Beyond Market Readiness

Innovation Ecosystems and Human Needs in the 21st Century

A post-SDG agenda for incubators delivering flourishing lives for all on a flourishing planet

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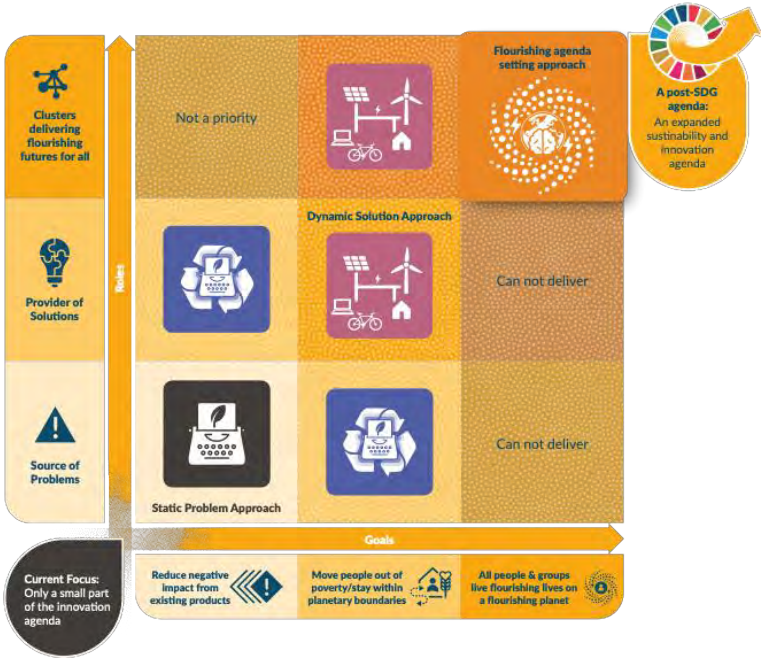
1. Why moving beyond market readiness is necessary and urgent

Innovation ecosystems have become one of the central organizing concepts of the 21st century. Governments, companies, universities, investors, and civil society increasingly rely on them to drive economic growth, technological progress, and solutions to challenges such as climate change, resilience, health, and social development.[1] Yet despite unprecedented levels of innovation capacity, self-reported wellbeing is declining in many countries, mental health challenges are increasing across age groups, many basic human needs remain unmet, and planetary pressures continue to intensify.[2]



This tension points to a growing realization: innovation systems that are guided primarily by market demand are not, on their own, sufficient to deliver a better future.[3] On the contrary, an exclusive focus on technology- and market readiness in the innovation ecosystem will accelerate negative trends, from obesity and mental ill-health to climate change, biodiversity loss, and rising inequality.[4]

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Markets are highly effective at scaling solutions where purchasing power is strong, people have time and capacity to make reflected choices, and short-term returns are clear.[5]

However, human needs are unevenly distributed across income groups, generations, geographies, and time horizons.[6] Many of the most important and reflected needs for individual and collective wellbeing, such as long-term health, creativity, knowledge, inclusion, care, resilience, ecological stability, and intergenerational security, are weakly represented or entirely invisible in market signals.[7] As a result, innovation ecosystems risk becoming highly efficient engines for optimizing what is profitable rather than what is necessary.[8]

This challenge becomes particularly urgent as the world approaches the end of the Sustainable Development Goals (SDGs) framework in 2030. The SDGs have played a critical role in establishing a shared global baseline for reducing harm: addressing extreme poverty, improving access to basic services, and limiting environmental degradation.[9] Yet a post-SDG agenda must move beyond harm reduction. It must articulate a positive and aspirational vision: the conditions under which people can live flourishing lives on a flourishing planet.[10]

A post-SDG agenda raises deeper questions for innovation ecosystems: What should innovation be for, once basic material deprivation is reduced, and how should it be delivered?[11] How should innovation be guided when market demand systematically fails to capture long-term, collective, or non-monetized human needs?

While these questions apply to the entire innovation ecosystem, this paper focuses specifically on incubators and early-stage support structures as a critical leverage point.

Why focus on incubators?

Incubators occupy a uniquely influential position in innovation ecosystems. They operate where "the future is born", at an early stage of venture formation, where ideas, visions, business models, metrics, incentive structures, and growth strategies are still fluid.[12]

Decisions made at this stage, about the purpose of the venture, target markets, revenue logic, stakeholder engagement, and scaling pathways, often lock in trajectories that become difficult to reverse later.[13]

Incubators:

- Shape which problems and opportunities entrepreneurs prioritize and why.
- Influence which ventures receive mentorship, visibility, and early capital.
- Signal what "success" looks like through their evaluation criteria.
- Connect startups to investors, public actors, and corporate partners.
- Provide governance guidance before scaling dynamics intensify.

Because of this early-stage influence, incubators are not neutral intermediaries. They function as norm-setters and filters within innovation ecosystems. They help determine which innovations are amplified and which are marginalized.[14]

This role is particularly critical in domains involving deep tech and disruptive innovation. Areas such as advanced AI, biotechnology, materials science, energy and transport solutions, and enabling digital infrastructures are often inherently general-purpose. They can be shaped toward radically different societal outcomes depending on early design choices, funding structures, and incentive alignment.

Left primarily to market signals, such technologies risk being steered toward applications that reinforce consumption intensity, behavioural capture, inequality, or short-term profit extraction.[15] Yet at early stages, when incubators provide support, different alternative pathways remain open. Aligning ventures with human needs before scaling occurs can profoundly influence long-term trajectories.[16]

For this reason, incubators represent a strategic governance layer within innovation ecosystems. They are sufficiently close to entrepreneurs to influence business model formation, yet sufficiently connected to public institutions and investors to integrate broader societal goals.[17]

From market acceleration to human needs-oriented incubation

In this context, innovation ecosystems become a critical implementation layer of a post-SDG agenda. They have the potential to translate high-level goals into concrete solutions by shaping what is researched, funded, tested, scaled, and governed. Incubators, in particular, translate abstract policy ambitions into operational support structures: selection criteria, mentorship frameworks, funding recommendations, and performance metrics.

If incubators rely primarily on market traction and short-term scalability as guiding signals, they risk reinforcing existing inequalities, short-termism, and environmental degradation. If instead they integrate explicit human-needs frameworks into their evaluation and support processes, they can act as powerful instruments for steering innovation toward long-term sustainable wellbeing.

Positioning human needs at the core of incubator practice does not imply rejecting technology and market readiness. Rather, it reframes markets as one coordination mechanism among several, operating within boundaries defined by human flourishing, inclusion, and biophysical limits.[18] Incubators can thus evolve from being accelerators of growth alone to becoming deliberate stewards of innovation pathways, ensuring that early-stage ventures contribute to flourishing lives for all on a flourishing planet.

2. Eight market failures and a human needs innovation framework

Markets can be excellent at scaling solutions when:

(i) consumers can pay for what they need,
(ii) preferences can be expressed through monetary transactions,
(iii) value can be captured by the provider in relatively short time horizons, and
(iv) no one on the market can influence the system, exploit weaknesses and contribute to mental pollution.

In practice however, market signals increasingly reflect short-term behavioural activation, often driven by dopamine-linked reward loops, institutional power, and financial time compression, rather than what is required for a better society that support flourishing lives on a flourishing planet.

A human-needs framework helps innovation ecosystems identify and counteract these distortions, without assuming that "more market activity" equals "more human needs met and a better society."

1. Purchasing power ≠ human needs[19]

Markets primarily measure effective demand, needs backed by willingness and ability to pay. This creates a structural divergence between what improves wellbeing and what generates revenue. In welfare economics, effective demand reflects purchasing power rather than underlying welfare need, meaning that market signals systematically underrepresent those with low income even when disease burden or social vulnerability is high.[20]

This is not merely an "equity" issue; it is an innovation guidance problem. If market traction is treated as the main proof of relevance, innovation ecosystems will systematically overweight affluent segments and underweight:

- low-income populations
- public-benefit prevention
- needs that are real but poorly monetizable

Recent cross-national research shows that medicine prices, insurance design, and household purchasing capacity strongly determine access, independently of clinical need.[21] Evidence also shows that pharmaceutical innovation tends to focus disproportionately on diseases affecting higher-income populations relative to global burden of disease.[22] Examples include:

- **Lifestyle-related chronic disease**
  Health economics research consistently shows that preventive public health interventions often produce high long-term social returns but weak short-term private returns, creating underinvestment under purely market-driven models.[23]

- **Affordable housing vs. luxury real estate**
  Urban economics research demonstrates that private developers rationally prioritize high-margin developments in affluent neighborhoods when land values and returns are highest, even when aggregate unmet demand for affordable housing is substantial.[24]

- **Assistive technologies and long-term care**
  long-term care financing often depends on public budgets or fragmented household payments, leading to underinvestment relative to projected demographic need.[25]

Implication for innovation ecosystems:
If market signals are used as the only guide, then a lack of markets can be mistaken for lack of need for solutions delivering on human needs. A human needs framework makes unmet human needs in society visible even when purchasing power is weak or non-existing.

2. Dopamine-driven reward loops[26]

A defining feature of modern consumer markets is the systematic commercialization of neural mechanisms that evolved to enhance survival under scarcity. Human reward systems-particularly dopaminergic pathways connecting the ventral tegmental area, nucleus accumbens, and prefrontal cortex-developed to reinforce behaviours that increased evolutionary fitness: consuming calorie-dense foods, responding to novelty, seeking social approval, and conserving energy.[27]

In ancestral environments, these cues were rare and adaptive. In modern commercial environments, they are engineered, amplified, and continuously available. This creates what evolutionary psychologists describe as an evolutionary mismatch, where survival-oriented reward systems are exposed to hyper-stimulating environments far beyond those in which they evolved.[28]

Dopamine plays a central role not merely in pleasure but in motivation, anticipation, and reinforcement learning. Variable reward schedules-where outcomes are unpredictable-produce particularly strong dopaminergic responses and promote repeated checking or seeking behaviour.[29] When commercial actors deliberately design products around these principles, they create environments that favour habit formation and compulsive repetition.

Across sectors, firms increasingly optimize not only for utility, but for reinforcement intensity. The following domains illustrate how survival circuits are operationalized in contemporary markets. Examples include:

- **Addiction-like eating**
  Human preference for sugar, fat, and salt evolved as an adaptive response to caloric scarcity. In modern food systems, these preferences are exploited through the engineering of "hyper-palatable" foods-products formulated with optimized combinations of sugar, refined carbohydrates, fats, salt, and texture to maximize reward intensity.[30]

  Experimental and epidemiological research suggests that ultra-processed foods can activate reward-related neural circuits in patterns resembling other addictive substances for vulnerable individuals.[31]

  The result is a system in which products are optimized for immediate reinforcement rather than long-term metabolic health. Rising rates of obesity, type 2 diabetes, and diet-related chronic disease reflect, in part, the large-scale interaction between evolutionary reward mechanisms and hyper-engineered food environments.[32]

- **Short-term attention tools**
  Social belonging and status sensitivity were evolutionarily critical for survival in small groups. Digital platforms convert these social signals into quantifiable, intermittent micro-rewards-likes, comments, shares, streaks, follower counts-triggering dopaminergic anticipation and repeated checking behaviour.[33]

  Neuroimaging research shows that receiving social media "likes" activates reward-related brain regions associated with reinforcement learning.[34] Importantly, unpredictable notification timing and infinite scroll mechanisms operate on variable reward schedules, which are known to strengthen habit formation.

  Persuasive design research documents how interface architecture-frictionless scrolling, autoplay, algorithmically curated feeds-removes natural stopping cues and maximizes engagement time [8]. Business models dependent on

advertising and data extraction therefore align economically with prolonged attention capture.

Evidence linking heavy social media use with increased anxiety, depressive symptoms, and sleep disruption-particularly among adolescents-remains complex and debated, but systematic reviews increasingly highlight associations between intensive engagement patterns and poorer mental health outcomes.[35]

In evolutionary terms, mechanisms designed to maintain group cohesion are now embedded in scalable attention markets that monetize social reward sensitivity.

- **Fast fashion and approval seeking**
  Humans are highly responsive to signals of social belonging and status differentiation. In traditional societies, clothing served communicative functions tied to identity, group membership, and environmental adaptation. Modern fast fashion systems amplify these signalling dynamics through rapid trend cycles, influencer amplification, and micro-seasons that shorten perceived product lifespans.

  Consumer research shows that fashion consumption is strongly linked to social identity construction and peer comparison processes.[36] Social media intensifies this dynamic by accelerating visibility and trend turnover.

  From a behavioural standpoint, frequent novelty exposure stimulates dopaminergic anticipation mechanisms.[37] Rapid trend replacement creates recurring novelty spikes, encouraging repeated purchasing tied to identity signalling rather than functional need. The economic success of fast fashion therefore rests partly on the systematic activation of status sensitivity and novelty-seeking-mechanisms that once supported adaptive social integration but now drive high material throughput and environmental degradation.[38]

Across food systems, digital platforms, and consumer fashion, a common pattern emerges:

Markets increasingly reward the optimization of survival-era reward circuits-sugar craving, novelty seeking, social validation sensitivity-within environments of abundance.

These systems are economically rational at the firm level. However, at the societal level, they contribute to:

- Chronic metabolic disease
- Attention fragmentation
- Anxiety and mood dysregulation
- High material consumption and environmental strain

The issue is not that dopamine exists. It is that business models are increasingly structured to amplify dopaminergic reinforcement independent of long-term wellbeing.

Implication for innovation ecosystems:
If scale, engagement, and revenue growth remain dominant success metrics, innovation ecosystems will structurally favour ventures that optimize behavioural reinforcement rather than human flourishing.

A human-needs framework introduces a corrective lens. It asks: Does the innovation strengthen long-term health? Does it support autonomy rather than exploit cognitive vulnerabilities? Does it enhance capability, creativity, and connection? Does it operate within planetary limits?

Without such criteria, ecosystems risk accelerating innovations that monetize evolutionary survival mechanisms in ways that undermine human wellbeing.

3. Manipulated demand[39]

Markets do not merely respond to preferences; they actively shape and amplify them. A significant body of behavioural economics and consumer research demonstrates that preferences are endogenous, formed and modified through framing, social influence, advertising exposure, and choice architecture.[40]

Through branding, framing, identity signalling, algorithmic amplification, and behavioural design, firms influence what individuals perceive as necessary, urgent, or desirable. Digital platforms can conduct large-scale, real-time experiments to optimize user behaviour, effectively transforming preference formation into an engineered process.[41]

This creates a structural divergence between expressed demand and underlying human needs. When preferences are continuously shaped by marketing ecosystems and digital optimization systems, market signals reflect inducement capacity rather than wellbeing value. Growth, therefore, may indicate successful preference construction rather than meaningful improvement in quality of life.

Research in consumer psychology shows that social comparison, scarcity framing, and identity-based messaging significantly increase willingness to purchase independent of functional need.[42] If innovation ecosystems treat rising demand as proof of relevance, they risk reinforcing cycles of manufactured consumption while underinvesting in solutions addressing structural wellbeing gaps. Examples include:

- **Beauty and personal care: insecurity-based positioning**
  Marketing research documents how beauty and personal care industries frequently activate self-discrepancy and appearance-based comparison processes to stimulate consumption.[43] Exposure to idealized body imagery and "problem-solution" framing (e.g., anti-aging, skin imperfections) increases dissatisfaction and purchase intention, even in the absence of objective need.

- **Consumer electronics: planned novelty cycles and status signalling**
  Consumer behaviour research demonstrates that perceived obsolescence often arises from symbolic and social signalling dynamics rather than technical necessity.[44] Annual product cycles and marketing emphasis on incremental upgrades amplify status competition and novelty-seeking behaviour.

- **Tourism and "experience" markets driven by social proof**
  Digital platforms amplify destination visibility through algorithmic ranking and viral content, creating waves of demand driven by social proof rather than intrinsic need.[45] Empirical work shows that online reviews and influencer content significantly alter destination choice and willingness to pay.[46]

- **Credit and "pay later" products that de-salience future cost**
  Behavioral finance research demonstrates that separating consumption from immediate payment reduces the "pain of paying," increasing consumption propensity.[47] Buy-now-pay-later models and micro-credit systems leverage temporal discounting biases, shifting attention from long-term budget impact to short-term gratification.

Implication for innovation ecosystems:
If demand is engineered, market traction becomes an ambiguous signal. Innovation ecosystems must distinguish between value created and desire stimulated. A human-needs framework introduces evaluative criteria that ask not only whether users want a product, but whether it addresses a genuine constraint on flourishing.

4. Short-term optimization[48]

Even when long-term benefits are large and well evidenced, competitive markets often underweight them because financing and valuation systems reward near-term performance. Empirical financial economics shows that equity markets and executive compensation structures systematically prioritize short-term earnings performance, influencing corporate investment behaviour.[49]

This is visible in corporate capital allocation patterns, R&D choices, and managerial incentives. Recent theoretical and empirical work models how short-horizon investors can create a "short-termism trap," pushing firms toward short-maturity projects even when this reduces long-term firm value in equilibrium.[50]

In public-welfare domains (health, resilience, social infrastructure), short-termism is especially damaging because the highest-value interventions are preventative, cumulative, and often only measurable over long horizons.

Short-term optimization distorts innovation priorities by privileging rapid monetization over cumulative societal benefit. When financing structures, reporting cycles, and performance incentives emphasize near-term returns, solutions requiring longer development horizons are systematically disadvantaged. Studies of corporate myopia show that firms facing greater short-term earnings pressure reduce long-term investment, including R&D and human capital development.[51]

This is not simply a capital allocation issue; it is an innovation direction issue. If ecosystems reward quick scaling and early revenue above long-term resilience, they will overproduce incremental optimizations and underproduce systemic transformations. Examples include:

- **Energy Systems: Incremental Optimization Over Structural Transition**
  Energy investment patterns frequently favor incremental efficiency improvements within existing fossil-based systems rather than transformative infrastructure with longer payback periods (e.g., grid modernization, deep retrofits, storage ecosystems). Research in climate economics demonstrates that short discount horizons and capital market constraints can slow deployment of long-lived decarbonization infrastructure despite strong long-term benefits.[52]

- **Housing and Urban Development: Short-Term Return Over Long-Term Liveability**
  Real estate development models frequently prioritize rapid turnover and price appreciation rather than long-term social cohesion, walkability, or climate resilience. Urban economics literature documents how speculative dynamics and short investment horizons shape development patterns even when long-term social infrastructure benefits are well understood.[53]

- **Digital Products: User Growth Over User Wellbeing**
  Digital platform firms are rewarded for monthly active users, engagement intensity, and retention metrics. Organizational research shows that metric-driven environments shape product design toward measurable short-term growth indicators rather than long-term user wellbeing or social outcomes.[54]

Implication for innovation ecosystems:
If funding, acceleration, and scaling decisions depend heavily on short-term traction, the ecosystem will structurally underproduce long-horizon solutions that are essential for flourishing lives.

5. Externalities and shared systems[55]

Markets generally fail to price harms and benefits that occur outside individual transactions, particularly when impacts are diffuse, delayed, spatially dispersed, or collectively shared. Classical economic theory recognizes externalities as side effects of production or consumption not reflected in prices. In the 21st century, however, the scale and interdependence of these effects have transformed them from isolated inefficiencies into systemic risks.[56]

While firms optimize within existing price signals, many critical determinants of human wellbeing, climate stability, biodiversity integrity, clean air, soil fertility, freshwater availability, antimicrobial effectiveness, and social trust, exist largely outside direct market exchange. They function as foundational public goods and shared ecological infrastructures.[57] Their degradation often occurs gradually or at a distance from the originating transaction, making it difficult for price mechanisms alone to internalize their value.

The absence of effective pricing for shared-system degradation means innovation can be highly efficient while intensifying long-term instability. Competitive pressure may amplify this dynamic: firms that internalize environmental or social costs can face short-term disadvantages relative to those that externalize them.[58] As a result, markets do not reliably converge toward sustainable equilibria where shared systems are concerned.

This is not a marginal technical failure. It is a boundary condition problem. Markets operate within biophysical systems but do not automatically protect the thresholds that sustain them. Research on planetary processes shows that destabilization of climate regulation, nitrogen cycles, biodiversity, and ocean chemistry alters development prospects and security conditions across generations.[59]

In this context, externalities are not mere "spillovers." They signal interaction with complex adaptive systems that contain tipping points and nonlinear feedback loops.[60] Once critical thresholds are crossed, cascading effects can emerge that markets are structurally ill-equipped to anticipate or manage. Examples:

- **Fossil-intensive supply chains**
  Short-term cost advantages in energy, transport, and materials persist despite long-term climate destabilization costs that remain partially externalized. Integrated assessment models show that carbon-intensive production continues because market prices fail to reflect full social cost of emissions.[61]

- **Fast material throughput in consumer goods**
  Low-cost plastics and disposable products create long-lived waste streams and ecosystem harm not reflected in purchase prices. Global material flow analyses demonstrate that rising throughput generates accumulating ecological burdens outside market accounting.[62]

- **Air pollution from urban mobility systems**
  Automotive markets reward vehicle sales while health impacts from particulate emissions fall on public systems. Epidemiological evidence links air pollution exposure to large mortality and morbidity burdens not internalized in vehicle pricing.[63]

Implication for innovation ecosystems:
If shared-system impacts remain external to evaluation frameworks, innovation ecosystems risk amplifying degradation pathways. A human-needs framework embeds planetary and collective constraints into innovation assessment, ensuring that private scaling does not undermine shared life-support systems.

6. Fragmentation of complex human needs[64]

Human needs are interdependent and systemic. Health depends on housing quality, food systems, environmental exposure, social cohesion, education, and economic stability. Public health and systems research consistently show that these determinants interact across domains rather than operate in isolation.[65] Yet market organization tends to fragment these interdependencies into separate sectors with independent revenue models and optimization logics.

This sectoral fragmentation can produce innovations that are locally rational but systemically harmful. A firm may successfully optimize within its industry while collectively contributing to worsening outcomes across connected domains. Systems science literature describes how siloed governance structures generate "policy resistance," where improvements in one sector unintentionally exacerbate pressures in another.[66]

Over time, this fragmentation creates reinforcing feedback loops. For example, food systems optimized for low-cost caloric output interact with sedentary urban design and high-stress work environments, contributing to chronic disease burdens. The concept of "syndemics" highlights how obesity, malnutrition, and climate change are co-produced by interconnected systems of production and consumption.[67] Each sector appears innovative within its boundaries, yet the overall system drifts further from conditions that support flourishing.

This dynamic also distorts measurement and accountability. Because performance metrics are typically sector-specific—healthcare costs, transport efficiency, education test scores—no single actor is responsible for integrated wellbeing outcomes. Research on performance management shows that narrow metrics can drive optimization within sectors while obscuring cross-sector externalities and long-term resilience impacts.[68] Without deliberate coordination across domains, markets reward partial optimization rather than systemic coherence.

When innovation ecosystems evaluate ventures in isolation rather than as part of interacting systems, they risk accelerating fragmented solutions that intensify rather than resolve structural challenges. Examples:

- **Chronic disease management ecosystems**
  Pharmaceuticals, medical devices, and specialized clinics profit from managing conditions whose upstream determinants, diet, stress, urban design, remain under-addressed. Epidemiological evidence demonstrates that chronic disease burdens are strongly shaped by social and environmental determinants beyond healthcare delivery.[69]

- **Vehicle-centric mobility systems**
  Vehicle innovation improves efficiency and comfort while contributing to sedentary lifestyles, congestion, and urban sprawl. Urban health research links car-dependent planning to reduced physical activity and increased non-communicable disease risk.[70]

- **Education technology focused solely on test performance**
  Digital tools may optimize measurable outputs while neglecting social development, creativity, or long-term cognitive resilience. Education research shows that excessive focus on standardized metrics can narrow learning outcomes and undermine broader capability development.[71]

Implication for innovation ecosystems:
If innovation support structures evaluate ventures sector by sector, without assessing systemic interaction, fragmentation persists. A human-needs framework promotes cross-sector alignment and system-level outcome evaluation rather than isolated performance me

7. Power Imbalance[72]

Markets are not neutral arenas of equal actors. Political economy research demonstrates that institutional asymmetries allow large firms and concentrated capital to shape regulatory environments, public narratives, technical standards, and cultural norms.[73] Market competition therefore unfolds within power structures that influence which problems are prioritized and which solutions are deemed legitimate.

When dominant actors influence rule-setting processes, market signals may reflect strategic advantage rather than societal priority. Contemporary analyses of regulatory capture show that influence operates not only through direct lobbying but through structural dependence, informational asymmetry, and long-term institutional relationships.[74] As a result, regulatory frameworks and standards can entrench incumbent models while raising barriers to alternative approaches.

Power imbalance operates not only through formal political intervention but also through agenda-setting and framing mechanisms. Research in science and technology studies shows how corporations influence research funding priorities, sponsor academic partnerships, shape media discourse, and define technical benchmarks that determine what qualifies as "innovation".[75] By shaping evaluative criteria and policy narratives, dominant actors can narrow the field of acceptable alternatives before competitive processes even begin.

This dynamic creates path dependency within innovation ecosystems. Institutional theory and platform economics research demonstrate that start-ups frequently align their business models with dominant infrastructures, digital platforms, distribution networks, supply chains, because these define access to capital, customers, and data.[76] Over time, such alignment can lock ecosystems into incremental adaptations of incumbent systems rather than enabling transformative alternatives that better serve long-term human needs.

Innovation ecosystems therefore operate within a political-economic context structured by concentrated power. Without deliberate safeguards, they may unintentionally reproduce dominant pathways rather than challenge them. Examples:

- **Platform dominance in digital markets**
  Large technology firms can influence standards, control data infrastructures, and acquire emerging competitors, shaping innovation trajectories. Empirical research documents how platform concentration affects entry dynamics and acquisition strategies in digital markets.[77]

- **Pharmaceutical pricing and patent extensions**
  Strategic use of intellectual property rules, including patent evergreening and regulatory exclusivity extensions, can delay generic competition and sustain high prices independent of therapeutic value.[78]

- **Food industry lobbying on labelling and public health regulation**
  Research on corporate political activity shows how food and beverage firms use framing strategies and coalition-building to influence nutrition policy and labeling standards.[79]

Implication for innovation ecosystems:
If power asymmetries shape market signals, incubators and innovation actors must consciously avoid equating dominant market position with societal benefit. A human-needs framework introduces countervailing criteria that prioritize public interest and long-term wellbeing over incumbent advantage.

8. Missing Futures[80]

Future generations have needs but no purchasing power, no voting rights in present markets, and no direct participation in investment decisions. Even when future risks are predictable, demographic ageing, climate impacts, infrastructure decay, market systems systematically discount long-term consequences. Intergenerational welfare economics demonstrates that standard market discounting undervalues long-term wellbeing relative to present consumption.[81]

Discount rates embedded in financial models, political cycles, and performance metrics compress the future into present-value calculations. Empirical research shows that high discount rates and short political time horizons bias decision-making toward near-term payoffs, even when long-term social returns are substantially higher.[82] This creates a structural tendency toward underinvestment in anticipatory solutions and overinvestment in immediate consumption.

The absence of a market voice for future populations results in chronic under-provision of resilience, prevention, and inter-generational equity. Climate economics literature highlights how future damages are systematically undervalued when evaluated through conventional cost–benefit frameworks.[83]

This temporal asymmetry is not limited to climate risk. It affects all domains where benefits accrue slowly and cumulatively. Investments in cognitive development, ecosystem restoration, public health infrastructure, or institutional capacity often yield compounding returns over decades. Longitudinal evidence from early childhood development research shows very high long-term social returns, yet sustained funding remains politically fragile because benefits materialize beyond electoral cycles.[84] Evaluation systems privilege short-term measurable outputs over long-term capability formation.

Moreover, future risks often interact in nonlinear ways. Climate stress can exacerbate migration pressures, infrastructure strain, food insecurity, and geopolitical instability. Ageing demographics can amplify fiscal stress on healthcare and pension systems. Systems risk research demonstrates that interacting long-term pressures can generate cascading instability that is difficult to predict using short-horizon models.[85] Because these dynamics unfold gradually, they are deprioritized in competitive markets focused on present returns. Examples:

- **Ageing population support systems**
  Long-term care infrastructure and assistive technologies often remain underdeveloped until demographic pressure becomes acute. Demographic projections show predictable increases in dependency ratios decades in advance, yet investment in care capacity typically lags projected need.[86]

- **Early childhood development programs**
  Long-term cognitive, educational, and health benefits are well documented, yet funding remains politically and financially constrained because returns materialize over long time horizons.[87]

- **Public research in foundational science**
  Basic research with long horizons depends disproportionately on public funding due to weak immediate monetization. Innovation studies show that foundational scientific breakthroughs often precede commercial application by decades, making them unattractive under short private return expectations.[88]

Implication for innovation ecosystems:
If future needs lack institutional representation, innovation will skew toward present consumption. A human-needs framework explicitly integrates intergenerational considerations into

evaluation criteria, ensuring that anticipatory innovation receives sustained support

3. Innovation ecosystems delivering on human needs

If market demand alone is insufficient to identify and prioritize human needs, the role of innovation ecosystems must be reconsidered.[89] An innovation ecosystem that aims to deliver flourishing lives for all on a flourishing planet cannot be limited to accelerating market-ready solutions. It must also be capable of identifying unmet needs, future needs, and collective needs, and of mobilising innovation activities before clear demand signals emerge.[90]

Recent work on expanded innovation agendas for cities and regions highlights that innovation ecosystems operate across multiple layers simultaneously: governance, finance, infrastructure, data, institutions, culture, and human capital.[91] Within this broader system, markets are only one coordination mechanism among several. Others include public mission-setting, needs assessments, long-term planning, experimentation, and institutional collaboration across sectors.[92]

A human-needs-based innovation ecosystem therefore shifts the primary question from "What solutions are market-ready?" To "What human needs must be met, now and in the future, within planetary limits, and what mix of actors and instruments is required to meet them?"

This shift is particularly important in a post-SDG context, where the challenge is no longer only to reduce clearly negative outcomes, but to actively enable flourishing lives at scale.[93]

3.1 Inclusion and unmet needs

One of the most persistent gaps in market-led innovation is inclusion. Large segments of the population experience unmet or under-met needs not because solutions are technically infeasible, but because expected financial returns are weak, delayed, or uncertain.[94] Preventive health, accessibility solutions, affordable housing, mental health support, and basic services in low-income or rural contexts are well-documented examples.[95]

A needs-led innovation ecosystem makes these gaps visible by explicitly mapping human needs across populations, rather than inferring them from purchasing power. In doing so, it enables innovation actors to distinguish between low demand caused by lack of relevance and low demand caused by exclusion.[96]

This approach also changes how success is measured. Instead of focusing only on revenue growth or scale in affluent markets, innovation performance can be assessed in terms of needs met, risks avoided, and wellbeing improved, particularly for groups that are otherwise underserved.[97]

Key implication:
Absence of market demand often signals exclusion, not irrelevance.

3.2 Future needs and demographic change
Many of the most consequential human needs are temporally misaligned with market signals. Ageing populations, rising chronic disease burdens, cognitive health, long-term care systems, and social support structures are all highly predictable needs based on demographic trends.[98] Yet innovation in these areas often lags, as benefits accrue over long time horizons and target groups may have limited purchasing power.[99]

An innovation ecosystem oriented toward human needs must therefore be anticipatory rather than reactive. This requires systematic foresight, demographic analysis, and early-stage experimentation, supported by public and mission-oriented actors that can absorb uncertainty and long development cycles [4].

The expanded innovation agenda highlights that cities and regions are particularly well positioned to act on future needs, as they experience demographic and social changes directly and can align innovation efforts across health, housing, mobility, and social services.[100]

Key implication:
Anticipatory innovation requires needs-based foresight, not reactive demand.

3.3 Planetary sustainability as a boundary condition
Planetary sustainability is not a separate objective from human needs; it is a prerequisite for meeting them over time.[101] Short-term consumption patterns that benefit a minority can undermine the life-support systems required for current and future populations to flourish.

Markets alone are structurally ill-equipped to protect shared planetary systems, as many environmental costs remain external to individual transactions.[102] A needs-led innovation ecosystem therefore treats planetary boundaries as non-negotiable constraints within which innovation must occur, rather than as optional considerations or niche markets.

This framing aligns innovation with avoided emissions, resource efficiency, resilience, and system transformation, rather than incremental optimisation of existing, high-impact pathways.

Key implication:
Markets must be nested within biophysical limits, not expected to discover them organically.

3.4 Toward a 21st-century innovation ecosystem
Taken together, inclusion, future needs, and planetary sustainability point toward a redefinition of innovation ecosystems. In the post-SDG era, innovation systems must be capable of delivering value where markets are weak, slow, or silent, while still leveraging markets where they are effective.

A human-needs-based framework does not replace markets, but complements them with governance, missions, metrics, and institutions that reflect long-term human and planetary priorities. This expanded innovation agenda allows cities, regions, companies, and

research institutions to move from being problem reducers to becoming solution providers for flourishing lives on a flourishing planet.

4. Integrating delivery on human needs for all in innovation ecosystems

To translate a human-needs-first innovation agenda into practice, leaders across policy, business, finance, academia, and innovation support organisations should consider the following actions:

Actions to integrate human needs for all in innovation ecosystems

1. ***Redefine success criteria for innovation***

Move beyond market traction and short-term financial performance as primary indicators of success. Explicitly include criteria related to human needs met, wellbeing outcomes, inclusion, avoided harm, and long-term resilience in how innovations are evaluated and supported.

2. ***Integrate Business Model Innovation Assessment for Human Needs***

Adopt systematic business model development and benchmarking tools to assess start-ups, companies, and innovations at early stages. Use these tools not only to evaluate economic viability, but to examine how value is created and for whom, what needs are addressed, and what risks or externalities are generated.

3. ***Complement market signals with needs assessments***[103]

Institutionalise human-needs assessments within innovation programmes, incubators, and funding mechanisms. Treat weak market demand as a signal for further investigation, not automatic rejection, particularly for innovations targeting underserved groups, future needs, or collective goods.

4. ***Align public funding and innovation support with human needs-led criteria***

Use public procurement, grants, mission-oriented funding, and innovation challenges to crowd in solutions that markets underprovide. Apply structured assessment tools to ensure supported innovations align with long-term human and planetary priorities, not only near-term scalability.

5. ***Build capability across the ecosystem***

Invest in training and capacity-building so that innovation managers, investors, and policymakers can use business model benchmarking tools in a human-needs context. This includes understanding systemic impacts, long-term value creation, and trade-offs across social, environmental, and economic dimensions.

6. ***Continuously learn and recalibrate***

Treat the innovation ecosystem itself as a learning system. Use ongoing benchmarking and evaluation to identify patterns of over- and under-investment, adjust priorities, and refine how human needs, market mechanisms, and planetary boundaries are balanced over time.

5. Capacity building for human need driven leaders in innovation ecosystems

1. Redefine Success Criteria for Innovation

Innovation ecosystems tend to inherit the success metrics of financial markets: growth, valuation, speed, and exit potential. While these indicators are useful, they are incomplete proxies for societal value. If incubators evaluate startups primarily on traction and revenue, they implicitly assume that market demand reflects human need. As outlined earlier, this assumption is often false.

Redefining success criteria is therefore the foundational capacity shift. It involves expanding what counts as "performance" to include human needs met, harms avoided, inclusion achieved, and resilience strengthened. This does not replace financial discipline; rather, it complements it with a broader definition of value creation. When incubators signal that wellbeing, prevention, and long-term impact matter alongside growth, they reshape entrepreneurial incentives from the earliest stages.

How an incubator can build capacity:

A. Introduce a dual-metric evaluation framework

- Combine traditional metrics (revenue, traction, runway) with:
  - Human needs addressed (clear problem framing)
  - Target population (who benefits, who is excluded)
  - Wellbeing outcomes (e.g., health, autonomy, capability)
  - Avoided harm (emissions, inequality, addictive use patterns)
  - Long-term resilience contribution
- Require assessment on both sets of metrics and integrate in investment and market/supply-chain dialogues.

B. Implement "Flourishing KPI" dashboards

- Develop standardized indicators (e.g., delivery on human needs, avoided CO_2, improved access hours, reduced stress indicators, inclusion rate).
- Make these visible alongside growth charts in pitch decks and internal dashboards.

C. Adjust selection criteria

- During intake screening, score applicants on:
  - Human needs delivery (what human need if any will be met)
  - Global inclusion/export potential (is the innovation resource efficient and cost efficient enough so that to can deliver in a world where 8-12 billion people live flourishing lives)
  - Planetary compatibility (Does the innovation support a Half-Earth future where 8-11 billion can live flourishing lives on a flourishing planet)
- Ensure at least a percentage of cohort slots are reserved for high-need but lower-traction startups.

D. Redesign Demo Day narratives

- Require founders to articulate:
  - Whose lives improve?
  - Over what time horizon?
  - What harm is reduced?
- Invite public health, social policy, or environmental experts as evaluators alongside investors.

2. Integrate Business Model Innovation Assessment for Human Needs

Many societal impacts are not determined by the technology itself but by the business model through which it is deployed. Revenue logic, incentive structures, pricing strategies, and stakeholder relationships shape who benefits, who pays, and what risks emerge. Yet business model analysis is often treated narrowly as a question of profitability.

Building capacity in structured business model assessment means systematically examining how value is created and captured, and at whose expense. By introducing structured tools early in the incubation process, ecosystems can identify externalities, behavioural risks, exclusion patterns, and long-term systemic effects before they become locked in. Early-stage reflection is particularly important for digital and deep-tech ventures, where scaling dynamics can rapidly amplify both benefits and harms.

How an incubator can build capacity:

A. Mandatory early-stage business model diagnostics

- Use structured tools (e.g., extended Business Model Canvas) that explicitly assess:
  - Value creation
  - Value capture
  - Externalities
  - Stakeholder distribution
  - Dependency on engagement intensity

B. Externality mapping workshops

- Facilitate sessions where startups identify:
  - Direct impacts
  - Indirect system effects
  - Long-term risks
  - Potential unintended consequences

C. Revenue-quality assessment

- Distinguish between:
  - Revenue from capability-building value
  - Revenue from behavioural capture (e.g., ad-driven engagement)
- Encourage founders to explore alternative monetization models where needed.

D. Risk stress-testing

- Introduce scenario exercises:
  - What if regulation changes?
  - What if long-term harm evidence emerges?
  - What if vulnerable populations are affected?

3. Complement Market Signals with Human Needs Assessments

Markets provide information, but they do not provide a complete map of societal priorities. Weak demand may signal lack of relevance, but it may also signal affordability barriers, future needs, public goods characteristics, or structural exclusion. If incubators rely solely on market traction as their radar, they risk overlooking precisely those innovations that address high-need, low-income, or long-horizon challenges.

Institutionalizing human-needs assessments adds a second lens to opportunity evaluation. It shifts the central question from "Is there strong paying demand now?" to "Where are wellbeing gaps most severe, and what innovation pathways could address them?" This anticipatory and inclusion-oriented perspective strengthens the ecosystem's ability to identify and nurture solutions that markets alone might neglect.

How an incubator can build capacity:

A. Human-needs mapping at intake

- Require startups to map:
  - Primary needs addressed
  - Target populations
  - Unserved groups
  - Long-term demographic relevance
- Compare this against regional/national burden-of-disease or vulnerability data.

B. "Low-traction deep-need" review panel

- When market demand is weak, conduct a structured secondary review:
  - Is low traction due to affordability barriers?
  - Is it a future demographic need?
  - Is it a public good?
- Avoid automatic rejection based on weak revenue signals.

C. Community advisory boards

- Include representatives from underserved populations to provide feedback on relevance and accessibility.

D. Human needs-based opportunity scans

- Publish annual priority areas based on:
  - Basic human needs
  - Flourishing needs

4. Align Public Funding and Innovation Support with Human Needs-Led Criteria

Public resources play a disproportionate role in shaping early innovation trajectories. Grants, procurement programs, mission-oriented funding, and challenge competitions influence which problem areas receive entrepreneurial attention. If these mechanisms mirror purely market-driven selection criteria, they reinforce existing distortions.

Aligning funding with needs-led criteria ensures that public support actively corrects market blind spots rather than amplifying them. This requires explicit alignment with long-term human and planetary priorities—such as prevention, resilience, inclusion, and systemic sustainability. By crowding in innovation where private returns are weak but societal returns are strong, incubators and public partners can rebalance the innovation landscape.

How an incubator can build capacity:

A. Mission-oriented funding tracks

- Create thematic tracks (e.g., Healthy Aging, Regenerative Food, Climate Resilience).
- Link eligibility to clear human-needs objectives.

B. Public procurement pilots

- Partner with municipalities to pilot solutions addressing:
    - Public health gaps
    - Energy efficiency
    - Social inclusion
- Provide early-stage demand for non-market-strong innovations.

C. Blended finance mechanisms

- Combine grants + equity for:
    - Prevention-focused startups
    - Public good innovations
- Reduce pressure for short-term revenue scaling.

D. Impact-weighted investment committees

- Include impact specialists in funding decisions.
- Use structured scoring that balances:
    - Financial viability
    - Needs intensity
    - Long-term systemic contribution

5. Build Capability Across the Ecosystem

Shifting from a market-only lens to a human-needs-informed approach requires new competencies. Founders must understand systemic impacts and long-term value creation. Investors must be able to evaluate prevention-based or delayed-return models. Policymakers and incubator managers must interpret business models not only for financial viability but also for societal alignment.

Building capability across the ecosystem means embedding systems thinking, behavioural awareness, and long-horizon analysis into training, mentoring, and governance structures. Without shared understanding, needs-based criteria risk remaining rhetorical. With capability development, they become operational tools that shape real decisions.

How an incubator can build capacity:

A. Training modules for founders

- Topics:
    - Systemic impact analysis
    - Behavioural ethics in product design
    - Long-term value creation vs short-term engagement
    - Planetary boundary implications

B. Investor education workshops

- Train angel networks and VCs on:
    - Evaluating prevention-based business models
    - Understanding delayed return structures
    - Identifying addiction-compatible revenue risks

C. Cross-sector immersion programs

- Organize visits to:
    - Public health departments
    - Urban planning units
    - Climate adaptation agencies
- Expose founders to system realities beyond market segments.

D. Embedded ethics and systems advisors

- Provide expert advisors on:
    - Behavioural design
    - Public health
    - Environmental systems
- Integrate them early, not post-scale.

6. Continuously Learn and Recalibrate

Innovation ecosystems are dynamic. Market conditions shift, technologies evolve, demographic pressures change, and unintended consequences emerge. A needs-based framework cannot be static; it must be adaptive and evidence-informed.

Treating the incubator itself as a learning system enables continuous recalibration. By systematically reviewing portfolio patterns, impact outcomes, and emerging societal risks, ecosystem leaders can detect overinvestment in engagement-driven models, underinvestment in prevention, or new blind spots related to future generations. Continuous learning transforms needs alignment from a one-time policy decision into an ongoing governance process.

How an incubator can build capacity:

A. Portfolio pattern analysis

- Annually assess:
  - % of startups serving high-income vs low-income groups
  - % revenue tied to engagement-based models
  - % targeting prevention vs remediation
  - Climate alignment of portfolio

B. Longitudinal impact tracking

- Follow startups beyond exit:
  - Did predicted wellbeing outcomes materialize?
  - Did unintended harms emerge?
  - Were addiction risks observed?

C. "Red team" review cycles

- Invite external experts to challenge:
  - Blind spots
  - Systemic overinvestment patterns
  - Missing needs

D. Adaptive selection criteria

- Adjust intake priorities based on:
  - Emerging societal risks
  - Demographic changes
  - Environmental thresholds

E. Transparent reporting

- Publish annual "Needs Alignment Report":
  - Areas overfunded
  - Areas underfunded
  - Lessons learned
  - Recalibration decisions

6. Next steps

This paper has argued that innovation ecosystems guided primarily by market signals are powerful engines for scaling solutions aligned with short-term profitability, strong purchasing power, and established consumption patterns. Yet they remain structurally weak in identifying, prioritising, and safeguarding the full spectrum of human needs across populations, generations, and planetary boundaries.

If the post-SDG era is to move beyond harm reduction toward enabling flourishing lives for all on a flourishing planet, the critical question is not whether innovation should continue, but how it should be guided, and by whom.

This is why the focus on incubators is decisive. Incubators operate at the formative stage of innovation trajectories — where purposes are articulated, business models designed, metrics chosen, and incentives aligned. At this early moment, alternative futures remain open. Once ventures scale, capital intensifies, and network effects consolidate, redirection becomes exponentially more difficult.

Incubators therefore represent a strategic governance layer within innovation ecosystems. They are not merely accelerators of growth; they are filters of possibility. They shape which problem framings are legitimized, which solution pathways are amplified, and which definitions of success become normalized.

A post-SDG innovation agenda must therefore move from market acceleration alone to human-needs-oriented incubation.

Incubators and the Next Generation of Solution Providers

If innovation ecosystems are to contribute to flourishing lives, incubators must intentionally cultivate a new generation of solution providers, ventures that address not only material deficits but also the deeper conditions for wellbeing, capability, and meaning.

This includes support for ventures that support higher human needs: Creativity, Knowledge, Collaboration

Flourishing lives extend beyond physical survival and consumption. They include:

- Creative expression
- Intellectual exploration
- Scientific curiosity
- Cultural participation
- Collective problem-solving

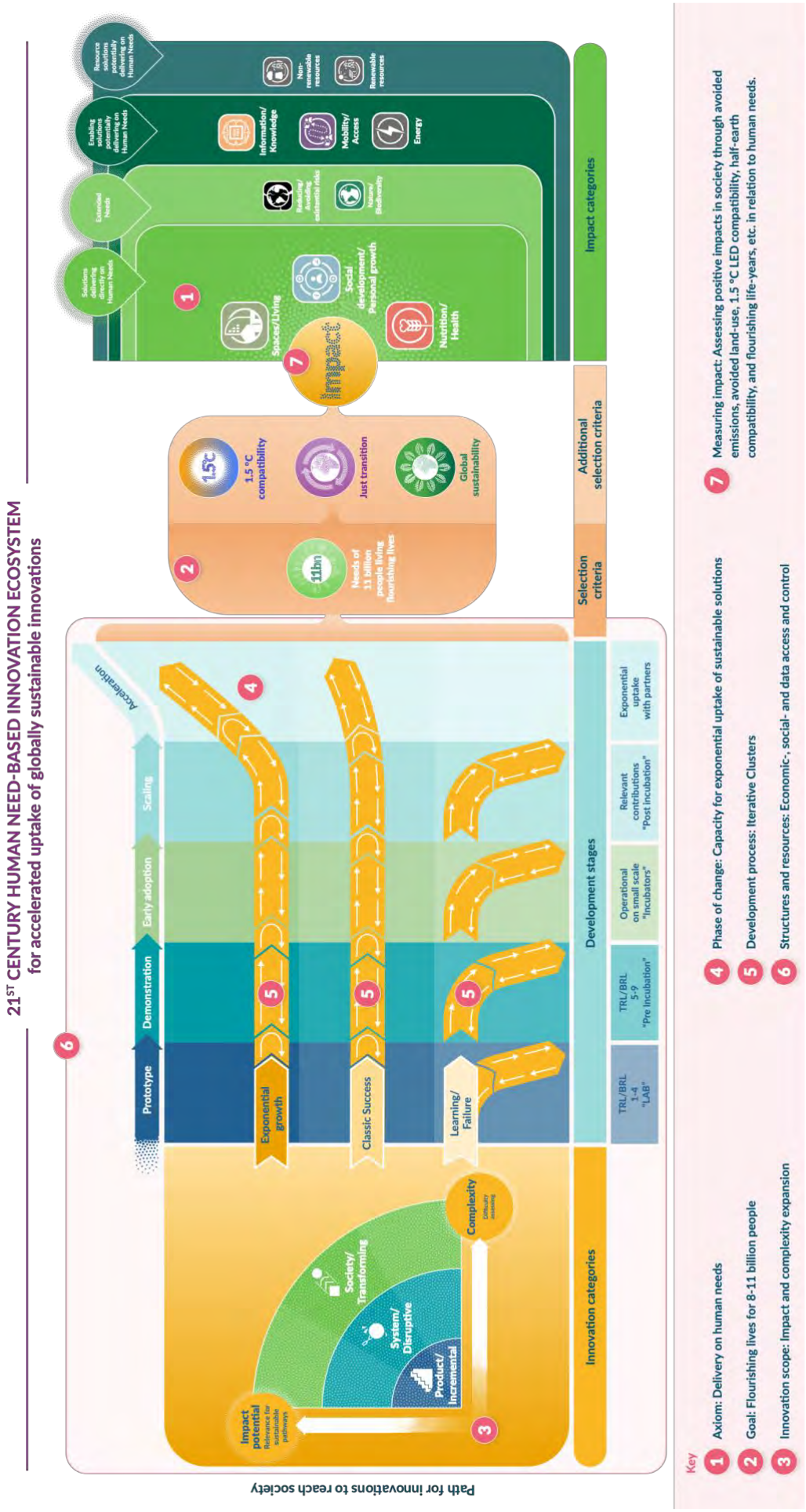
Science centres, cultural centres, maker spaces, libraries, digital labs, museums, and interdisciplinary collaboration hubs are not peripheral institutions. they are infrastructure for higher human development.

Incubators can:

- Partner with science centres to co-develop exploratory technology ventures.
- Use cultural institutions as testbeds for participatory design and creative entrepreneurship.
- Support hybrid ventures that combine art, science, and sustainability.
- Encourage ventures that build collective intelligence rather than individual consumption intensity.

In doing so, incubators help cultivate citizens as creators and contributors, not merely consumers.

Appendix 1: A 21st century innovation ecosystem



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