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A Comprehensive Financial and Organizational Analysis of Telerehabilitation Business Models for Sustainable Growth and Market Expansion in the Healthcare Sector

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ABSTRACT

This shift marked the end of the pandemic era, where telerehabilitation was merely an emergency measure, and the beginning of a new growth trajectory for digital health, with the global market estimated at USD 5.32 billion in 2024 and projected to grow to USD 11.81 billion by 2030 at a CAGR of 13.2 per cent. However, the financial and organisational basis of this growth is poorly documented, to varying degrees, in the different clinical indications. This paper presents a financial and organisational evaluation of fourteen peer-reviewed and industry-based sources to create a holistic view of business models for telerehabilitation. Evidence is presented under three themes: Business model frameworks in digital health, Health-economic evidence for telerehabilitation, and Clinical and organisational implementation. Results found that per-patient savings ranged from USD 565.66 to USD 2,352.00, with four of eight studies showing moderate results for combined neurological and cardiological populations; per-patient savings were found to be favourable, with ninety-two per cent of reviewed cardiac studies showing favourable results for protocolized, exercise-based cardiac interventions; and results were least consistent for heterogeneous musculoskeletal indications. Financial sustainability of telerehabilitation businesses was identified through business model syntheses as having common elements such as diversified revenue streams, partnerships with payers and with technology vendors, and adaptive governance. Analysis shows that rather than a common telerehabilitation approach, business model design is the most defendable path to sustainable market expansion.

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1. INTRODUCTION

The need for physical rehabilitation is increasing along with the prevalence of cardiovascular disease, stroke and musculoskeletal disorders, and there are still shortages of rehabilitation professionals and geographic limitations to in-person rehabilitation. Addressing these limitations, the provision of assessment, exercise and therapeutic supervision via information and communication technologies has become a strategic solution: Telerehabilitation [8, 10]. In parallel, the commercial interest in telerehabilitation has grown, and the global market for telerehabilitation was estimated to be worth USD 5.32 billion in 2024, and is expected to reach USD 11.81 billion by 2030 at a compound annual growth rate of 13.2 percent from 2025 to 2030 [6]. Revenue was highest in North America in the region, driven by mature reimbursement structures and a high burden of chronic diseases, and highest in the orthopedic application, at 31.9 percent, and the physical therapy segment accounted for 43.0 percent of service revenue [6]. Despite this commercial potential, the majority of the reimbursed and privately-funded telerehabilitation programs have been developed around business models that were applicable for episodic in-person services, and the sustainability of telerehabilitation-specific business models is not well established [1, 7]. One of the challenges noted in the telemedicine literature is that pilot programs often do not move into a scaled-up, sustained model, due in part to the lack of consideration for value, revenue mechanisms, and the unique costs of remote care delivery from the business model design [1]. Business model frameworks have subsequently been proposed as formal and structured methods to represent the mechanisms by which digital rehabilitation services generate, realise and reap value for payers, providers, and patients [11] (the Business Model Canvas, in particular). This paper is based on evidence from fourteen peer-reviewed and industry sources to create a comprehensive financial and organizational analysis of telerehabilitation business models. The analysis draws commercial market paths on the existing clinical and economic evidence basis, outlines recurring elements and sources of uncertainty in health-technology businesses, and reveals factors associated with sustainable growth. The goal is to offer healthcare managers, investors and policy analysts an evidence-based view of which areas of telerehabilitation business models are financially sustainable and which areas are financially uncertain and, therefore, have a material risk of failure over time.

2. LITERATURE REVIEW

2.1 *Business Model Frameworks in Digital Health*

The literature review served as a foundation for a second review of business models for telemedicine services, which yielded twenty-two papers and a value-centered framework where the patient, health providers, technology vendors, payers, and government agencies are interdependent stakeholders that will need to invest in videoconferencing technology, home-monitoring devices, and information-technology infrastructure, respectively, to achieve the eventual improvement in quality, efficiency, and accessibility of care. A stakeholder-value orientation was extended to a larger subsample of the health-technology sector and a systematic review of thirty-four papers on business models in the health-technology, medical-device and biotechnology sectors revealed nine main categories of health-technology business model and a taxonomy of twenty-eight uncertainty factors, suggesting that the elements of open innovation, sustainability orientation and dynamic adaptability form the core of resilient business models in the health-technology sector [7]. The nearly five thousand records that were initially found were also the basis of a complementary systematic review, which also found that none of the existing frameworks covers all aspects of telehealth commercialization and suggested the creation of hybrid frameworks which combine market, technology, financing and regulatory elements [13]. The Business Model Canvas was directly applied to help to structure the design and expansion of value driven clinical services, in which the needs of the stakeholders, the required capabilities, as well as the revenue mechanisms, all come together in one strategic instrument for healthcare managers [11].

2.2 *Economic Evidence for Telerehabilitation*

Studies on the health-economic outcomes of telerehabilitation are still limited to cardiovascular and musculoskeletal outcomes. In the eleven identified studies eligible for inclusion in the systematic review, fewer than half were cost-effective against a conventional willingness-to-pay threshold and five studies provided cost-utility results that favored telerehabilitation over standard care [2]. A parallel systematic review specifically on exercise-based cardiac telerehabilitation found that 92% of included studies reported strong evidence for the cost-effectiveness of the exercise-based cardiac telerehabilitation arm compared to the center-based cardiac rehabilitation arm with only three studies showing a statistically significant difference in average per-patient costs in favor of the exercise-based cardiac telerehabilitation arm and concluded that exercise-based cardiac telerehabilitation is broadly comparable in cost-effectiveness terms to center-based cardiac rehabilitation [3]. A more comprehensive, systemic review of both neurological and cardiovascular diseases evaluated eight of the cited studies, which included 865 patients, and found four studies to be statistically significant with per-person cost savings between USD 565.66 and USD 2,352.00, and a single study to be statistically significant for differences in quality adjusted life years (QALYs), which corresponded to an incremental cost-effectiveness ratio (ICER) of approximately USD –21,666 per QALY gained [4].

2.3 *Clinical and Organizational Evidence*

Additional information on the operational characteristics of the viability of telerehabilitation is gained from clinical trial evidence. An early business-model case study on telerehabilitation after total knee replacement showed that the cost of post-surgical rehabilitation in Italy is around 182 million euro per year, and identified four possible candidate governance models, with decision-makers preferring slow and gradual transitions rather than a complete replacement of the in-person pathway for rehabilitation [5]. A Cochrane systematic review of stroke telerehabilitation included 22 RCTs with 1,937 participants and showed that telerehabilitation was generally comparable to face-to-face rehabilitation in terms of functional outcomes, and identified cost-effectiveness and feasibility as areas in need of more primary research [8]. Forty-three older adults with CHD were randomized to either cardiac telerehabilitation or standard care in a pilot randomized controlled trial, which found statistically significant increases in steps per day and scores for health promoting lifestyle behaviors at 6 and 12 weeks post-randomization, and no adverse events reported, suggesting that cardiac telerehabilitation is achievable in older adults, who have been under-represented in cardiac rehabilitation trials [12]. A systematic review and meta-analysis of eight trials with 1578 participants showed that hybrid programs reduced hospital readmission and mortality rates, which were statistically comparable to usual rehabilitation, and had a beneficial effect on peak oxygen uptake, concluding that hybrid delivery models may balance clinical rigor with the flexibility of a distributed approach [14]. Lastly, reflections on the COVID-19 period of rapid uptake of telerehabilitation flexibilities highlighted that there was a unique natural experiment during the pandemic, and that it was essential to build partnerships across care delivery, data, workforce, and policy domains to solidify the process of telerehabilitation as a sustainable service line, not just a pandemic accommodation [10].

3. METHODS

The study uses a narrative synthesis research methodology that draws on fourteen sources ranging from systematic reviews to randomized controlled trials, business-model literature, and industry market-intelligence reporting published or last updated in the period 2015–2024. Sources were categorized into three thematic clusters – business model frameworks, evidence of health-economic evidence, and evidence of clinical/organizational implementation – which correspond to the structure of the literature review presented above. After cross tabulating quantitative data from each source (market revenues, cost-effectiveness proportions, numbers of participants, and standardized means differences), comparisons were possible across disease areas and geographic region. No new primary data were gathered, only synthesis and interpretation of previously published data; monetary values are presented in the currency and reference year of the source study. Due to the varying study designs of the sources included, results are presented descriptively, not by formally pooling them with a meta-analysis, and projections of financial data are derived directly from the cited industry market report, where they were not model-generated independently.

4. RESULTS AND DISCUSSION

4.1 Market Trajectory and Regional Structure

The global telerehabilitation market's projected trajectory, summarized in Table 1 and Figure 1, indicates sustained double-digit revenue growth through the remainder of the decade, rising from approximately USD 4.70 billion in 2023 to a projected USD 11.81 billion in 2030 [6].

Table 1. Projected Global Telerehabilitation Market Revenue, 2023–2030

Year	Global Revenue (USD Billion)	Cumulative Growth vs. 2023
2023	4.70	Baseline
2024	5.32	+13.2%
2025	6.35	+35.1%
2026	7.19	+53.0%
2027	8.14	+73.2%
2028	9.21	+96.0%
2029	10.42	+121.7%
2030	11.81	+151.3%

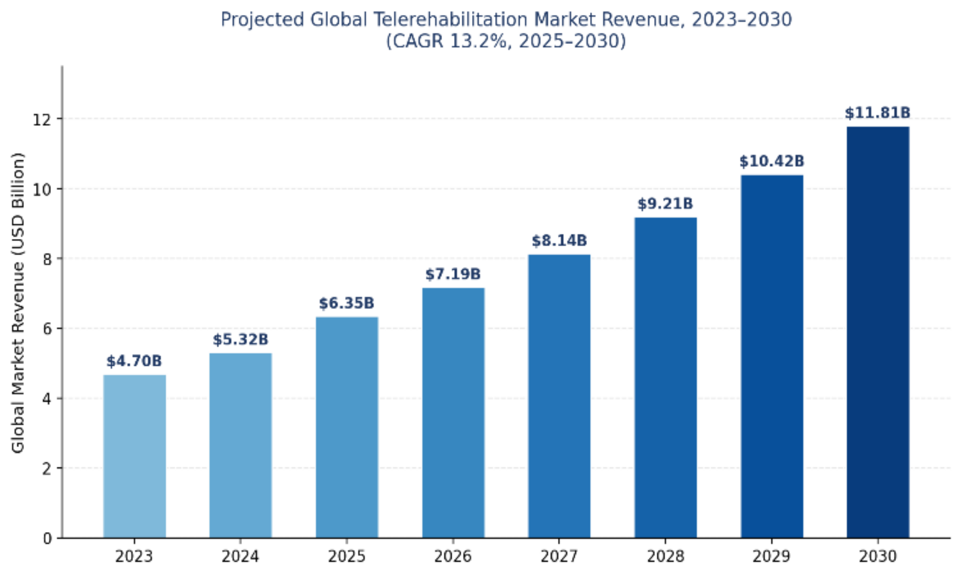

Figure 1. Projected Global Telerehabilitation Market Revenue Growth (Source: [6])

This growth is not uniform – as illustrated in Figure 2, the revenue share of North America in 2024 was 41.5 per cent, followed by Europe at around 30.4 per cent, Asia Pacific at 19 per cent and Latin America at 6.4 per cent [6]. Regional CAGR estimates differ from the global average, indicating that countries like Sweden and Italy are expected to have the highest growth rates within their respective regions, not just the highest share of current revenue, and should be taken into account when organizations consider taking a geographic approach to expansion [6]. In component segmentation, software consistently dominates the regional revenue mix, accounting for more than seventy percent of North American and Asia Pacific revenue share, and is also the fastest-growing revenue stream, suggesting that ability to provide platform and data-analytics capabilities, not hardware provisioning, is becoming the main source of commercial differentiation and margin capture [6].

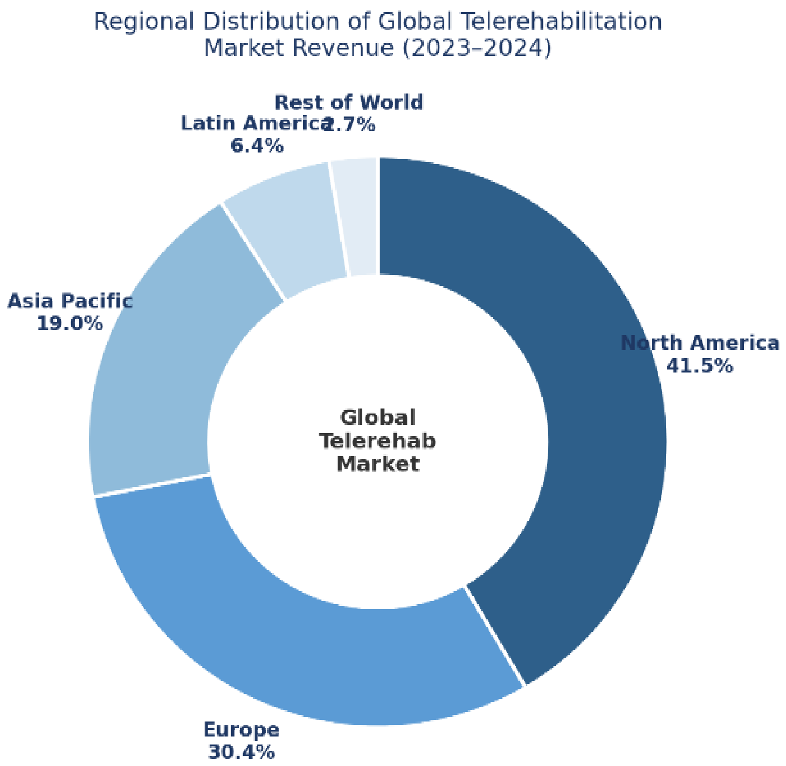

Figure 2. Regional Distribution of Global Telerehabilitation Market Revenue (Source: [6])

4.2 *Financial and Cost-Effectiveness Evidence*

Table 2 and Figure 3 summarize cost-effectiveness findings across the three principal economic reviews included in this synthesis. The proportion of individual studies reporting favorable cost-effectiveness ranged from 45 percent in the broad cost-utility review [2] to 92 percent in the cardiac-specific exercise-based review [3], with the neurological and cardiological review occupying an intermediate position at 50 percent [4].

Table 2. Comparative Cost-Effectiveness Findings Across Economic Reviews

Review	Studies Included	Favourable Cost-Effectiveness	Key Financial Finding
Baffert et al. [2]	11 (6 cardiovascular)	45% (5/11)	>50% of studies below WTP threshold
Batalik et al. [3]	Systematic review, exercise-based CTR	92%	3 studies show significant per-patient cost advantage
Del Pino et al. [4]	8 studies, 865 participants	50% (4/8)	Savings of USD 565.66–2,352.00 per person

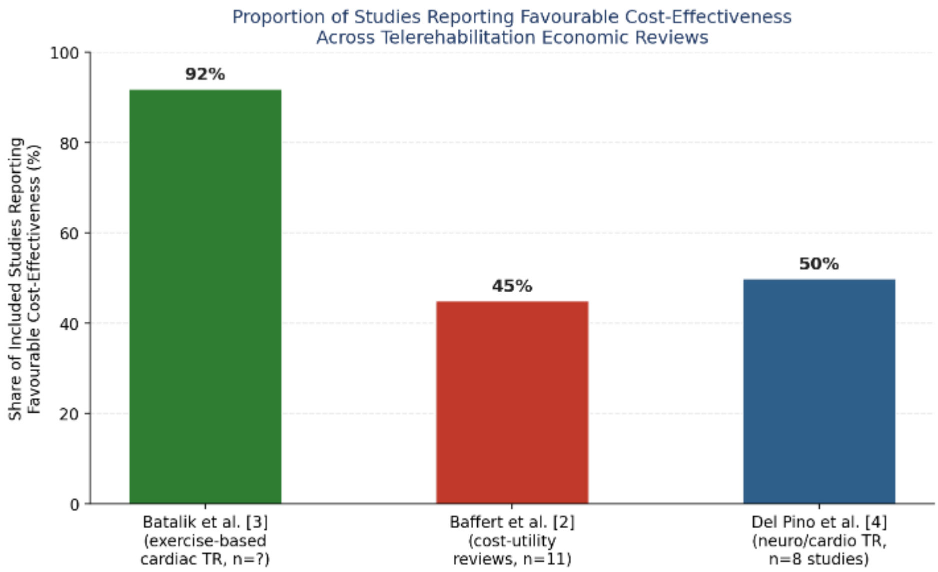

Figure 3. Proportion of Studies Reporting Favourable Cost-Effectiveness (Sources: [2], [3], [4])

These results suggest that financial outcomes depend strongly on the condition and protocol—exercise-based cardiac protocols with carefully thought-out, protocolized, remote-monitoring components seem to have the most consistent financial outcomes, while heterogeneous neurological and orthopedic protocol outcomes are more variable. The pattern has direct organizational implications: The development of the service line for telerehabilitation in healthcare organizations should be directed to protocol-based, standardized interventions in early stages in order to justify the investment in more diverse clinical populations. When savings were reported they were between USD 565,66 and USD 2,352,00 per patient, a difference that is significant enough to impact payer contracting decisions at scale, especially for cardiac and stroke rehabilitation programs with high patient volume [4].

4.3 *Clinical Effect Size and Disease-Specific Financial Implications*

Table 3 and Figure 4 display the standardized mean differences for the musculoskeletal telerehabilitation outcomes based on the largest meta-analysis conducted in this area [9] and by the type of condition. Hip fracture, osteoarthritis and spine-pain indications had a comparatively modest treatment effect within the wide range of 0.24 to 0.91 [9] reported for spine-pain, while joint replacement indications had a standardized mean difference of 0.87.

Table 3. Standardized Mean Differences for Musculoskeletal Telerehabilitation by Condition

Musculoskeletal Condition	Standardized Mean Difference	95% Confidence Interval
Hip fracture	0.87	0.34 – 1.41
Joint replacement	0.24 – 0.91 (range)	Variable by study
Osteoarthritis	0.24 – 0.91 (range)	Variable by study
Spine pain	0.24 – 0.91 (range)	Variable by study

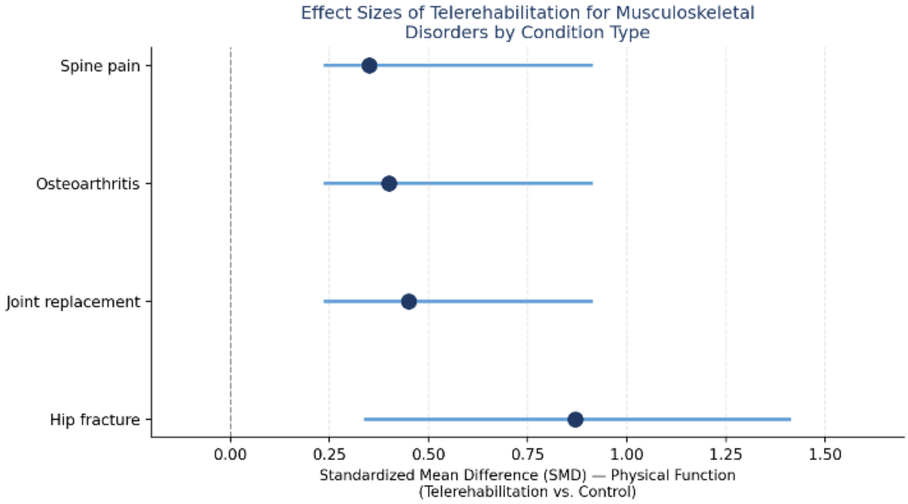

Figure 4. Effect Sizes of Telerehabilitation for Musculoskeletal Disorders (Source: [9])

This may be of particular importance from a financial-planning perspective because it demonstrates that the tariff and staffing models for each clinical indication should be tailored based on the effect size, which is more robust and consistent in some indications than others, and which is likely to support a premium or outcomes-based payment approach. This indication-specific trend is confirmed by the pilot trial data for cardiac telerehabilitation: at six weeks, participants in the intervention group saw significant improvements in steps/day of 4,126.58 steps/day compared to the control group, and at 12 weeks, the step/day difference was 5,285 steps/day; there were also significant differences in health-promoting lifestyle scores between the intervention and control groups, as shown in Figure 6 [12].

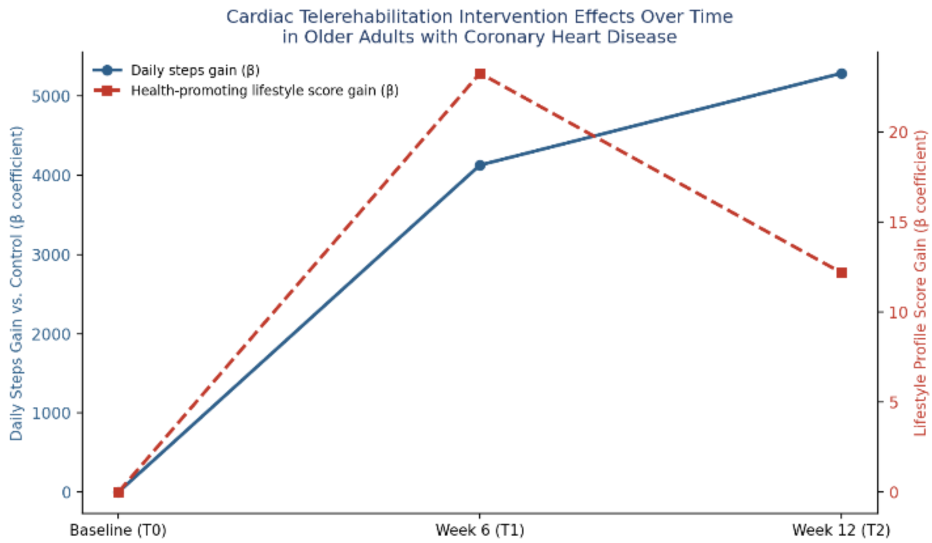

Figure 6. Cardiac Telerehabilitation Intervention Effects Over Time (Source: [12])

Of the 43 randomized, 20 participants completed the entire intervention; adherence to pedometer-based telemonitoring was 90 percent while adherence to web-based data upload was 40 percent, suggesting that passive monitoring channels (not requiring active data entry by the patient) achieve materially higher patient adherence than active ones (requiring the patient to actively enter data), with direct implications for technology-investment prioritization within telerehabilitation ventures [12].

4.4 Business Model Components and Organizational Uncertainty

Table 4 synthesizes recurring business model components identified across the health-technology and telehealth business-model literature, and Figure 5 presents these components in a canvas format adapted specifically to telerehabilitation service design.

Table 4. Synthesized Business Model Components for Telerehabilitation Ventures

Business Model Component	Representative Elements	Source(s)
Key Partners	Payers, device vendors, cloud/IT providers, referral clinicians	[1], [7]
Value Proposition	Improved access, reduced travel burden, comparable clinical outcomes	[1], [11]
Revenue Streams	Per-session reimbursement, subscription access, value-based contracts	[7], [13]
Uncertainty Factors	28 factors spanning regulation, reimbursement, technology, and acceptance	[7]
Governance Preference	Incremental, hybrid transition over abrupt replacement of in-person care	[5]

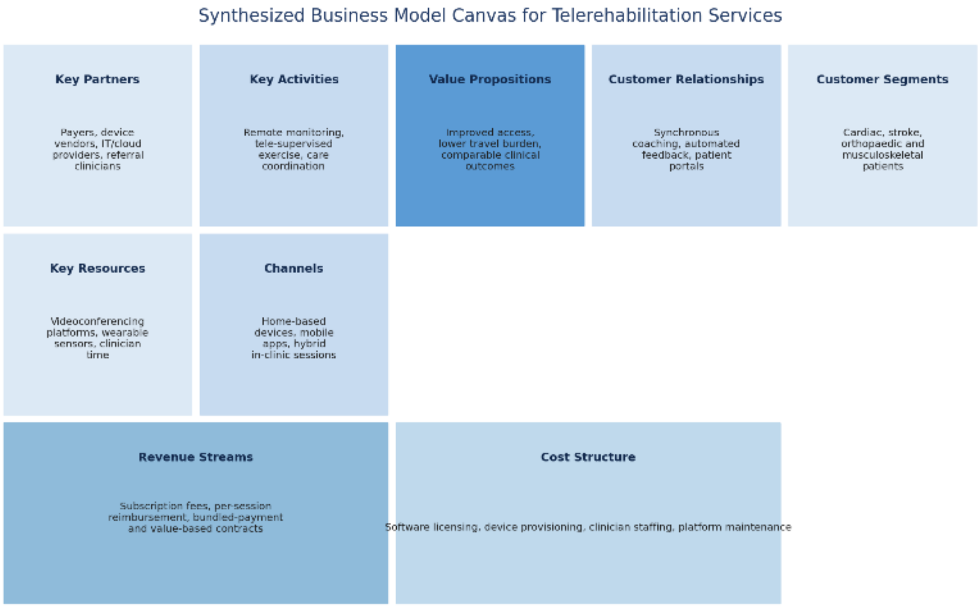

Figure 5. Synthesized Business Model Canvas for Telerehabilitation Services (Sources: [1], [7], [11], [13])

Common key partners are third-party payers, device manufacturers, and cloud-infrastructure providers; key revenue streams are usually per-session reimbursement, subscription-based access, and more recently value-based or bundled payment contracts based on functional outcomes [1, 7, 11, 13]. Twenty-eight uncertainty factors were identified in health-technology business models, encompassing the regulatory approval process, unpredictable reimbursement policy, technology obsolescence, and use by clinicians [7]. Businesses that want to reduce this uncertainty have been found to be more willing to engage in open-innovation partnerships and more flexible business models than in business models with only a single revenue stream [7]. The initial governance-model research investigating TKA telerehabilitation also revealed a preference for incremental, hybrid governance transitions rather than replacing existing face-to-face referral pathways abruptly, which indicated a preference for how the pathway is implemented, with a focus on risk management [5].

4.5 Organizational Implementation Evidence

Table 5 summarizes participant-level evidence from the clinical and organizational studies included in this synthesis.

Table 5. Participant-Level Evidence from Key Clinical and Organizational Studies

Study	Design	Sample	Principal Outcome
Laver et al. [8]	Cochrane systematic review	22 RCTs, n=1,937	Outcomes comparable to in-person rehabilitation
Yang et al. [14]	Systematic review & meta-analysis	8 RCTs, n=1,578	Comparable readmission/mortality; improved peak VO_2
Su et al. [12]	Pilot RCT	n=43 (20 completers)	Significant gains in daily steps and lifestyle score
Molina-Garcia et al. [9]	Systematic review & meta-analysis	37 trials, n=4,288	Favourable across all clinical outcomes measured

The Cochrane review of stroke telerehabilitation (22 trials, 1937 participants) and the hybrid comprehensive telerehabilitation meta-analysis for cardiovascular disease (8 trials, 1578 participants) support that the clinical outcomes of telerehabilitation are, in general, similar to in-person rehab in both neurological patients and cardiovascular patients, and that cost and quality-of-life data are less consistently reported than functional outcome data [8], [14]. This "evidence imbalance" – with more robust clinical evidence documenting clinical effectiveness than financial evidence documenting financial effectiveness – is a structural barrier to investment underwriting: current capital allocators/payer organizations assessing telerehabilitation business cases will need to rely on a relatively thin economic evaluation evidence base, compared to the clinical evidence base. The COVID-19 policy environment, which temporarily removed some reimbursement and licensure barriers in certain jurisdictions, was a de facto implementation experiment, and the volume of real-world delivery of telerehabilitation during this time was significantly increased, but formal learning health system partnerships to create and share economic evidence of this increased delivery volume have not yet been broadly established [10]. Eliminating this evidence gap, especially via scaled deployment of prospective, protocolized cost-utility studies directly into market deployments is the most impactful path to robusting the financial argument for further market growth.

5. CONCLUSION

Based on evidence synthesised in this study, telerehabilitation has a significant amount of commercial momentum, with the global market estimated to increase by over double from 2024 to 2030, and the evidence base for the economic benefits of telerehabilitation is not consistent for every clinical indication and geographic market. The cost-effectiveness of protocolized, exercise-based cardiac interventions has been well documented, moderately well documented for neurological and broader cardiological indications, and least consistently documented for heterogeneous musculoskeletal indications; which suggests that rather than being a one-size-fits-all approach to the rehabilitation service line, sustainable business model design should be indication-specific. Frequent elements of business models found in the literature were payer and technology-vendor partnerships, diversified revenue streams, and dynamic adaptability to regulatory uncertainty, and a significant number of the healthcare organizations preferred incremental and hybrid implementation pathways, which offers a practical template for organizations looking to expand their telerehabilitation services responsibly. Future studies should focus on prospective, protocol-driven cost-utility analyses undertaken in scaled deployments and on long-term follow-up of patient adherence to passive versus active monitoring pathways to help bridge this longstanding clinical evidence gap and financial evidence required to support long-term investments in the use of telerehabilitation as a routine care pathway.

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