracts, of which 1063 did not meet

inclusion criteria. We identified 767 records for full-text review. We could not retrieve 10 of these, leaving 757 full-text reports to assess for eligibility. Of these, 272 articles met the inclusion criteria and were included in the concept analysis. Many investigators who identified SI as the basis of their research omitted a definition. Instead, they presupposed a definition, resulting in ambiguous understanding, measurement, and outcomes. See Fig. 1.

Characteristics of included articles. Of the included articles, nearly half (43.6%) were from Europe, followed by Asia (27.8%) and North America (16.5%). The remainder were from Africa (3.7%), Australia or New Zealand (2.9%), and South America (4.8%). Almost all (97.8%) were published since 2010. In the following sections, we describe the results of the concept analysis (Walker and Avant, 2019).

Identifying uses of SI

Structural. In several articles (Shu et al., 2020; Kaya Özbağ et al., 2019; Solis-Navarrete et al., 2021; Lewis and Henry, 2019), SI referred to organic, grassroots movements to move ideas into products and services to achieve sustainable outcomes or impact. In other articles, SI and SE were used interchangeably with the idea that the application of SE business principles was useful in developing, implementing, and sustaining SI(s) (Choi and Majumdar, 2015; Flynn, 2017; Smith, 2012). Some articles described organizations as hybrid entities with a SE developed alongside an SI to increase its sustainability (Almeida et al., 2012; Daub et al., 2020; Greblikaite et al., 2016; Matzembacher et al., 2019; Vuorio et al., 2018; Yasir et al. 2021). SE blurs the boundaries between SI and business, and the notion of non-profit organizations (Shu et al., 2020).

SI requires systems-based, multi-actor, i.e., government, business, academia, and civil society, also known as the Quadruple Helix; (Carayannis et al., 2018) approaches to match the complexity of societal challenges (Nicholls et al., 2015; Anheier et al., 2019). Although mention of PSEI was an inclusion criterion, only a few articles (Benneworth et al., 2020; Carayannis et al., 2018; Terstriep et al., 2022) addressed the specific structures of PSEI that contributed to SI.

Processes. SI has been used to describe the positive relational aspects, nuances, and spaces of interactions among engaged actors (Villar Olaeta, 2017; Thomas and Pugh, 2020; Milley and Szijarto, 2022). Most articles described SI as collaboratively conceptualized and operationalised by community and academic researchers (Cunha and Benneworth, 2020; Păunescu, 2014; Milley and Szijarto, 2022) and the processes used to turn new ideas incrementally into products and services for social good.

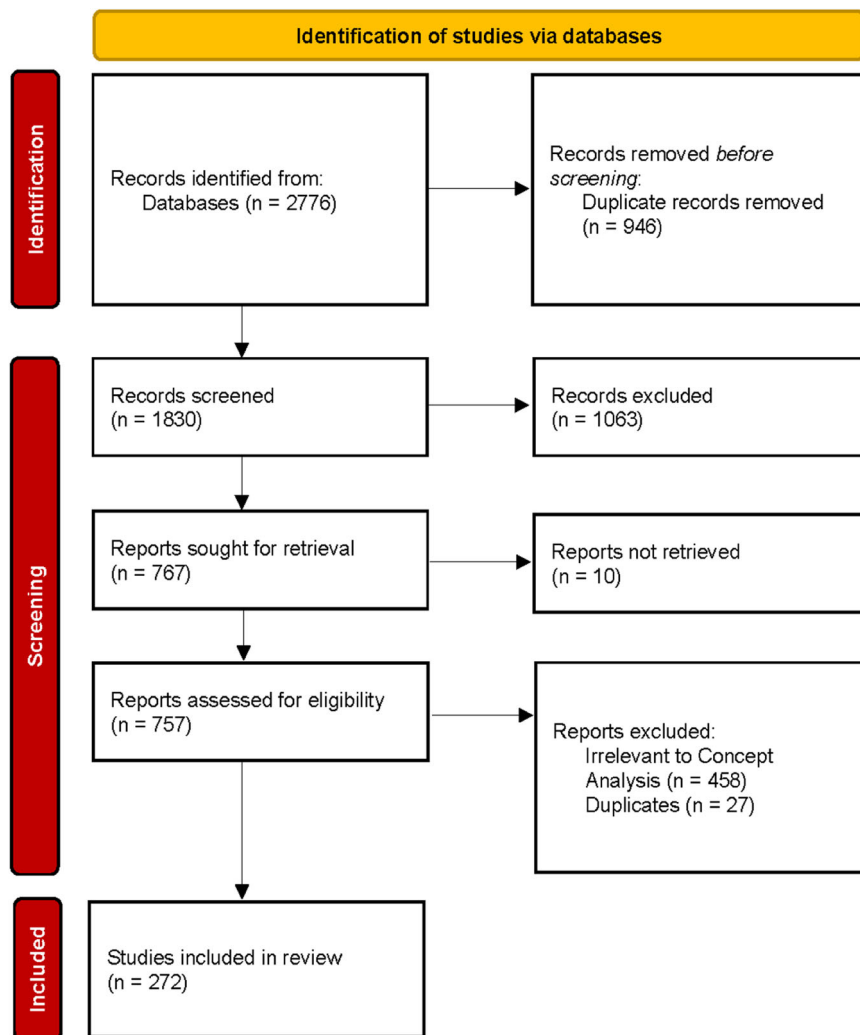


Fig. 1 Identification of studies flow diagram.

Irrespective of SI detail in varying projects, processes that included engagement, reciprocity, relationality, and action emerged.

A few articles were critical of the rationale for SI and pointed to the 2008 financial crisis and shift from government- and business-supported social safety nets to an expectation that SI would fill the void and redress insufficiencies in current systems (Lindberg et al., 2019). Some articles reported an implicit or explicit expectation that SI offers an approach to modernizing welfare states (Kamaludin et al., 2021). Aligned with this focus was the implicit message that society needs to do more with less (Edwards-Schachter and Wallace, 2015). This variation in the intent of SI from a political device advancing insufficiency in the social welfare system to collaborative action within reconfigured hierarchical processes created confusion about accountability for SI and PSEI contributions to positive social change.

Outcomes. In many definitions, SI was referred to as an outcome (Eichler and Schwarz, 2019; Kumari et al., 2020; Aguirre-Bastos, 2017; Cunha and Benneworth, 2020). Most articles used SI with implicit or explicit expectations that new products and services result in more sustainable, cohesive, and inclusive societies (Grimm et al., 2013). Beneath this was a foundation valued by principles of equity and distributive and procedural justice. However, the crux of this orientation was action for demonstrable positive social change (McKelvey and Zaring, 2018). Implicit in the articles was that academic actors represent many disciplines,

each with diverse research expertise and capabilities but often limited capacity to synthesize or generate evidence-informed solutions to societal needs.

Defining attributes. Defining attributes are characteristics of a concept that appear repeatedly to enable the most comprehensive understanding (Walker and Avant, 2019). Benneworth and Cunha (2015) have suggested that a working definition of SI should encompass three themes: (a) mass change in organization of a social function, (b) collective coordination by novel societal institutions, and (c) constructive change of social power relations. First, we deconstructed definitions using Eichler and Schwarz's (2019) five elements to identify defining attributes of SI. In addition, for PSEI, we identified the following attributes: (a) intentionality, (b) transdisciplinarity, and (c) evidence-informed solutions. See Fig. 2.

Addresses a complex social need. Schumpeter's 1934 definition, which was consistent with Eichler and Schwarz's (2019) first element, states that a defining attribute of SI is that SI addresses a social need (van der Have and Rubalcaba, 2016; Păunescu, 2014) with its value accruing to society rather than an individual (van der Have and Rubalcaba, 2016). Indeed, some suggest that 'pure' SI should not generate financial benefit (van der Have and Rubalcaba, 2016; Cardella et al., 2021). The idea that SI addresses

Antecedents	Defining attributes	Consequences
<ul style="list-style-type: none"> • Legislation/policy; investment potential; engaged ecosystem • Leadership; culture; strategic priority; infrastructure; education/training; resources; incentives • Common goals; collaboration • Faculty/student commitment and competence; engaged community 	<ul style="list-style-type: none"> • Addresses a societal problem • Novel to population or setting • Novel relationships and capabilities • Collaborative action • Intentional • Transdisciplinary • Evidence-informed solutions 	<ul style="list-style-type: none"> • Diffused/permeated SI culture • Reconfigured hierarchy in collaborations with community • Meaningful and sustained relationships with mutual benefit • PSEI growth • Positive societal impact

Fig. 2 Antecedents, defining attributes, and consequences for a concept analysis of social innovation for post-secondary educational institutions.

a social need that emerges with the failure of traditional approaches (Nicholls and Murdock, 2011) is deficit-focused. Others take a positive approach with the idea that SI might improve quality of life, well-being, and prosperity (Pol and Ville, 2009; De Bernardi et al., 2022).

Novel to population or setting. SI must be novel and was often related to an earlier state of uncertainty, ambiguity, or complexity associated with the identified social need (Kaya Özbağ et al., 2019; Jiménez Escobar and Morales Gutiérrez, 2011; García-González and Ramírez-Montoya, 2021; Göransson, 2017). In some definitions, an existing innovation was new to the population or setting (Marques et al., 2018), contributing to its novelty. This idea is consistent with Westley and Antadze’s (2010) definition of SI, suggesting it influences the social system in which it occurs.

Novel relationships and capabilities. In developing and implementing a SI, a defining attribute is the formation of new social relationships and capabilities that benefit civil society and enhance society’s capacity to act (Eichler and Schwarz, 2019; Aguirre-Bastos, 2017; Arocena and Sutz, 2021; Anheier et al., 2019). SI convenes previously unrelated actors, ideas, practices, programs, or products in new configurations to address a social need (Westley et al., 2017; Arocena and Sutz, 2021). This results in societal benefits through more horizontal, collaborative relationships (Arocena and Sutz, 2021; Eichler and Schwarz, 2019; Kaya Özbağ et al., 2019; Marques et al., 2018; van der Have and Rubalcaba, 2016; Avelino et al., 2017; Ayob et al., 2016; Anheier et al., 2019).

Collaborative action. SI is rooted in collaborative action, frequently focusing on vulnerable groups (Castro-Spila, 2018; García-González and Ramírez-Montoya, 2021; Grinberga-Zalite and Mazure, 2017). Edwards-Schachter and Wallace (2017) refer to innovation as a collective learning process involving civil society that is aimed at addressing a social need with co-creation through experimentation, often explicitly drawing on “design thinking” (Bartoloni et al., 2022). Implicit in collaborative action is the concept of engagement with new partners and collaborations (Scott, 2020).

Intentional. The attribute of intentionality distinguishes SI from organic social change or even happenstance (Kaya Özbağ et al., 2019; Shu et al., 2020; Solis-Navarrete et al., 2021; Lewis and Henry, 2019). Accordingly, to align with strategic priorities, resource allocation, and accountabilities at PSEI, SI must be intentional (Grimm et al., 2013; Polbitsyn, 2021; Terstriep et al., 2022). Also, SI has a temporal dimension to satisfy changing

social challenges (Caroli et al., 2018). Given the three missions of PSEI, the intentionality of SI seems integral to prioritizing and resourcing such efforts (Polbitsyn, 2021).

Transdisciplinary. PSEIs are inherently transdisciplinary, with a mandate for integration across research, teaching, and service (Milley and Szijarto, 2022). If the knowledge to respond to complex social needs lies at the boundaries of disciplines, then transdisciplinary collaboration must be a defining attribute of SI for PSEI.

Evidence-informed solutions. Aligned with the research mandate of PSEI (Compagnucci and Spigarelli, 2020), the attribute of evidence-informed solutions reinforces the expertise and contributions of academic researchers and students to develop evidence with the potential to address complex societal challenges. Solutions for some societal challenges may require synthesizing and mobilizing existing evidence; others require collaborative action to co-create new evidence. Evidence-informed solutions are more likely to improve societal impact with longer-term sustainability.

From these defining attributes, we propose that SI for PSEIs is the intentional implementation of a transdisciplinary initiative to respond to a social need enabled through collaborative action leading to new or improved capabilities and relationships with community to generate evidence-informed solutions that are more effective, efficient, just, and sustainable. Aligned with others (Centre for Social Innovation, 2023; Villar Olaeta, 2017; Foroudi et al., 2021), SI for PSEIs is an inclusive concept that includes community engagement, social entrepreneurship, care for the environment, and service learning. To demonstrate the defining attributes of SI at PSEI (Walker and Avant, 2019), we describe: (a) model case of SI at a PSEI (SI Initiative), (b) borderline case (Office of Sustainability), and (c) related case (Innovate Calgary, Social Innovation Hub). We used University of Calgary cases because we were most familiar with our own institution, could easily verify characteristics, and did not want to misrepresent entities from other PSEIs.

Model case—social innovation initiative. The model case, the SI Initiative at the University of Calgary (UCalgary), is an example of the concept and all its defining attributes (Walker and Avant, 2019). With strong community support, UCalgary was founded in 1966 (University of Calgary, 2023c). UCalgary’s 2023 strategic plan, *Ahead of Tomorrow*, aims to: (a) increase access to impactful and future-oriented education; (b) harness the power of research and innovation to tackle society’s biggest challenges; (c) locate community at the center of all we do; and (d) make our processes to move ideas to action clearer, simpler, and better than any other university (University of Calgary, 2023a). Thus, UCalgary has strategically positioned itself to advance education, research, and societal contribution (Third Mission). However, a need remains to understand how leadership and institutional logics create variability in approaches to achieve its goals. This understanding is critical to ensure profound and authentic movement beyond rhetoric in this ambitious goal.

In 2020, the Vice-President Research struck a multi-disciplinary SI Task Force that recommended: (a) understanding SI for PSEI, (b) building capacity for SI among faculty and students, and (c) rewarding SI (University of Calgary, 2021b). In 2021, an academic director was appointed to lead the SI Initiative and develop a business plan. Aligned with *Ahead of Tomorrow*, the SI Initiative strategised how to mitigate the challenges of traditional PSEI institutional logics (Benneworth et al., 2022) and

create clearer and simpler processes to move ideas into action in collaboration with the community.

Partnerships with community. Consultation with community leaders revealed an unevenness in meaningful and sustained community-university research partnerships. Community partners were no longer satisfied with researcher-initiated and -led projects, often perceived as transactional versus collaborative. Examples included requests to community partners for letters of support to help researchers secure funding/grants to explore a question that only identified the problem rather than a solution. The SI Initiative modified its approach to create novel cross-sectoral and transdisciplinary relationships and capabilities for mutual benefit to move the traditional university ‘push’ of research ideas to community ‘pull’ of collaborative research focused on solutions. Thus, the model case of SI at a PSEI embraces the concept of the ‘missing middle’ (Benneworth et al., 2020) among the major actors in SI. Academic researchers may have greater capacity than the other actors to form meaningful and sustained relationships to synthesize existing research or generate new evidence to support SI (Benneworth et al., 2020).

Students and student experiences. Given that undergraduate and graduate students want experiential learning, efforts are underway to design a model to increase student exposure to SI. Since most societal challenges are complex and take considerable time to achieve solutions, undergraduate student experiences will be implemented in four-month blocks with short-term outputs and outcomes designed within a larger SI Initiative. At the graduate level, a four-course certificate will expose students to SI theory and research with experiential learning in a capstone project for the master’s degree in Transdisciplinary Studies.

Collaborative action. The SI Initiative adopted the role of the ‘missing middle’ (Benneworth et al., 2020) to engage in collaborative action among the Quadruple Helix actors in SI (Carayannis et al., 2018). To further strengthen academic researchers’ roles in engaging in novel collaborations, UCalgary invested \$19MM in research and scholarship (University of Calgary, 2023d) to transcend disciplinary boundaries. With its 2023–2030 strategic plan (University of Calgary, 2023a), UCalgary will intentionally focus on improving its processes to enable collaborative action so researchers and community partners can move ideas to evidence and action more efficiently.

Mobilizing evidence-informed social innovation research. Often, researchers and students recognize that their research has societal value; in other cases, they need to learn how to mobilize it. The SI Initiative developed a coaching service for researchers to explore options for mobilizing knowledge, including co-creating solutions with community, creating an SE, and others. This service supports researchers to design an appropriate knowledge mobilization approach.

Borderline case—office of sustainability. A borderline case, UCalgary’s Office of Sustainability has most, but not all, of the defining attributes of SI (Walker and Avant, 2019). Since 2009, when the name was changed from Environmental Policy to Sustainability Policy, UCalgary has been committed to excellence and leadership in sustainability (University of Calgary, 2010). Within the portfolio of the Provost and Vice-President (Academic), the Office of Sustainability focuses on (a) social responsibility, (b) engagement, (c) experiential learning, (d) capacity building, (e) diversity, and (f) entrepreneurialism (University of Calgary, 2022b). Through its Campus as a Learning Lab and

Mobilizing Alberta projects, the Office of Sustainability brings together faculty, students, and staff for experiential learning and applied research projects focused on sustainability in UCalgary’s built and natural environment (University of Calgary, 2022a). Given that experiential learning is the primary focus, not all projects generate evidence-informed solutions nor include community engagement. Thus, the Office of Sustainability is a borderline case.

Related Case—innovate calgary, social innovation hub. A related case, Innovate Calgary’s Social Innovation Hub (Innovate Calgary, 2023), demonstrates ideas like SI but differs when examined closely (Walker and Avant, 2019). Innovate Calgary has helped hundreds of companies and entrepreneurs bring their ideas to market with historical focus on technology commercialization and the creation of economic metrics (e.g., jobs created, revenue generated, capital raised). Resources include (a) invention disclosure, (b) protection of intellectual property, (c) company creation, (d) analysis of technologies for commercial potential, (e) marketing for scale, (f) innovation ecosystem connections, (g) mentorship, and (h) grant and venture navigation.

The Social Innovation Hub builds on technology commercialization pathways and expands the target audience to include researchers and innovators (i.e., social entrepreneurs) who have dual objectives of creating net positive societal impact in financially sustainable ways. Social entrepreneurs are typically active in markets and aim to generate economic profits, some or all of which are reinvested in pursuit of their social mission (Szijarto et al., 2018). Members of the Social Innovation Hub have access to: (a) space, (b) training to access early-stage investment funds, which are adjudicated from an SE lens, (c) mentorship in business practices to increase demand for their goods, services, or intervention, and (d) support to develop and access networks. SE is a term frequently associated with SI (Foroudi et al., 2021). However, unlike SI, it refers primarily to characteristics of an organization rather than innovation (Antadze and Westley, 2010; Benneworth and Cunha, 2015). SEs are distinguished from conventional business organization’s emphasis on profits to achieve social ends (Arena et al., 2015) without reliance on public funds (Luke et al., 2013). In contrast to Luke et al.’s emphasis on the exclusion of public funds, the Social Innovation Hub considers all types of capital (natural, human, and financial) to achieve durability and scalability in the intended outcomes of the social entrepreneur. Thus, Innovate Calgary’s, Social Innovation Hub is a related case because it lacks the defining attributes of novelty to a population or setting and transdisciplinarity. A SE may or may not advance evidence-informed solutions.

Antecedents. Walker and Avant (2019) have described antecedents as the conditions that must occur prior to the occurrence of the concept. Based on a precedent established by Fleiszer et al. (2015), we organized antecedents by (a) outer and inner contexts, (b) characteristics of SI at PSEI, (c) processes to implement SI, and (d) stakeholder characteristics (Damschroder et al., 2009). While the characteristics of SI initiatives will influence specific SI projects, in this article, we refer to SI as an initiative for PSEI with outcomes and impact for the institution.

Outer context. UCalgary is a prominent actor in a larger innovation ecosystem (Pel and Kemp, 2020). Government at multiple levels (federal, provincial, and municipal) creates legislation and policies to increase investment potential and prioritize SI approaches to address societal challenges. An engaged innovation ecosystem with meaningful and sustained relationships between UCalgary and its community is a critical antecedent for SI. PSEIs

considered impenetrable ‘ivory towers’ focussed on researcher-driven SI are less likely to engage in their innovation ecosystem.

Inner context. Inner context antecedents necessary for SI at UCalgary include leadership, strategic priorities, innovation culture, infrastructure, education and training, resources, and incentives. For example, UCalgary’s leadership and strategic priorities generally align with innovation and SI (University of Calgary, 2023a). A deep commitment to listening to stakeholders in cross-sectoral and transdisciplinary research, and a focus on education and training, resources, and incentives for SI will shape UCalgary’s institutional logics to support academic researchers and students to engage meaningfully in the SI ecosystem. Finally, the incentive structure for academics at UCalgary must shift to recognize and reward community-university partnerships like traditional rewards for teaching, research (grants and publications), and service (University of Calgary, 2021a).

Characteristics of SI at PSEI. Antecedent characteristics of SI at UCalgary include education, infrastructure, and resources. Across faculties (e.g., nursing, medicine, social work, and business) and entities (e.g., Office of Sustainability, Innovate Calgary), UCalgary offers courses for many levels of learners, including certificates, workshops, and internships to increase exposure to SI theory and practice. With a focus on transdisciplinarity (University of Calgary, 2023d), faculty and students work collaboratively across disciplines to synthesize or generate new knowledge with community to address social challenges. Finally, UCalgary recognizes that it must adopt an approach to the sustainable measurement of SI with data to inform impact and accountability (Cunha et al., 2022).

Process of SI at PSEI. Antecedent processes that enable SI must have common goals that bridge institutional logics (Benneworth et al., 2020). Clearly articulated in its 2023 strategic plan (University of Calgary, 2023a), UCalgary aims to make its processes clearer and simpler, including more efficient structures and processes for community partners to engage with academic researchers. Aligned with the San Francisco Declaration on Research Assessment that challenged how traditional metrics of academic outputs are measured (DORA, 2023), determining the impact of SI at UCalgary requires attention to new measurement tools and processes like those proposed by Cunha et al. (2022).

Stakeholder characteristics. The final antecedent of SI is stakeholder characteristics. UCalgary is recognized at the forefront of entrepreneurial thinking with institutional leaders, faculty, and students who are competent in and committed to SI. Commitment to SI also requires intentional, meaningful, and sustained relationships with community partners to collaborate, conceptualize and progress on social challenges. Given that UCalgary intends to serve its community, the new strategic plan is to strengthen community engagement with high trust in partnerships for initiatives focussed on achieving social good.

Consequences of SI at PSEI. Walker and Avant (2019) have described consequences as the outcomes that occur because of the occurrence of the concept. From the literature, generic social change was the consequence identified in most definitions (Cardella et al., 2021; Choi and Majumdar, 2015; Edwards-Schachter and Wallace, 2017; García-González and Ramírez-Montoya, 2021; Kumari et al., 2020; McKelvey and Zaring, 2018; van der Have and Rubalcaba, 2016; Baptista et al., 2019; Shahverdi et al., 2018; Parthasarathy et al., 2021; Calvo Martinez et al., 2018). Generic social change referred to improved quality of life (Pol and

Ville, 2009), social justice (Choi and Majumdar, 2015; Villar Olaeta, 2017), and quality of life, well-being, and prosperity that promoted inclusion of marginalized and vulnerable groups (Castro-Spila, 2018). However, there was limited specificity of either outputs, outcomes, or impact that resulted from SI initiatives generally, and none were specific to SI at PSEI. Thus, the consequences of SI are extrapolated from the literature and our knowledge of PSEI operations and outcomes.

Diffused/permeated culture of SI. PSEIs with strategic directions that include antecedents and attributes of SI, such as UCalgary, should expect a culture of innovation that contributes to its Third Mission by permeating disciplinary boundaries, research institutes, and other entities. This culture includes a general understanding of how faculty, students, and staff use SI to address societal challenges. Although not all will be interested in SI, nor abandon discovery research in favour of SI, at UCalgary the culture has shifted with greater emphasis on transdisciplinarity and meaningful and sustained community engagement for mutual benefit.

Reconfigured hierarchy in collaborations with civil society. UCalgary researchers increasingly engage in meaningful and sustained partnerships with individuals with lived experience. Aligned with concepts like integrated knowledge translation (Straus et al., 2013) and patient-oriented research (Zibrowski et al., 2021), these approaches erode traditional hierarchical relationships, and participants are guided and supported to co-create solutions as co-researchers. A better understanding of the lived experience of a social problem is more likely to result in workable and sustainable solutions.

Meaningful and sustained relationships with mutual benefit. Generally, one project, or even a single research program, has limited potential to address societal challenges. Thus, UCalgary is focussed on building meaningful and sustained relationships at multiple levels for large-scale initiatives (e.g., University of Calgary (2023b)). With the intent of meaningful and sustained relationships with government, business, and community agencies, UCalgary is building structures and processes to collaborate with researchers and students to co-create solutions. In addition, UCalgary faculties are increasing incentives for community engagement in annual performance assessments for academic researchers. Thus, UCalgary prioritizes strengthening relationships that benefit the community and faculty researchers.

PSEI growth. Success in grant competitions increases with evidence of meaningful and sustained community partners co-creating solutions to social challenges. Given that gaps in knowledge often lie at the boundaries of disciplines, the focus on transdisciplinarity is critical. A new master’s degree in Transdisciplinary Studies with an embedded certificate in SI increases graduate student exposure to theory and applied research in the field. In the context of the antecedents, UCalgary is well-positioned for growth among Canadian and international PSEIs.

Positive societal change. The final consequence of SI is a positive social impact on all citizen’s quality of life, well-being, and prosperity. Impact is achieved when the basic routines, resources, or beliefs change inside a social system (Westley, 2008) or when institutional changes occur (Pol and Ville, 2009; Carl, 2020). To capitalize on SI activities that improve quality of life, well-being, and prosperity, siloed governance structures in PSEIs need to be refined. Although offering bounded parameters, these governance structures and common means of independent engagement in scholarly activities and processes often constrain the potential for

SI at PSEIs. One author proposed SI as an approach to Canada's commitment to Truth and Reconciliation relative to Indigenous communities in Canada because of similar philosophical roots between SI education and Indigenous pedagogy (Kennedy et al., 2023). Through co-learning and meaningful consultation with Indigenous elders, SI may create opportunities for positive social change (Kennedy et al., 2023).

Empirical referents. Empirical referents are the indicators and measurement tools that provide evidence of the concept (Walker and Avant, 2019). With definitional clarity, the next step at UCalgary is to monitor implementation and measure the outcomes and impact of SI activities. Most articles in this analysis did not consider measurement or accountability for outcomes and impacts associated with SI projects, and each of the major actors will likely have different expectations for measurement. In their review of the literature from 2000 to 2015, Milley et al. (2018) reported themes in evaluation of SI generally, and noted differences in evaluation of SI and SE, where SI focussed on evaluation of learnings and SE focussed on summative return on investment, reflecting a balance between learning and accountability and building capacity for evaluation. To address the complexity of measuring SI initiatives, Cunha et al. (2022) proposed six dimensions (i.e., social, environmental, process, political, educational, and economic) with 38 indicators to measure the impact of SI. While these indicators suggest areas to demonstrate, document, and identify areas for investment, there is no consensus on indicators. Also needed are brief, reliable, and valid scales for measurement of outcomes and impact of SI at PSEI.

Discussion

The purpose of this paper was to increase conceptual clarity between SI and other related phenomenon with application specific to PSEI. This review unearthed key attributes of SI for PSEI as we critically reflected on the literature and our experiences to advance SI. In addition to attributes of SI generally (Eichler and Schwarz, 2019), we exposed intentionality, transdisciplinarity, and evidence-informed solutions as critical attributes of SI for PSEI.

Our definition is similar to others (Benneworth and Cunha, 2015; Phills et al., 2008; Pol and Ville, 2009; Bragaglia, 2021) who defined SI as a novel solution to a social challenge that is more effective, efficient, sustainable, or just than current solutions, and for which the value created accrues primarily to society as a whole rather than private individuals. The defining attributes of intentionality, transdisciplinarity, and evidence-informed solutions were missing from previous definitions but are important to accountability for SI in PSEIs. Our definition uses a complex systems perspective in its reference to institutional logics and gives prominence to institutional theory (see, for example, Greenwood et al. (2011); (Moore and Westley, 2011)). Processes include the interconnection of actors and activities in developing, diffusing, and utilizing innovation addressing societal challenges on an organizational or societal level (Fulgencio and Fever, 2016).

Aligned with others (Milley et al., 2018; Foroudi et al., 2021; Surman, 2018), we found that SI is an inclusive concept that permeates institutional culture at PSEI and encompasses research and practices such as experiential learning, community engagement, social entrepreneurship, and care of the environment, among others (Foroudi et al., 2021; Villar Olaeta, 2017). However, conceptual caution is required to differentiate SI from inclusive innovation (Patiño-Valencia et al., 2022). SI addresses general societal challenges, whether inclusive or not. Inclusive innovation requires reducing exclusionary structural social problems, such as poverty and inequity (Patiño-Valencia et al., 2022).

Our concept analysis corroborates findings that SI is social in its ends and means (Murray et al., 2010), where 'ends' refers to the goals and results, and 'means' refers to the tools that make these results happen (Aleksandrova et al. 2020). Like many others (Kaya Özbağ et al., 2019; Voorberg et al., 2015; von Schomberg, 2013), our definition reflects three important features: (a) focus on the production of sustainable outcomes; (b) innovation that changes relationships among major SI actors; and (c) SI outcomes that are not necessarily related to technology-driven innovations. Indeed, SI aims to develop novel relationships and capabilities that challenge, alter, or replace the dominant institutions or rules to address a social challenge (Avelino et al., 2017; Haxeltine et al., 2016). Thus, the normative ends of activities and outcomes of SI processes need to be agreed on through intentional, collaborative action based on contextual barriers and facilitators (Bolz and de Bruin, 2019). The ongoing challenge is evaluation with the correct balance between processes and outcomes.

Limitations. Although we undertook this concept analysis using a rigorous process with many articles reviewed, we noted limitations. We included only articles published in English; relevant information published in other languages may have furthered this work. We are cognisant that in seeking to understand the elements of a definition of SI, we did not attend to any weighting of elements that may have a bearing on SI activities and impact in different contexts, such as cross-cultural settings and ways of being and thinking. Future research warrants a more granular approach to understanding the importance of the key elements in individual contexts, and additional elements should be considered. Notwithstanding these challenges, this concept analysis is an essential first step in understanding SI in the context of PSEI. While the purpose of this concept analysis was to explore the definition of SI for application to PSEI, the model, borderline, and related cases are limited to one Canadian PSEI. This work invites future hypothesis-testing research and case applications of SI capacity in multiple, diverse PSEIs. Moreover, it remains unclear whether SI is a mature concept transcending context or whether the defining attributes identified here are specific to PSEI. The concept of SI must be contextualized to multiple levels in the ecosystem, inviting further research. Given the relatively slow adoption of the Third Mission in PSEI, many important insights about the conceptualization of SI may exist in the gray literature, which was out of scope for this study. Finally, Indigenous ways of knowing through oral traditions (Kennedy et al., 2023) may offer critical insights into SI that may be absent in this review.

Implications for PSEI. As part of organizational 'social innovativeness', PSEI are well positioned to connect major actors to co-create solutions that serve functional (efficiency and effectiveness) and transformational (justice and sustainability) endpoints (Anheier et al., 2019). Society will benefit from many new and unconventional partnerships *with a deep purpose* to improve quality of life, well-being, and prosperity. Together, these partners will (a) gain a deeper appreciation for the power of data, (b) advance applications using that data to generate evidence-informed solutions, and (c) invest in their data capacity and orient their organizational culture towards SI. Society will benefit from a better understanding of SI and the social challenges being addressed. To accomplish this, PSEIs need to orient students, staff, and faculty to SI and increase exposure through experiential learning that is systems-focused, transdisciplinary, collaborative, contextual, and reflective (McGowan, 2019).

Conclusion

We have advanced a conceptual and theoretical understanding of SI in PSEI, which informs future work of applying its defining

attributes and invites exploratory work to evaluate the concept in PSEI. We conclude that SI is an inclusive concept that includes SE and technological innovation. Indeed, if *social* were removed from the concept, it may situate all innovation as having the potential to impact society positively (Schubert CEEP, 2021). A focus on innovation may also eliminate the blurriness in boundaries between SI and SE that use technology to advance their work. Central to this conclusion is recognizing multiple dimensions of value and differentiating the purpose of innovation as a tool to create forward progress in a society, not only as a means to economic development (Henderson and Teasdale, 2023). Only further examination will determine the extent to which we have captured the essence of SI generally and, more specifically, a contextually imbued meaning specific to PSEI. While we conclude that SI as a concept may not yet be sufficiently mature to offer a nuanced understanding in particular contexts, this concept analysis offers profound resonance, importance, and promise for the contribution of PSEIs within contemporary society.

Data availability

Search terms for each database are provided supplementary information to facilitate replication.

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Author contributions

KB conceptualized the study, designed the concept analysis, analysed data, and wrote the first draft of the manuscript. TB assisted with screening articles, data management, and editing. KAH conducted the literature searches and assisted with data management. DN, AB, ADK, JA, and JD assisted to conceptualize the study and interpret results. All authors read and approved the final version of the manuscript.

Competing interests

The authors declare no competing interests.

Ethical approval

This article does not contain any study with human participants performed by any of the authors.

Informed consent

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Additional information

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Correspondence and requests for materials should be addressed to K. M. Benzies.

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