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Health Policy Analysis

Building Blocks of Value Creation Within Value-Based Health Systems: A Delphi Study

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ABSTRACT

Objectives: Health technologies can provide significant value to health systems; however, identifying and structuring the factors that drive this value is crucial for informed resource allocation. This study aims to develop a consensus-driven framework that defines the key factors influencing value creation in health technologies and identifies system-level barriers that may limit their potential impact.

Methods: A mixed-method approach was used, starting with a targeted review, resulting in 21 frameworks that informed an initial framework draft. A 3-round web-based Delphi exercise was conducted with 22 experts from academia, industry, patient representation, policy making, and healthcare regulation. In round 1, participants contributed value statements—specific characteristics influencing value creation—within the initial framework. Thematic analysis using NVivo consolidated these into a comprehensive framework. Rounds 2 and 3 involved participants rating the importance of these cocreated statements on a 5-point Likert scale.

Results: The scoping review yielded 10 value domains (politics, health system organization, governance, financing, geographic features, population health, resource generation, providers, private industry, and technology features) with 46 subdomains. The Delphi exercise ultimately generated 61 value statements for 38 subdomains, with 17 achieving consensus and stability.

Conclusions: The resulting value framework offers an evidence-based, system-centered approach to value assessment, incorporating diverse stakeholder perspectives and system factors. This approach addresses gaps in current value capture. Future research should focus on validating the domains and subdomains identified in this framework across different healthcare settings.

Keywords: Delphi Method, framework, health system, health technology, value assessment.

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Highlights

- Health technology value assessment is complex, requiring a multifaceted framework to capture broad system factors and guide resource allocation. Traditional frameworks often focus narrowly on direct clinical outcomes, overlooking broader system influences and stakeholder perspectives that are crucial for long-term impact on health systems.
- This article presents a consensus-driven, system-centered framework that integrates key factors influencing health technology value. By engaging diverse experts, the study highlights both facilitators and barriers to value creation, offering a comprehensive tool to assess technology value more accurately and inform decision making in complex healthcare environments.
- The framework identifies value drivers often missed in traditional assessments. This insight supports decision makers in identifying and prioritizing technologies based on system factors, thereby aligning value assessment with evolving health policy and funding environments.

Introduction

Decisions about which health technologies to select and fund are among the most consequential policy choices for health systems, influencing both population health and system sustainability. Under ideal conditions, these decisions maximize patient benefit under fixed budgets.[1] However, in practice, even therapies with strong clinical evidence often fail to deliver promised benefits because of "system factors," such as organizational, political, and financial barriers that impede implementation (implementation is the period that follows the decision to adopt—we follow this convention from Implementation Science), creating an efficiency gap between modeled and realized value.[2,3] This gap not only represents foregone health and economic losses but also reflects systemic failures that no single technical fix can resolve. The methods used to make efficient decisions are as important as the adoption decision itself, which has motivated an expansion of value assessment methods in recent years.

Value assessment frameworks have traditionally focused on clinical trial outcomes, cost-effectiveness ratios, and budget impact analyses.[4] These approaches may overlook the wider context that determines whether an innovation actually delivers its benefits as intended. Data infrastructure constraints, misaligned incentives, and regulatory hurdles routinely delay or dilute implementation. As a result, drugs, devices, and digital technologies can underperform or fail entirely after a decision has been made to adopt.

Over the past decade, approaches such as value-based healthcare and multicriteria decision analysis have broadened the view of value beyond quality-adjusted life-years.[5,6] However, the literature rarely discusses a systems context, often mentioning the "decision context" without operationalizing it. Studies have called for a larger focus to be placed on the "decision context" within health technology assessments (HTAs).[7] However, the concept of "decision context" is conceptually

vague and, in turn, lacks a clear means of incorporating it into decision making. Currently, no consensus-driven frameworks exist that map out system-level factors, such as the decision context in which technologies operate, and therefore what enables and/or contrains their potential to create value. In this article, "decision context" refers to the structural, political, and institutional factors that enable or hinder value creation across 3 interdependent levels, including macro (eg, national policy and governance), meso (eg, health provider networks, hospital systems), and micro (eg, individual clinicians and patient outcomes). For any technology, context involves factors related to its own lifecycle and in relation to the broader system; hence, the health system and decision context can be treated synonymously.[8]

The concept of value-based health systems (VBHS) has recently emerged as a complement to value-based healthcare. This approach seeks to broaden the understanding of how health systems create value by explicitly incorporating factors beyond the clinical perspective—such as public health, equity, and system-wide efficiency affected by policies. Embracing this wider perspective is essential for identifying and addressing barriers to value creation; however, research is needed to integrate these factors into existing value assessment methods.[9] As such, VBHS is a concept with the potential to align value creation and assessment methods to societal decision making. For this to occur, the interdependencies of stakeholders (eg, healthcare regulators, professional societies, and healthcare professionals) and the structural components of the healthcare system, such as incentive frameworks, governance arrangements, and care delivery models (eg, primary care networks in the United Kingdom) must be *explicitly* characterized and formalized to inform value assessment and support decision making.

To address these challenges, we propose a framework that systematically identifies key components of the health system according to their perceived relevance in value creation. This framework emphasizes the importance of the context in which health technologies are implemented, mapping out key system-level factors that can enable or hinder the realization of a health technology's potential added value. In this research, health technologies include drugs, devices, vaccines, and digital health products. By adopting a broad definition of health systems, aligned with the World Health Organization definition "consisting of all organizations, people, and actions whose primary intent is to promote, restore, or maintain health," our framework integrates factors across the health system. This definition incorporates actions by broader society that may influence health.[10]

Methods

This study consisted of 2 phases: the first, a literature review, and the second, a Delphi study informed by the findings of the literature review. The targeted review was conducted first to identify domains and subdomains relevant to health systems performance analysis and value assessment. For greater coherence, we refer to these themes as factors of the value creation chain, consistent with other usages.[11] We use the term factor to refer to any domain, subdomain, or stakeholder-relevant factor that contributes to value creation across a technologies lifecycle. This encompasses institutions, processes, and stakeholders.

In this article, the term "domain" represents the highest-level factors within our health system framework; within domains, "subdomains" are captured. Subdomains are a collection of more specific factors of health systems that shape value creation. Lastly, value statements represent the third level and intend to facilitate the search for specific information about the health system that influences the value creation of a health technology. For example, within the domain "Politics," the subdomain "political discourse" could generate a value statement, such as "Public political attention on a health issue can accelerate the funding and adoption of related technologies."

Targeted Literature Review

The targeted literature review examined 2 themes: value assessment in health systems and health systems performance assessment, searching both themes together and separately. The search strategy for this targeted review involved a comprehensive search of databases, including MEDLINE and PubMed Central, alongside reference mining of identified articles for further relevant studies. Search terms included ("value") AND ("evaluation" OR "assessment" OR "analysis") AND ("health") AND ("framework" or "monograph"). The search was conducted in February 2023 to identify articles published between January 2017 and January 2023 using a combination of terms related to value assessment frameworks in healthcare; this search period captures the emergence of literature that consolidated previous research on the broader elements of value that are applicable to all health technologies and health system performance frameworks that underpin VBHS. Articles were included if they formalized a framework for assessing the value of technologies in health systems (and at any level, ie, beyond market access) with no restriction based on study design; this encompasses value assessment and health system frameworks that relate to the assessment of individual technologies and the health system factors related to assessing all technologies, respectively. Exclusion criteria included any articles not in the English language. Reviewers used the literature review software Rayyan to assist with the study selection process. Three reviewers independently conducted the review, and any discrepancies were resolved through discussion. The review findings were utilized to gain a strong understanding of the current literature base and generate a baseline set of domains and subdomains for the Delphi exercise.

Delphi

The Delphi method is a scientific approach used to organize and structure expert discussions, aiming to generate insights on controversial topics with limited information.[12] It is increasingly adopted in the health sector for creating value frameworks.[13,14] The Delphi technique was chosen to collate expert opinions within an area with limited published research. Resultingly, a 3-round, web-based Delphi exercise was executed using the Welphi platform.[15] Welphi facilitates web-based Delphi panels by enabling participant communication, ensuring the anonymity of participant responses, and allowing asynchronous result collection, enabling participants to complete the exercise at their convenience.

The exercise included 3 rounds of Delphi. It began with an open-ended, qualitative round (R1) in which the participants received key value domains (such as politics, organizational features, and health system governance) and subdomains (such as trade and industrial interests, political discourse, and media) identified from the targeted review. This framework helped participants consider broader system characteristics that affect value. Participants were asked to write value statements about

the subdomains (or other characteristics) and their influence on the value creation of a technology. A sample value statement was also shown to participants: "The number of bilateral or multilateral trade agreements a state is a party to influences access to and affordability of health products and services (by shaping technology markets)." Feedback on any missing key value domains or subdomains was also requested. Please refer to the appendix for the full information provided to participants in the Delphi.

After R1, the researchers completed a thematic analysis of the qualitative feedback using the software NVivo[16] and condensed the proposed value statements into a concise framework. In round 2 (R2), the participants were shown the updated cocreated framework and were asked to rate each value statement on a 5-point agreement Likert scale (ranging from strongly disagree to strongly agree) according to their level of agreement on whether it is an important aspect to consider when assessing the value of a technology. Lastly, in the third round (R3), participants were shown the distribution of responses across all participants for each value statement, as well as their own response, and were asked to rerate each value statement.

Recruitment and Eligibility

A diverse group of stakeholders was gathered to ensure a range of perspectives and opinions to meet the research objectives. Participants were chosen through key informant sampling from the professional networks of the researchers, aiming for representation among payers/decision makers, HTA experts, academics (with diverse expertise in health policy and implementation science), industry representatives, policy makers, physicians, and patient advocates.[17] Experts were selected based on their senior-level experience, requiring a minimum of 10 years in the health sector. The invitees primarily had experience in the United Kingdom, United States, Germany, Switzerland, the Netherlands, and Croatia. Additionally, many European participants brought experience from a range of European countries.

A high-income country focus on Europe and North America was chosen on the assumption that the factors influencing value creation would be notably different based on the economic context and geography of the countries. Conducting and Reporting Delphi Studies guidelines were followed.[18] An ethics review was performed at the London School of Economics and Political Science before data collection, which confirmed that formal ethics approval was not required because the study did not involve the collection of personal or patient-level information.

Data Analysis

Data were analyzed according to consensus and stability of responses. First, percentage agreement was analyzed, and value statements were perceived to have overall agreement if ≥70% of participants rated it as either "important" or "very important," methodology in line with other studies.[19] Second, the interquartile range (IQR) was used to measure the dispersion of participant responses and thus consensus, with an IQR of ≥1 to be classed as achieving consensus.[20] Lastly, the stability of responses was analyzed between rounds 2 and 3 to understand the extent participants were changing their minds. A cut-off point for instability was used as a ≥10% change in participant responses between rounds 2 and 3. Value statements were included in the final framework if they had overall agreement and were stable.

Results

Literature Review

A total of 1859 articles were identified through the review. After screening the titles and abstracts, 1589 were excluded. The resultant 270 articles were full-text screened, resulting in 21 studies focused on value assessment and 5 on health system performance that informed the proposed framework for round one of the Delphi. Factors with the potential to affect value creation were extracted from included studies to generate an initial framework inductively; for example, institutional factors derive from health system assessment templates, and adoption and implementation factors derive from the Non-adoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS) framework, and these were amalgamated with established value assessment domains. The initial framework comprised 46 subdomains grouped within 10 value domains: (1) politics (n = 7), (2) health system organizational features (n = 4), (3) health system governance (n = 4), (4) healthcare financing (n = 6), (5) resource generation (n = 2), (6) providers (n = 8), (7) private industry (n = 7), (8) geographic features (n = 2), (9) population health (n = 2), and (10) technology features (n = 4) (see Appendix Table 1 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.06.005 for the full framework).

Delphi

A total of 129 participants were invited to participate in the Delphi, of which 32 accepted, and 22 completed all 3 rounds. A full breakdown of the included stakeholder groups is shown in Table 1.

Data analysis

A total of 198 value statements and 7 subdomains were proposed through qualitative feedback in R1. Because of the overlap of many proposed value statements, the thematic

Table 1. Delphi stakeholder participation in rounds 1 and 3.

Stakeholder group	Round 1 participants	Round 3 participants
Academia (total)	13	11
Health policy and health systems research	7	5
Health economics	4	4
HTA	1	1
Implementation science	1	1
Industry (pharmaceuticals, medical devices, and digital technologies)	5	4
Patient advocate	1	1
Policy maker	2	2
Physician	1	0
Marketing authorization (including regulation and HTA)	1	1
Payer/decision maker	1	0
Other (including thinktanks, NGOs, and patient safety roles)	3	3
Total	27	22

HTA indicates health technology assessment; NGO, nongovernmental organization.

analysis allowed the researchers to refine and consolidate numerous value statements, resulting in 61 final statements to be validated further in R2 and R3 using Likert scale ratings. Appendix Table 2 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.06.005 presents the results of the thematic analysis, highlighting the identified themes and their frequencies.

Consensus measurement

In R2, 11 value statements had an IQR of >1, indicating a wide range of opinions and thus dissensus. Those with dissensus included, "The digital maturity of a country, specifically that of health information systems, influences the generation of real-world data that can provide stronger evidence of effectiveness to facilitate (consistent) access to the technology." (IQR = 2) and "Technologies with no alternatives or with a large therapeutic impact are more likely to be reimbursed than 'me too' technologies, thus they are more highly valued." (IQR = 2). However, in R3, participants moved toward consensus, resulting in all value statements having an IQR of 1.

Regarding agreement levels, 43 value statements had over 70% ratings of "important" or "very important" in R3. Table 2 displays the Delphi agreement results for all value statements, including each value statement's percentage agreement levels.

Finally, according to the stability analysis between rounds 2 and 3, 26 statements were determined to be stable (ie, had <10% difference in ratings between the 2 rounds). As a result, 17 value statements were considered stable and had consensus of agreement, as shown in Table 3. Assessing stability provided additional insight into the reliability of stakeholder views across rounds, beyond measures of consensus. The limited stability observed for many value statements highlights the novelty and complexity of the topic, suggesting that a shared understanding of key factors in value creation is still emerging. However, it is important to note that many value statements had participants shifting between "agree" and "strongly agree" instead of between agreement and disagreement. Appendix Table 3 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.06.005 displays all value statements with R2 and R3 agreement levels, along with stability results. Figure 1 shows the value domains and sub-domains that were removed or retained after R3 to produce the resulting framework.

Value statements with the highest consensus and agreement rates were concentrated in the domains of governance, politics/political influence, and health system organization. In contrast, financing mechanisms, such as earmarked taxes and private insurance, were among the least agreed-upon, suggesting greater contextual divergence in their perceived relevance. Table 4 showcases the value statements with the highest and lowest agreement levels for each value domain.

Figure 2 shows the concept map developed from the targeted review (see Appendix Table 1 in Supplemental Materials found at https://doi.org/10.1016/j.jval.2025.06.005) and adapted based on the stable value statements with consensus. It represents the interconnectedness of structures and stakeholders involved in creating value in health systems. The figure presents the value creation chain in health systems, informed by 3 themes: value assessment, adoption and implementation, and health systems analysis.

Discussion

Value assessment frameworks have long had a narrow view on value, without fully considering the system in which decisions are made. To our knowledge, this study is the first to systematically identify factors of health systems that both enable and constrain value creation. Our resulting framework fills a critical gap by providing policy makers with a structured view of the decision context across macro, meso, and micro levels. These findings represent a step toward a deeper understanding of how factors of the system interact with new technologies entering the market, thereby affecting their success in terms of value creation. The limited literature connecting value creation in health systems to value assessment highlights this study's novelty, and the following sections situate the findings within the broader literature on value.

The interplay between governance, financing, service delivery, and stakeholder incentives demonstrate that value is not simply a function of the technology itself but also the system's readiness to support its uptake. These factors should be systematically accounted for before final decisions relating to reimbursement and coverage are made.

The value framework serves 3 practical purposes. First, it supports the assessment of technologies based on their value creation potential. More research will be needed to refine recommendations about the type of evidence required to address each component; however, the framework indicates what areas should be prioritized as part of the value assessment toolkit. Second, the framework can be used to identify specific barriers to value creation that are rooted in the most consequential parts of the system. For example, if a technology is not aligned with prevailing political priorities, this misalignment, once identified, can guide funding decisions or implementation planning. Third, the framework facilitates systematic dialog across stakeholders by formalizing factors of the "decision context" that are typically implicit in HTA.

Importantly, the framework highlights specific limitations and barriers. Value statements that failed to achieve stability or consensus point to areas of uncertainty or disagreement among stakeholders, such as financing arrangements and decentralized decision making. More research is needed to determine if the lack of consensus is due to varied and nuanced perspectives of participants and their context.

It was notable that some key areas—particularly digital infrastructure and health information systems, including real-world evidence—were not prominently featured in the final set of value statements, despite their well-established relevance to the implementation and effective use of health technologies. This omission may reflect an implicit assumption among participants that these digital components are already relatively mature and are progressing at a stable rate. Alternatively, it could indicate a shared difficulty in articulating digital health concepts during the Delphi process, potentially due to varying levels of digital literacy or the absence of a common vocabulary.

These gaps point to valuable opportunities for future refinement of the framework. We also posit that these observations could reflect the perceived relevance of a system component to value creation. When components such as information systems are seen to evolve in line with the needs of other technologies, their influence on value creation may be taken for granted and are therefore deprioritized.

This dynamic also applies to factors such as politics and political power. Conversely, the pace and unpredictability of political change, characterized by rapid or erratic changes, raises its importance as a factor in value creation. Our conceptual model (Fig. 2) suggests that political factors are upstream determinants, influencing governance and organizational structures. Although these associations were not explicitly considered by Delphi participants, high agreement scores in the politics domain may reflect the recognition of its overarching influence. If politics and political power is perceived as fast changing or

Table 2. Round 3 Delphi Agreement Results.

Subdomain	Value statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sum of agree + strongly agree
Politics							
Trade interests	The number of bilateral or multilateral trade agreements that a state is party to influences access to and affordability of health products and services (by shaping technology markets).	0%	5%	64%	32%	0%	32%
Trade interests	The production capabilities of a country may impact the import or export of medical technologies, affecting the availability and valuing of health technologies in the country.	0%	0%	23%	64%	14%	78%
Politics and political power	Political interests and priorities can influence the value of a technology. Technologies aligned with political interests may add value on this basis, leading to differential pricing and access.	0%	5%	14%	36%	45%	81%
Politics and political power	The political spectrum of a country may affect the level of solidarity among citizens, affecting their willingness to pay for new innovations they may not personally use.	0%	0%	14%	50%	36%	86%
Politics and political power	Relationships between politicians, policy makers, and innovators may influence regulatory and HTA guidelines, shaping the accessibility and potential added value of technologies.	0%	5%	9%	73%	14%	87%
Industrial interests	Countries may prioritize technologies produced by local pharmaceutical companies, affecting the perceived value and support for locally produced technologies vs internationally produced technologies.	0%	0%	9%	77%	14%	91%
Industrial interests	The level of industrial influence in policy making can affect the health technology assessment process, potentially altering willingness-to-pay thresholds and influencing the value assigned to technologies.	0%	0%	23%	68%	9%	77%
Political discourse	The current political discourse on health prioritization influences value generation and reimbursement of associated technologies.	0%	0%	23%	68%	9%	77%
Accountability mechanisms	Accountability metrics, such as payment incentives in value-based care, can affect the value of a new technology if they contribute to its success or failure in meeting established metrics.	0%	0%	32%	64%	5%	69%
Accountability mechanisms	Governance mechanisms in domestic governments, including the composition of relevant committees and the accountability they can enforce, determines the scope of solutions that will be considered, and by extension, the value of any single innovation.	0%	0%	9%	82%	9%	91%
Electoral cycles	Electoral cycles promote a short-term mindset within healthcare, leading to prioritization of policies, interventions, and products with quickly visible benefits.	5%	0%	5%	45%	45%	90%

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Table 2. Continued

Subdomain	Value statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sum of agree + strongly agree
Electoral cycles	Electoral cycles create political pressure that results in conservative decisions on access and affordability of health products and services.	5%	14%	41%	32%	9%	41%
Electoral cycles	In countries with separated politics and health systems, consistent funding and less reliance on the short-term mindset of politicians may support value-based decision making.	5%	18%	9%	55%	14%	69%
Media and reporting	Media reporting about a health technology may alter its value within the system by affecting patient and consumer opinion, leading to a change in demand.	0%	0%	5%	77%	18%	95%
Media and reporting	Media and reporting can shape the priorities and perceptions of policy makers, regulators, and technology assessors, influencing reimbursement and access.	0%	0%	14%	68%	18%	86%
Health system organizational features							
History of institutions	Historical motivations for and mechanisms used in the establishment of health systems influence the added value generated by technologies, across several dimensions.	0%	0%	23%	73%	5%	78%
History of institutions	The traditional organization of care, such as siloed, reactive care, may hinder the true realization of value from certain technologies.	0%	0%	5%	50%	45%	95%
Societal expectations	Societal expectations have a significant impact on adoption and implementation of technologies. This can be in terms of where responsibility for health lies (ie, state vs individual) and how citizens perceive good quality healthcare.	0%	0%	9%	77%	14%	91%
Intersectorality	Technologies that demonstrate value beyond clinical benefit to the health sector, eg, reducing disability related costs and unemployment, may be valued more in countries with more intersectorality.	0%	0%	23%	59%	18%	77%
Intersectorality	The closeness and compatibility of institutions and related entities that make investment decisions for health and healthcare determines the scope and size of those investments. Therefore, existing intersectoral relationships, including those between public and private bodies, determine the value of a solution.	0%	5%	55%	36%	5%	41%
Planning processes	The extent to which health planning is centralized, transparent, and follows consistent decision making processes for all health matters influences value creation; inconsistent decision making could lead to a lack of uptake and unrealized added value.	0%	5%	14%	73%	9%	82%

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Table 2. Continued

Subdomain	Value statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sum of agree + strongly agree
Planning processes	The planning entity or entities in a health system hold ultimate responsibility for allocating resources. These stakeholders determine the scope and size of investment in an innovation and the funds for implementation and adoption into routine use.	0%	14%	45%	36%	5%	41%
Health information systems	The digital maturity of a country, specifically that of health information systems, influences the generation of real-world data that can provide stronger evidence of effectiveness to facilitate (consistent) access to the technology.	0%	0%	9%	64%	27%	91%
Integrated care	The extent to which care is integrated across settings determines the value that can be created; this amounts to considering the physical, digital, and administrative connections between care settings as determinants of (potential) value creation that a health technology provides.	0%	0%	5%	77%	18%	95%
Health system governance							
(Extent of) decentralized decision making	The extent of decentralized decision making can increase difficulties for technology developers and result in inconsistent access to a technology.	0%	5%	14%	68%	14%	82%
(Extent of) decentralized decision making	Decentralized decision making can lead to greater engagement of local stakeholders, improving adoption and implementation of technologies.	0%	9%	27%	55%	9%	64%
(Extent of) decentralized decision making	Decentralized decision making can affect evidence about the value of a new technology due to limited systematic (jurisdiction-wide) data collection to inform policy making.	0%	5%	32%	50%	14%	64%
Regulatory bodies	Robust regulatory assessment processes can positively affect value recognition by increasing confidence in technologies and demand within the market.	0%	0%	14%	82%	5%	87%
Regulatory bodies	Innovation in regulation, especially for innovative technologies, can affect value creation by shaping access and managing industry frustration.	5%	0%	5%	73%	18%	91%
Regulatory bodies	The level of regulatory influence shapes the incentives for technology innovation and adaptation.	0%	5%	18%	68%	9%	77%
Person centeredness	Countries with person-centered governance are more likely to prescribe technologies that provide additional benefits, such as higher quality of life and patient convenience in comparison with other countries.	5%	5%	36%	55%	0%	55%
Person centeredness	Patient-centeredness may affect the value of technologies through the direct interests of patients. This likely contributes to the development of more "rare" and/or "innovative" technologies (as even smaller population groups may request so, given the willingness to pay by the system).	0%	5%	59%	32%	5%	37%

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Table 2. Continued

Subdomain	Value statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sum of agree + strongly agree
Professional bodies	Professional bodies significantly affect the adoption and implementation of new technologies through shaping the knowledge and attitudes of their members by disseminating information regarding "best practice" guidelines and new clinical pathways.	0%	0%	9%	50%	41%	91%
Geographic features							
Access to resources	Countries with limited resources find more value by investing in health care provision, eg, infrastructure for services, over health technologies, which affects the potential added value of technologies and their adoption.	5%	9%	18%	64%	5%	69%
Access to resources	Systems with more resources value "softer" dimensions of value offered by a technology more, such as patient-oriented benefits.	5%	0%	41%	50%	5%	55%
Climate and other environmental exposures	Countries that are more susceptible to climate change and extraordinary climate events will have relatively limited health system capacity and access to technology, influencing value creation and availability/access.	5%	14%	50%	32%	0%	32%
Population health							
Risk factors for disease	Risk factors for a disease within a population (some that are lifestyle bound) influence the demand for certain health technologies, especially those focused on prevention and chronic disease management.	0%	5%	9%	55%	32%	87%
Patient lack of medical knowledge	Healthcare quality signals that patients and the public can readily interpret determine the extent to which value can be judged. In turn, the value created by health technologies is only recognized if these signals are conveyed and measured appropriately.	5%	9%	9%	68%	9%	77%
Nature of conditions and their prevalence	Technologies that treat conditions with significant impact on patient quality of life and/or those that require lifelong treatment are likely to be highly valued.	5%	5%	5%	86%	0%	86%
Technology features							
Core features	Technologies with no alternatives or with a large therapeutic impact compared are more likely to be reimbursed than "me too" technologies; thus, they are more highly valued.	0%	14%	9%	45%	32%	77%
Core features	The extent to which a health technology has been developed together with end users and thereby responds to actual needs and is compatible with existing systems and practices is likely to influence its adoption and implementation, affecting its value to the system.	0%	0%	14%	45%	41%	86%

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Table 2. Continued

Subdomain	Value statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sum of agree + strongly agree
Knowledge required to use the technology	The extent to which specialized knowledge is required to use the technology influences the value of the technology, ie, greater need for specialized knowledge is associated with higher value. Innovators support in building requisite knowledge and skills for the user adds value to the providers, independent of the clinical value of the technology itself.	9%	5%	27%	55%	5%	60%
Knowledge required to use the technology	The extent to which knowledge is required to use a technology determines the likelihood that it will be optimally used, thereby affecting the added value the technology can provide.	0%	0%	0%	68%	32%	100%
Knowledge required to use the technology	Technologies requiring significant changes to the care model may have a slower uptake curve, affecting their value and utilization.	0%	0%	0%	55%	45%	100%
Scope for adapting the technology	Scope for adapting the technology at hand, improving its design and characteristics over time, as well as the impact it has on subsequent technologies (often referred to as spill-over effects) affect its value and impact on the health system.	0%	0%	9%	82%	9%	91%
Technology supply model	A stable and well-functioning supply chain is key for the value of a health technology because it secures a stable supply for health providers and patients, affecting accessibility and perceived value.	0%	5%	9%	68%	18%	86%
Healthcare financing							
General taxation	Tax policy can influence value generation, such as the R&D tax credit, affecting investment in innovation and the types of innovation.	0%	5%	14%	68%	14%	82%
General taxation	Publicly funded health systems may have strict criteria for reimbursement, influencing rewards for innovation and value creation.	0%	5%	9%	64%	23%	87%
Earmarked taxes	Health systems financed from earmarked taxes are more vulnerable to economic shocks and struggle to finance consistent access to health technologies, affecting their overall value and affordability.	5%	9%	59%	27%	0%	27%
Social insurance	Social insurance bodies define health coverage and reimbursement of technologies, which influences the coverage policies of private insurers, thereby influencing the value of the technology.	0%	9%	41%	41%	9%	50%
Private insurance	The prevalence of private insurance coverage in a population and the governance arrangements shaping these insurers' practices determine the potential value of a technology with a bias toward short-term cost-savings to care, over long-term societal value creation.	0%	5%	36%	55%	5%	60%

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Table 2. Continued

Subdomain	Value statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sum of agree + strongly agree
Out-of-pocket spending	Significant out-of-pocket spending, especially when representing a substantial proportion of the patient's income, can lead to limited access and treatment discontinuation for financial reasons, diminishing the overall value realization of the product.	0%	0%	5%	27%	68%	95%
Provider payment mechanisms	Value-based care that is achieved by linking payment to outcomes rather than services, can incentivize better outcomes and improved quality, such that providers value cost-effective technologies.	0%	9%	9%	27%	55%	82%
Resource generation							
Physical capital	The state of development of physical capital influences the (potential) added value of health technologies by shaping capacity to treat patients, which affects demand for services, thereby shaping willingness to pay from public sources.	0%	0%	14%	73%	14%	87%
Human capital	The knowledge of the workforce, ie, professional training and experience, to innovate influences the value and adoption of health technologies.	0%	0%	0%	59%	41%	100%
Human capital	The capacity of the workforce, ie, time available to undertake necessary work, to innovate influences the value and adoption of health technologies.	0%	0%	0%	59%	41%	100%
Providers							
Primary care	Technologies that can be delivered in primary care settings and/or those involved in prevention can reduce demand for secondary care services.	0%	5%	18%	23%	55%	78%
Specialized care	Specialized care is often characterized by the use of more expensive and innovative technologies, as more "complex" conditions have to be treated in specialized care than, for example, primary care. Specialized care tends to utilize health technologies that may be developed for more "rare" conditions or more "complex" conditions; thus, lower volumes are required to create value from a technology.	0%	5%	27%	59%	9%	68%
Urgent care	Health technologies used in urgent care may have increased perceived value because they play a critical role in reducing mortality.	0%	9%	14%	45%	32%	77%
Private industry							
Pharmaceutical manufacturers	Pharmaceutical companies' focus on maximizing revenues may affect reimbursement terms, limiting broad access to health technologies.	0%	9%	14%	32%	45%	77%
Pharmaceutical manufacturers	When pharmaceutical manufacturers prioritize patient access and collaborate with health systems, taking into account unmet need, the value of the technology for the health system increases.	0%	0%	23%	50%	27%	77%

Note. Value statements represent the third level of the framework, with the intent to provide detailed information about characteristics of health systems that influence value creation. Cells highlighted red if sum of agreement is below 70% and green if sum of agreement is above 70% in final column.

Table 3. Stable value statements with consensus in round 3 of the Delphi.

Domain	Subdomain	Value statement
Politics	Politics and political power	Political interests and priorities can influence the value of a technology. Technologies aligned with political interests may add value on this basis, leading to differential pricing and access.
Politics	Politics and political power	The political spectrum of a country may affect the level of solidarity among citizens, affecting their willingness to pay for new innovations they may not personally use.
Politics	Electoral cycles	Electoral cycles promote a short-term mindset within healthcare, leading to prioritization of policies, interventions, and products with quickly visible benefits.
Politics	Media and reporting	Media and reporting can shape the priorities and perceptions of policy makers, regulators, and technology assessors, influencing reimbursement and access.
Health system organizational features	History of institutions	The traditional organization of care, such as siloed, reactive care, may hinder the true realization of value from certain technologies.
Health system governance	Regulatory bodies	Robust regulatory assessment processes can positively affect value recognition by increasing confidence in technologies and demand within the market.
Health system governance	Professional bodies	Professional bodies significantly affect the adoption and implementation of new technologies through shaping the knowledge and attitudes of their members by disseminating information regarding "best practice" guidelines and new clinical pathways.
Technology features	Core features	The extent to which a health technology has been developed together with end users and thereby responds to actual needs and is compatible with existing systems and practices is likely to influence its adoption and implementation, affecting its value to the system.
Technology features	Knowledge required to use the technology	The extent to which knowledge is required to use a technology determines the likelihood that it will be optimally used, thereby affecting the added value the technology can provide.
Technology features	Knowledge required to use the technology	Technologies requiring significant changes to the care model may have a slower uptake curve, affecting their value and utilization.
Healthcare financing	Out-of-pocket spending	Significant out-of-pocket spending, especially when representing a substantial proportion of the patient's income, can lead to limited access and treatment discontinuation for financial reasons, diminishing the overall value realization of the product.
Resource generation	Physical capital	The state of development of physical capital influences the (potential) added value of health technologies by shaping capacity to treat patients, which affects demand for services, thereby shaping willingness to pay from public sources.
Resource generation	Human capital	The knowledge of the workforce, ie, professional training and experience, to innovate influences the value and adoption of health technologies.
Resource generation	Human capital	The capacity of the workforce, ie, time available to undertake necessary work, to innovate influences the value and adoption of health technologies.
Providers	Primary care	Technologies which can be delivered in primary care settings and/or those involved in prevention can reduce demand for secondary care services.
Providers	Urgent care	Health technologies used in urgent care may have increased perceived value because they play a critical role in reducing mortality.
Private industry	Pharmaceutical manufacturers	Pharmaceutical companies' focus on maximizing revenues may affect reimbursement terms, limiting broad access to health technologies.

Figure 1. The resulting framework. Showcasing all value domains and sub-domains after Delphi round 3. The light colored domains and sub-domains are those that were not stable across rounds 2 and 3 and did not receive consensus across participants and thus were not included in the "final" framework.

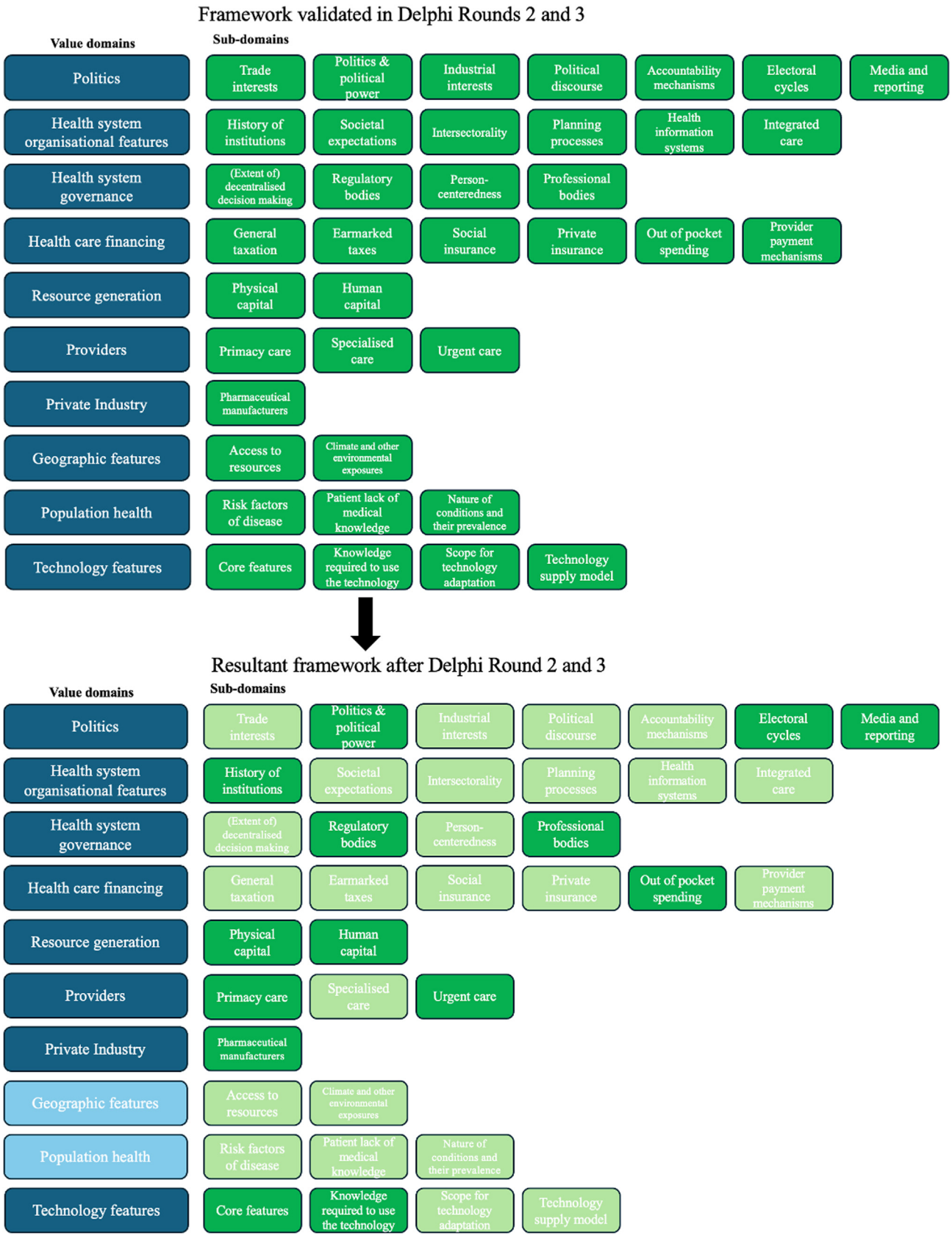

Table 4. Round 3 Delphi results showcasing only the highest and lowest agreement value statements per value domain.

Subdomain	Value statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sum of agree + strongly agree
Politics							
Media and reporting	Media reporting about a health technology may alter its value within the system by affecting patient and consumer opinion, leading to a change in demand.	0%	0%	5%	77%	18%	95%
Trade interests	The number of bilateral or multilateral trade agreements that a state is party to influences access to and affordability of health products and services (by shaping technology markets).	0%	5%	64%	32%	0%	32%
Health system organizational features							
Integrated care	The extent to which care is integrated across settings determines the value that can be created; this amounts to considering the physical, digital, and administrative connections between care settings as determinants of (potential) value creation that a health technology provides.	0%	0%	5%	77%	18%	95%
Planning processes	The planning entity or entities in a health system hold ultimate responsibility for allocating resources. These stakeholders determine the scope and size of investment in an innovation and the funds for implementation and adoption into routine use.	0%	14%	45%	36%	5%	41%
Health system governance							
Professional bodies	Professional bodies significantly affect the adoption and implementation of new technologies through shaping the knowledge and attitudes of their members by disseminating information regarding “best practice” guidelines and new clinical pathways.	0%	0%	9%	50%	41%	91%
Person centeredness	Patient centeredness may affect the value of technologies through the direct interests of patients. This likely contributes to the development of more “rare” and/or “innovative” technologies (as even smaller population groups may request so, given the willingness to pay by the system).	0%	5%	59%	32%	5%	37%
Geographic features							
Access to resources	Countries with limited resources find more value by investing in health care provision, eg, infrastructure for services, over health technologies, which affects the potential added value of technologies and their adoption.	5%	9%	18%	64%	5%	69%
Climate and other environmental exposures	Countries that are more susceptible to climate change and extraordinary climate events will have relatively limited health system capacity and access to technology, influencing value creation and availability/access.	5%	14%	50%	32%	0%	32%

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Table 4. Continued

Subdomain	Value statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Sum of agree + strongly agree
Population health							
Risk factors for disease	Risk factors for a disease within a population (some that are lifestyle bound) influence the demand for certain health technologies, especially those focused on prevention and chronic disease management.	0%	5%	9%	55%	32%	87%
Patient lack of medical knowledge	Healthcare quality signals that patients and the public can readily interpret determine the extent to which value can be judged. In turn, the value created by health technologies is only recognized if these signals are conveyed and measured appropriately.	5%	9%	9%	68%	9%	77%
Technology features							
Knowledge required to use the technology	Technologies requiring significant changes to the care model may have a slower uptake curve, affecting their value and utilization.	0%	0%	0%	55%	45%	100%
Knowledge required to use the technology	The extent to which specialized knowledge is required to use the technology influences the value of the technology, ie, greater need for specialized knowledge is associated with higher value. Innovators support in building requisite knowledge and skills for the user adds value to the providers, independent of the clinical value of the technology itself.	9%	5%	27%	55%	5%	60%
Healthcare financing							
Out-of-pocket spending	Significant out-of-pocket spending, especially when representing a substantial proportion of the patient's income, can lead to limited access and treatment discontinuation for financial reasons, diminishing the overall value realization of the product.	0%	0%	5%	27%	68%	95%
Earmarked taxes	Health systems financed from earmarked taxes are more vulnerable to economic shocks and struggle to finance consistent access to health technologies, affecting their overall value and affordability.	5%	9%	59%	27%	0%	27%
Resource generation							
Human capital	The capacity of the workforce, ie, time available to undertake necessary work and to innovate influences the value and adoption of health technologies.	0%	0%	0%	59%	41%	100%
Physical capital	The state of development of physical capital influences the (potential) added value of health technologies by shaping capacity to treat patients, which affects demand for services, thereby shaping willingness to pay from public sources.	0%	0%	14%	73%	14%	87%
Providers							
Primary care	Technologies which can be delivered in primary care settings and/or those involved in prevention can reduce demand for secondary care services.	0%	5%	18%	23%	55%	78%

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unstable, it may be seen as a high-priority area precisely because of its role in value creation. Literature on the political determinants of health[21-24] reinforces our finding and highlights the importance of this component in the context of all others.

This explanation may also apply to other subdomains that contain stable value statements. For example, healthcare financing did not feature prominently, despite ongoing discourse about financing technologies, eg, innovative financing of orphan drugs.[25,26] Within this domain, out-of-pocket spending was found to be important to value creation, with 95% overall agreement in R3. Again, this could indicate a perception that financing mechanisms are also evolving adequately to support value creation, therefore the specific issue of high out-of-pocket spending could be isolated.

This research formalizes the notion of "decision context" in HTA, which Garrison refers to as the steps involved in achieving patient access and use. These steps are ingredients of HTAs that are infrequently examined[27] despite efforts such as the INTEGRATE-HTA project that developed new models to support research in this area.[28] This is understandable because it is difficult to identify the value creation chain that is embedded in health systems. Our research is essential given that explicit methods are needed to determine the value of an innovation at different points in the lifecycle and in relation to the system. To illustrate this, we consider an aspect of the system governing the value created by an innovation; for example, the value of messenger RNA vaccines is connected to the ultralow temperature supply chain available to support distribution. The distribution step is a structural factor related to the value of messenger RNA vaccines: without distribution capacity, limited added value is possible. This aspect of timing or "market readiness" has been discussed in the context of innovation science and the success of companies,[29] and for this reason, interdependencies need to be investigated to extend value assessment and accelerate efficient decision making. This may be particularly important in countries with new HTA systems and highly constrained budgets for which resource allocation decisions are uniquely exposed to system factors.[30] To summarize, there are steps (in the system) that comprise the decision context, and the added value of an innovation is intrinsically linked to these. These steps involve structures and stakeholders that we have systematically identified to understand factors influencing value creation.

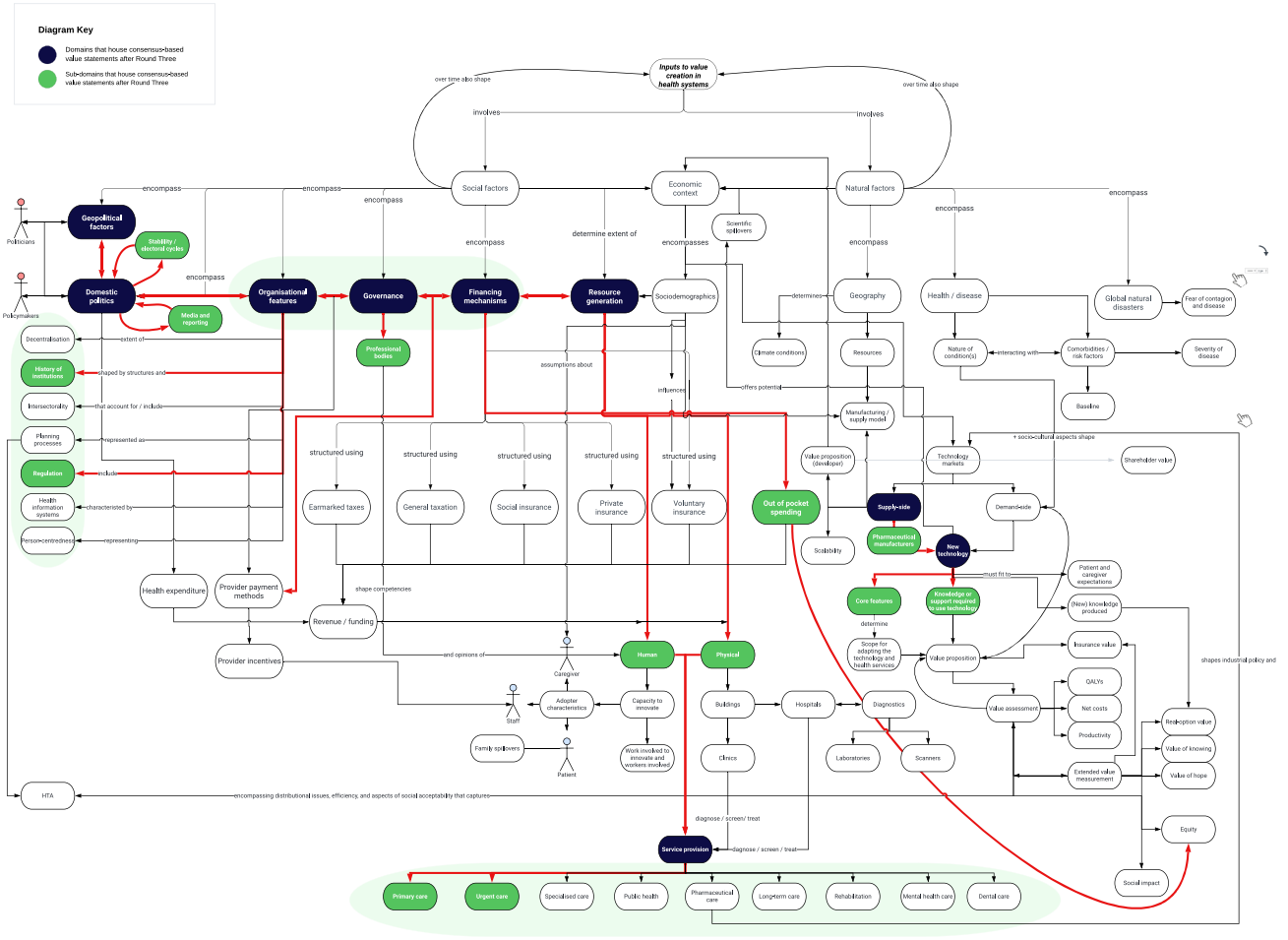
These ideas are emerging in fields that have been integrated into HTA and value assessment. For example, growing integration of implementation science into HTA raises the need to consider the cost of implementation. These costs should be considered to address the assumption that all technologies will be implemented in full within the stated time horizon, which is unrealistic for all technologies.[31] The expansion of implementation science in health research implies that resources are/will be mobilized to implement technologies, explicitly incurring "new" incremental costs that depend on system factors[32]—for this reason, factors governing value creation across the system should be explicitly addressed in reimbursement decisions.

Strengths and Limitations

The system-centric value framework has limitations due to its design and the emerging nature of this research area. Delphi exercises depend on the quality of expert involvement, and a larger, more diverse sample size could yield different value statements. Although a sample of 22 participants across 3 rounds meets acceptable criteria, it poses an inherent limitation that should be addressed in future research. A larger expert sample from various disciplines and stakeholders in value creation is needed to enhance the framework's generalizability.

The pervasive issues in the framework include potential conflicts in understanding concepts and definitions from round one's statements. Multidisciplinary participants are essential to the study design; however, differing interpretations may limit the construct validity of consensus statements. This could introduce a bias toward statements with clear terminology and lower agreement scores in other domains that might otherwise be incorporated in the final framework. Future research must

Figure 2. Where value is created in value-based health systems. Stable value domains with consensus are highlighted in black, and stable sub-domains with consensus are highlighted in green. They are seen in the context of the whole system and linkages between domains and sub-domains are shown in red.



assess participants' understanding of terminology to address this limitation.

Future research is also needed to extend measurements of the validity and stability of the domains over time and in different contexts; this amounts to expanding the framework and enhancing validity. In the long term, evaluations of the framework's impact on access to health technologies and services across different geographies are necessary. On the other hand, a major advantage of the value framework we have derived is that it is generalized; therefore, it can be applied to technologies with only minor adaptations. This framework establishes a common foundation, enabling stakeholders to adapt and apply it in ways that reflect their institutional needs and contextual realities.

Conclusions

The structural factors underpinning value creation include many organizations and stakeholders that determine the realized value of health technologies. Our framework offers a consensus-driven map of these factors, enabling decision makers to identify and address enablers and barriers systematically. The generalizable value framework produced by this research begins to formalize the decision context that shapes HTA decisions, such that funding decisions can explicitly take context into account. This work lays the foundation for integrating implementation considerations into mainstream assessment methods and highlights avenues for future research to expand and validate the framework across diverse settings.

Author Disclosures

Author disclosure forms can be accessed below in the Supplemental Material section.

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