New Revenue Streams Through Digital Services Implementation and Commercialization

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Abstract

In the rapidly evolving business landscape, telecom and IT companies seek revenue growth through digital services. This paper introduces an innovative approach for unlocking new revenue streams through digital service implementation. We propose an overlay organization design with 3 key functionalities. The Pre-(digital) Service Implementation Stage establishes B2B market creation, use case finalization, and SLAs. The Service Design and Implementation Stage ensures infrastructure alignment and quality assurance. The Post-(digital) Service Implementation Stage offers seamless delivery, tailored monetization, and AI-enhanced customer care. Cross-functional units facilitate partnerships, data analytics, and regulatory compliance. This holistic approach generates revenue and fosters growth within the digital economy. This paper equips organizations to transform and thrive in the dynamic realm of digital services. Finally, the proposed solution is mapped onto a primary revenue-generating industry sector in British Columbia, i.e., the Real Estate and Construction industry, to showcase the potential of the proposed framework to revolutionize revenue generation.

Keywords—Digital Transformation, Digital Services, Overlay Organization Design, Revenue Generation, Business Model Innovation, Telecom & IT Industry, Service Implementation, Service Monetization, Industry-specific KPIs

I. Introduction

The business landscape of the 21st century has witnessed a seismic shift with the emergence of digital services as a transformative force. As telecommunication and IT sectors strive to navigate this dynamic environment, the integration and commercialization of innovative digital services have taken center stage. With the proliferation of technologies like 5G, a new realm of possibilities has opened, promising enhanced connectivity, unprecedented speeds, and transformative applications and services. The rest of the paper is organized as follows. Section II presents the literature review. Our proposed solution is introduced in section III. In section IV, the rigorous mapping of the proposed solution to a real-world application and vertical industry sector is undertaken. Section V draws the conclusion. Finally, a list of references is provided in section VI.

II. Literature Review

Building upon digital transformation's evolving landscape, our literature review contextualizes our approach and identifies gaps. Starting with Pelkhanov et al.'s [1] systematic review of firms' transformation, it emphasized power dynamics and platform integration. However, there is potential for practical frameworks guiding telecom and IT companies to align digital service implementation, commercialization, and revenue generation with strategic objectives. Feng Li [2] explored digital technology's impact on creative business models, but operationalizing reconfigured models, particularly integrating digital services and revenue streams, remained unexplored. Andrea Sestino et al. [3] examined IoT and big data's role in managing digital transformation, but comprehensive integration of these technologies [4], [5] with a strategic overlay organization design for service implementation and monetization was missing. Mina Nasiri et al. [6] investigated smart technologies' role in supply chain relationships. However, a potential avenue emerged for prospective researchers to address and advance the integration of practical strategies for deploying smart technologies [7], [8] within a strategic organization design for service implementation and monetization. O. G. Rojas et al. [9] enhanced digital collaboration with a maturity model and software but did not explore potential integration within a strategic organization design for revenue-driven collaboration in the digital content industry. Finally, Henric Blichfeldt et al. [10] explored digital technology, innovation, and competitive advantage, but a comprehensive investigation into integrating these elements within an organizational framework for holistic business growth is lacking.

III. The Proposed Solution

A. An Overlay Organizational Design for Digital Service Integration

Our framework's core is the overlay organizational design, shown in Figure 1. As digital services reshape industries, a flexible structure is vital, seamlessly integrating innovation into operations. This novel approach bridges conventional models and digital transformation demands through three primary functionalities as follows.

1. Market Creation, Use Case Finalization, and SLA Agreement -- This phase is fundamental for successful digital service implementation. B2B market creation involves proactive engagement with all prospective and potential

clients and industries, shaping services based on needs. Intensive negotiations lead to innovative use cases, forming the foundation of strategic business plans and SLAs aligned with revenue goals.

2. Service Design and Implementation -- Aligning service Key Performance Indicators (KPIs) with network KPIs is crucial to translate strategic visions into tangible and measurable digital services. This synchronization will ultimately ensure quality user experiences. Organizations collaborate with technical sectors and partners to design

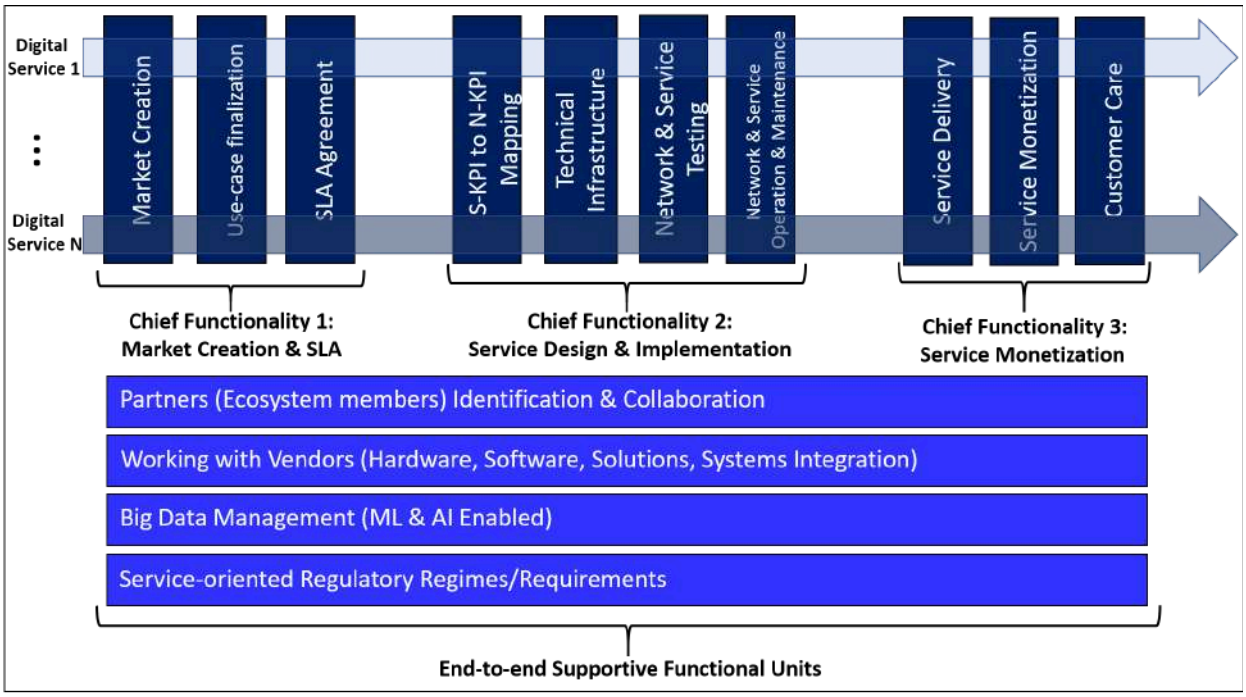

Figure 1: The proposed overall organization design for implementing and commercializing digital services.

and implement necessary technological infrastructure, from telecom networks to cloud solutions. Rigorous testing guarantees compliance with predefined KPIs and SLAs, aided by artificial intelligence (AI) and machine learning (ML)-driven solutions for proactive maintenance and network automation.

3. Service Monetization and Customer Care -- Post-deployment, this phase involves service monetization and customer care. Open APIs enable seamless service delivery, supported by dashboards empowering business customers to monitor their resource usage and performance against pre-agreed service level agreements (SLAs). Monetization strategies match service grades, while AI-driven customer care ensures swift query resolution

through omni-channel approaches. Last but not the least, the end-to-end security measures maintain customer trust.

B. End-to-End Functional Units

1. Partner Identification and Collaboration -- Successful implementation of the overlay organizational design relies on effective partnerships. Organizations identify and collaborate with potential partners, including national and international stakeholders. This collaboration spans ecosystem members like vendors, solutions providers, and systems integrators, bridging capability gaps and accelerating time-to-market.

2. Collaborating with Vendors and Solution Providers -- Engaging with national and international vendors and solution providers is pivotal. Through ongoing identification and collaboration, organizations access technological expertise, bridging gaps in hardware, software, solutions, and systems' integration. This mindset streamlines adopting cutting-edge technologies and fosters agility in responding to market demands.

3. Data Analytics with AI and ML -- Unified data governance and decision-driven big data analytics are core. By harnessing AI and ML, organizations extract insights from data, informing strategic decisions across the value chain. This approach ensures informed responses to dynamic market conditions, enhancing operational efficiency.

4. Service-Oriented Regulatory Regimes -- Navigating the regulatory landscape is crucial. Clear delineation of responsibilities and KPIs by regulatory bodies fosters accountability within the digital ecosystem. All ecosystem members uphold predefined KPIs in the view of the regulatory body, fostering a cooperative environment for service excellence and monetization (Refer to Figure 2 for details).

IV. A Practical Application: Real Estate & Construction Industry

Having established the bedrock of our proposed organizational framework for digital service implementation and commercialization, our attention shifts to its real-world applications. Acknowledging the pivotal role of the Real Estate and Construction industry in British Columbia's revenue generation, we delve into how our innovative

concept aligns with and transforms this dynamic sector. Bridging the conceptual and the concrete, we aim to unveil our framework's transformative potential within one of the region's vital economic drivers.

Stage 1: Initiating Market Creation in the Real Estate and Construction Industry

In the journey to transform the Real Estate and Construction sector, telecom and IT companies engage with diverse stakeholders, including investors and project managers. As innovative catalysts, the above companies introduce a curated portfolio of digital services, strategically addressing the construction industry-specific challenges outlined in Table 1. This tailored approach aims to reduce construction expenditures and enhance revenue streams. Through these interactions, telecom and IT enterprises not only initiate dialogues but also showcase the tangible benefits of digital services, fostering collaborative relationships and driving sector-wide transformation.

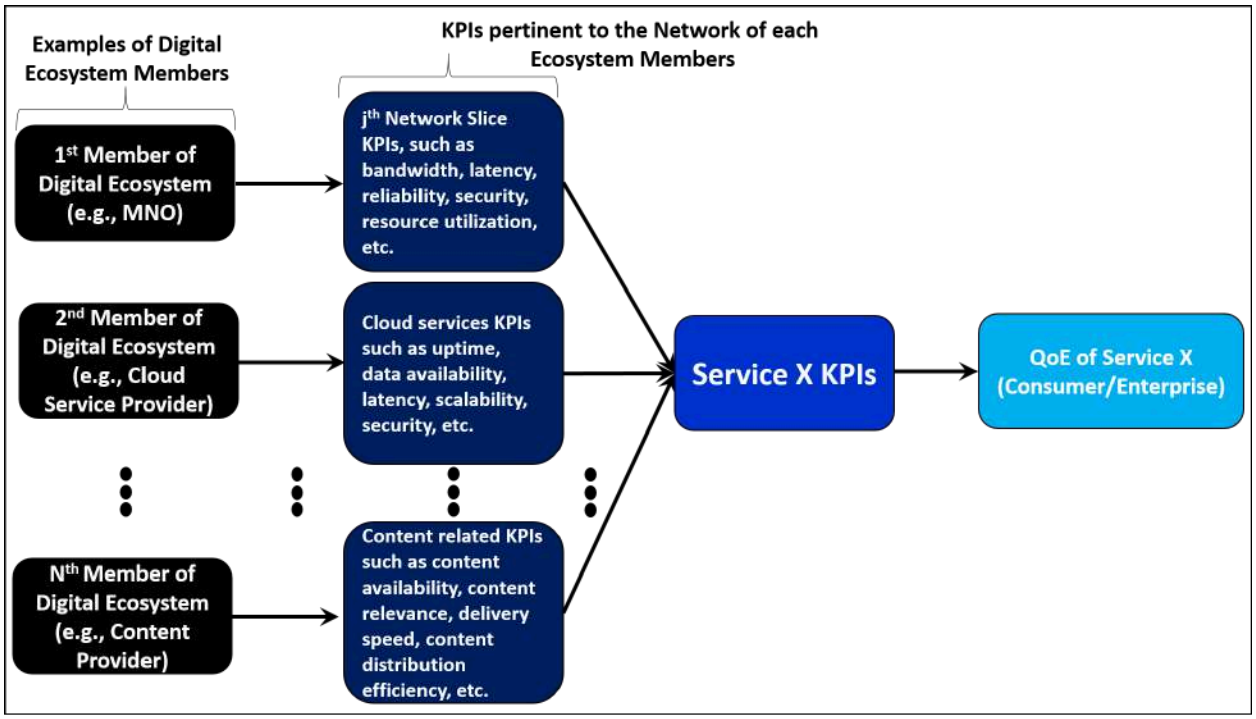

Figure 2: The proposed necessity of clear definition and enforcement of responsibilities and KPIs among all digital ecosystem members by the Regulatory body. (MNO stands for mobile network operator)

Stages 2 and 3: Use Case Finalization and SLA Agreement

Transitioning from initial engagement, our Real Estate and Construction journey enters a pivotal phase: refining use cases and formalizing SLAs. Collaborative efforts are made to tailor use cases to industry needs. Here, for the sake of demonstration, we choose the “remote construction site monitoring” as the candidate digital service to conduct

our further studies upon. On the other hand, establishing a robust SLA framework is a key element. This framework, crafted from Table 2's service Key Performance Indicators (KPIs), encompasses real- time monitoring and operational efficiency inherent to the selected service. The SLA solidifies the partnership between telecom/IT companies and the construction sector, incorporating technical benchmarks for service quality and a targeted customer experience for the end users. It fortifies the contractual basis with essential legal terms, payment conditions, and crystallizes the digital service concept into a tangible collaboration, forming the cornerstone of a prosperous partnership.

Stages 4 and 5: Mapping Service KPIs to Telecom/IT Network Requirements

In this phase, we establish a direct correlation between service Key Performance Indicators (KPIs) and critical technical prerequisites, guided by Table 3. For the sake of illustration, we consider the "video quality" KPI, by assuming 1- the network architecture supports 20 simultaneous video streaming feeds, 2- a distance of 10 kilometers

	Digital Service	Explanation	Impact on Expenditure Reduction	Impact on Revenue Generation
1	**Asset Tracking**	Tracking the construction equipment and materials to prevent theft, loss, and ensuring efficient resource allocation	X	
2	**Smart Building Management**	Optimizing building operations, including lighting, heating, cooling, and security systems through 5G-enabled sensors and devices	X	
3	**Remote Construction Site Monitoring**	Real-time video feeds from construction sites, allowing project managers and stakeholders to monitor progress and make decisions without the need of physical attendance	X	
4	**Remote Inspection**	Site Inspectors and engineers can use 5G-enabled video streaming to conduct site engineering inspections remotely, reducing the need for travel and improving efficiency	X	
5	**Augmented Reality (AR) Visualization**	Allowing clients and investors to virtually tour properties and construction sites, aiding in design, sales and decision making processes	X	X
6	**Virtual Reality (VR) Tours**	facilitating immersive VR tours of properties that are still under construction, giving potential buyers a realistic sense of the space and amenities		X
7	**Drones for Site Inspection**	Enabling swift data collection and analysis by using drones for site surveys, inspections, and aerial photography	X	
8	**Construction Equipment Automation**	Enabling remote control and automation of construction equipment to enhance safety and efficiency on-site	X	
9	**Health & Safety Monitoring**	Wearable devices can provide real-time health and safety monitoring for construction workers, improving on-site safety	X	
10	**Emergency Response**	Quick communications and coordination among response teams in case of emergencies or accidents on construction sites	X	
11	**Building Information Modeling (BIM)**	Rapid sharing of complex data among architects, engineers, and contractors to improve coordination and reduce errors	X	
12	**Supply Chain Management**	Real-time tracking of materials and supplies to ensure timely deliveries and delay minimization	X	

Table 1: List of potential digital services within the Real Estate and Construction vertical industry

between the construction site and the monitoring center, 3- all necessary technologies are available for this video transmission, and 4- targeted quality of experience (QoE) for all end users will be guaranteed, the required network KPIs are estimated to fulfill the service requirements. In summary we consider the

- Telecom and IT Network Requirements: To ensure seamless video transmission, this dimension spans high bandwidth, low latency, reliability, scalability, security, and interoperability,
- Corresponding Solutions and Technologies: Which utilizes 5G, Mobile Edge Computing (MEC), Content Delivery Network (CDN), and similar enablers, real-time video streaming is orchestrated to deliver pristine feeds to the monitoring center, and
- Telecom and IT Networks KPIs: Quantified thresholds from Table 3 establish network Key Performance Indicators (KPIs) such as video data rate, resolution, frame rate, and latency. These metrics guarantee uninterrupted video streams, ensuring superior quality for monitoring the construction site.

	Service KPI	Description
1	**Video quality**	Is crucial for accurate assessment, decision-making and reducing costly rework
2	**Low latency**	Quick response time between real-time actions and remote video feed prevents errors
3	**Real-time feed stability**	A seamless and stable video feed ensures that remote stakeholders can monitor construction progress without interruptions
4	**Remote camera control**	Precise control over camera angles and zoom levels enhances the ability to focus on specific areas of interest, improving project oversight and reducing the need for physical visits.
5	**Streaming reliability**	A reliable streaming experience prevents disruptions and ensures that remote stakeholders can consistently access important information, contributing to better project management.
6	**Alerts & notifications**	Effective alerts and notifications keep stakeholders informed about key events, enabling timely response and potentially reducing the risk of delays or issues.
7	**Compatibility**	Broad compatibility across devices and platforms ensures that various stakeholders can easily access the service, leading to improved collaboration and efficiency.
8	**Accessibility**	Easy access to the remote monitoring service supports efficient communication among stakeholders, potentially reducing delays and costly misunderstandings.
9	**Data usage efficiency**	Efficient data usage helps reduce operational costs associated with data transmission while maintaining the quality of the remote monitoring service.
10	**Recording & playback quality**	High-quality recording and playback enable accurate analysis and documentation of construction progress, contributing to project efficiency and documentation.
11	**Security and privacy**	Effective security measures prevent unauthorized access and protect sensitive information, avoiding potential breaches that could lead to costly consequences.
12	**Multiple view support**	The ability to switch between multiple camera views enhances the completeness of monitoring, potentially leading to more accurate decision-making.
13	**Service customization**	Tailoring the service to user preferences enhances satisfaction and usability, potentially leading to improved collaboration and efficiency.
14	**Compatibility with analytics**	Integration with analytics tools can provide valuable insights for decision-making, potentially leading to more efficient resource allocation and project management.

Table 2: List of comprehensive service KPIs for the digital service #3: remote construction site monitoring.

Stages 6, 7, 8, 10: Networks and Services Testing, Operation & Maintenance, and Service Delivery:

The next four stages, namely Networks and Services Testing, Networks and Services Operation and Maintenance, Service Delivery at Customer Premises, as well as the Customer Care delve intricately into technical nuances that extend beyond the scope of this paper. Hence, our attention shifts to the culmination of Part IV, where we interlink the proposed "Service Monetization" stage with the meticulously tailored service within the construction industry.

Stages 9: Service Monetization

As per Table 4, the service monetization phase structures subscription-based charging models for business customers, rooted in delivered network Key Performance Indicators (KPIs) and distinct service grades. This process allows customers to choose between Premium, Standard, and Basic quality levels, defined by specific KPI ranges

Telecom & IT Network Requirements (selection)	Solution, Technologies, and Platforms (selection)	Network KPIs (selection)	
		KPI	Sample threshold per video stream
• High Bandwidth • Low Latency • Reliability • Scalability • Security • Interoperability • Systems Integration	• End-to-end 5G Network • Mobile Edge Computing Platform (MEC) • Video Compression • Content Delivery Network (CDN) • Video Analytics Platform • Remote Camera Management Software Platform • Application Programming Interface (API) Integration • Remote Users Management	Video data-rate	2-10 Mbps
		Resolution	Full HD (1920 * 1080) or HD (1280 * 720)
		Frame Rate	24-30 frames per second
		Buffering Rate	2% - 5% of total viewing time
		Video Loss Rate	1% - 5% of total frames
		End-to-end Latency	200-300 ms
		Network Congestion	Maximum of 50% to 70% of current network utilization
		Jitter	20-40 ms
		Real-time Analytics Latency	300-500 ms
		API Response Time	300-500 ms

Table 3: Mapping the "Video Quality" Service KPI to Telecom/IT Network Requirements and KPIs

like video data rate, resolution, latency, etc. Monthly subscription fees cover the service, complemented by charges for the number of video streams used. Premium grade offers advanced support and analytics, while lower tiers offer varying levels of such features. This customized approach empowers businesses to opt for the service grade aligning with performance and budget needs, enabling flexible and value-focused service adoption.

V. Conclusion

This paper introduced a comprehensive framework for innovative digital service implementation and monetization, providing a fresh pathway for revenue generation and business growth. Leveraging the capacities of telecom and IT firms, our solution stepped beyond conventional models to deliver tailored services across diverse vertical industries. By showcasing its applicability in the lucrative real estate and construction sector of British Columbia, we illustrated the seamless alignment of service KPIs, technical requirements, and network capabilities, as exemplified in the "video quality" KPI demonstration. Enhanced by a progressive monetization model, this approach allows nuanced service adoption tailored to specific needs and budgets. The paper bridged theory and practice, underscoring adaptable solutions and customer-centricity. Integrating industry-specific KPIs, cutting-edge

technologies and pricing models, this harmonious convergence demonstrated the capacities of redefining business trajectories, enhancing value creation and profitability across various vertical sectors.

		Service Grade 1: (Premium Quality)	Service Grade 2: (Standard Quality)	Service Grade 3: (Basic Quality)
Charging Model	Monthly subscription fee	$50	$30	$15
	Extra charge per video stream	$5	$3	$2
	Support package	Advanced	Basic	Minimal
	Access to analytics	Advanced included	Basic included	Not included (available as an add-on)
Network KPIs	Video data rate	6-10 Mbps (per video stream)	4-6 Mbps (per video stream)	2-4 Mbps (per video stream)
	Video resolution	1920 * 1080 pixels (Full HD)	1280 * 720 pixels (HD)	1280 * 720 pixels (HD)
	Frame rate	30 fps	24-30 fps	24 fps
	Buffering rate	≤ 2% (of total video duration)	≤ 3% (of total video duration)	≤ 5% (of total video duration)
	Video loss rate	≤ 1% (of total transmitted frames)	≤ 2% (of total transmitted frames)	≤ 5% (of total transmitted frames)
	End-to-end latency	≤ 200 ms	≤ 250 ms	≤ 300 ms
	Network congestion	≤ 50% (of capacity during peak times)	≤ 60% (of capacity during peak times)	≤ 70% (of capacity during peak times)
	Jitter	≤ 20 ms	≤ 30 ms	≤ 40 ms
	Real-time analytics latency	≤ 300 ms	≤ 400 ms	≤ 500 ms
	API response time	≤ 300 ms	≤ 400 ms	≤ 500 ms

Table 4: Service monetization based upon different service grades

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