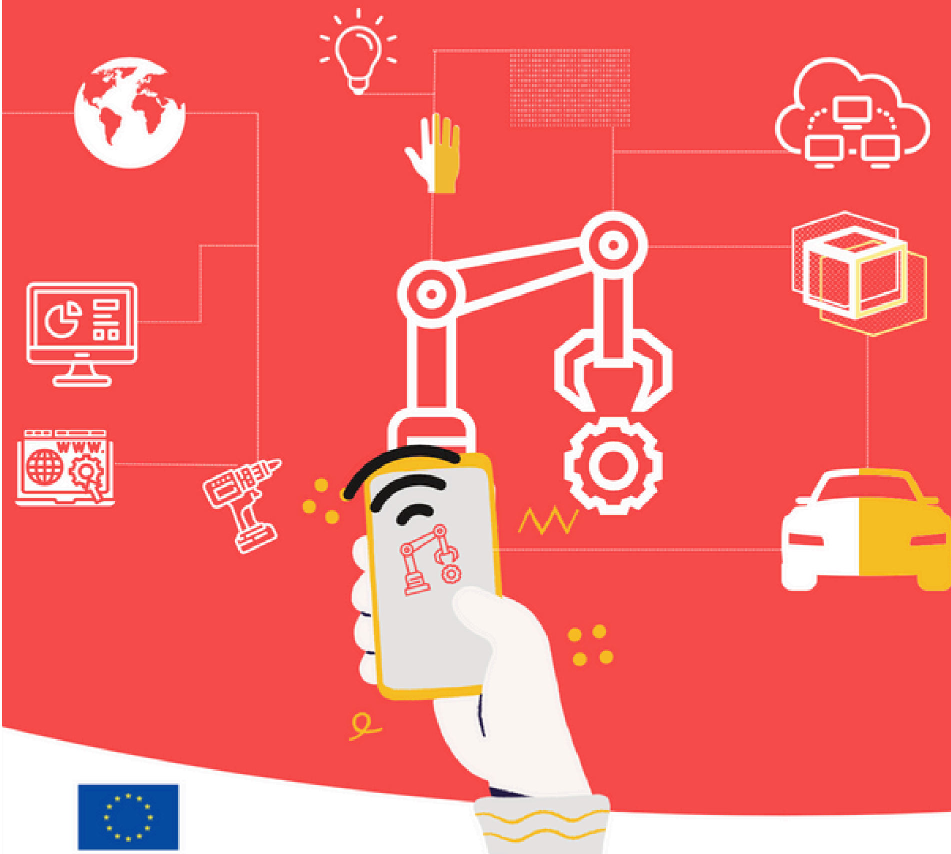
CHANGE2TWIN

Position Paper

Four Strategies for Repository-Based Community Platforms



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1. INTRODUCTION AND OBJECTIVES

Introduction

In today's fast-paced digital landscape, blending marketplaces with community platforms has become a strategic approach for businesses leveraging innovation networks for collaboration. Successful marketplaces deliver value while thriving on the active participation and engagement of their communities, even in the most basic buy-sell interactions. The real challenge lies in understanding how marketplace dynamics integrate with community frameworks. Developing effective distribution channels and fostering user engagement are crucial for marketplace success, as they build trust and participation through community involvement. The success of a marketplace often hinges on frequent visits by suppliers of value and consumers of value.

However, many marketplaces encounter challenges such as mismatched offerings and a lack of tailored functionalities to meet the specific needs of providers and users. Community engagement is particularly vital in building innovation networks, where multi-stakeholder, trans-disciplinary solutions are needed to tackle complex challenges—such as those in emerging technologies like digital twins and AI, or broader transitions like the digitization and the energy transition.

In the context of EU innovation and collaboration, marketplaces play a key role in matching supply and demand in emerging innovation areas and disseminating knowledge, which has led to the creation of numerous digital platforms. The European Commission (EC) has funded many of these platforms to support European industry by facilitating collaboration, data exchange, and create new business opportunities. However, many of these platforms are not sustained after individual EU funded projects conclude. Technical challenges such as data quality, interoperability, and cloud adoption hinder full potential. Moreover, the lack of effective business models further undermine their long-term viability, making it difficult to translate initial project outcomes into long-term success.[1]

For these marketplaces to contribute to a resilient European industry, it is crucial to understand when to develop them and what elements are essential for their long-term success. The lack of effective business models is closely tied to the need for an understanding of marketplace evolution.

[1] AN-ANALYSIS-OF-DRIVERS-AND-BARRIERS-FOR-THE-UPTAKE-OF-DIGITAL-PLATFORMS-IN-EUROPE.pdf (h2020-demeter.eu)

This necessitates a comprehensive **understanding of marketplace evolution,** and **the motivations driving user engagement**. By addressing these challenges and understanding these dynamics, we can uncover the key factors needed to build and sustain a successful marketplace within community contexts, ensuring that these platforms become integral and enduring components of a resilient European industry. To understand these dynamics, our primary focus lies on analysing the Change2Twin marketplace while also investigating other marketplaces and their corresponding business models. The text in textboxes specially focus on the Change2Twinh marketplaces. **By aligning the business model with the identified building blocks**, we aim to offer valuable insights for future marketplaces. Ultimately, this leads to concrete functionalities for these marketplaces and underscores the building blocks for the establishment and maintenance of a sustainable public funded marketplace.

The Change2Twin Marketplace is a well-organized, flexible technology platform that connects diverse functionalities with various technical systems, fostering a collaborative community for digital twin technologies. By offering a broad selection of advanced tools that meet interoperability standards and integrate with different technological frameworks, the Change2Twin Marketplace enhances flexibility and choice for users. It effectively bridges the gap between manufacturers and providers, promoting valuable partnerships and collaborative innovation. As a central hub, it supports the digital twin community by facilitating knowledge sharing and networking, which drives industry-wide advancements. Additionally, the Change2Twin Marketplace helps manufacturers advance their digital transformation efforts by providing access to funding through Change2Twin Open Calls.

Change2Twin Challenges of its Marketplace - The Change2Twin (C2T) initiative has introduced a range of services, including a marketplace, aimed at assisting SMEs and Digital Innovation Hubs (DIHs) in navigating the innovation landscape, particularly for digital twins, more effectively. Some challenges identified include mismatched offerings, pricing issues, low awareness of the marketplace, and a lack of user engagement. Companies are seeking highly specific solutions, and the future success of the marketplace hinges on aligning offerings with these demands and fostering a willingness to pay. The marketplace could offer broader benefits for DIH by expanding their networks beyond national borders. The DIHs could even set up their own regional marketplaces and connect these with the larger European C2T marketplace. However, it remains a challenge to involve DIHs and their networks, as the marketplaces are hardly used by either DIHS and SMEs as a distribution channel. SMEs and DIHs often prefer to find solutions within their local networks, where there are fewer cultural and language barriers.

The insights from this greenpaper are pivotal for the sustainability of marketplaces associated with EU funded projects, particularly in extending their impact beyond the project's funded period. These marketplaces act as platforms where providers and users connect to exchange knowledge, goods, or services. By facilitating transactions and enabling buying and selling mechanisms, they promote collaboration and drive innovation, ultimately strengthening European industry.

To ensure the continued growth and relevance of these marketplaces, it is essential to establish robust networks that support ongoing collaboration, knowledge sharing. This requires linking the business model with user engagement processes to provide clear insights into the sustainability and impact of these initiatives.

For a marketplace to remain sustainable, its business logic must be well-defined and it should integrate seamlessly with community platforms. Community platforms focus on fostering interaction, collaboration, and engagement among users with shared interests or goals, while marketplaces emphasize transactional elements. Understanding and aligning these distinct roles with the overall business model is critical. By creating a collaborative network among European Digital Innovation Hubs (DIHs) and other stakeholders, we can ensure the effective use of resources and secure the long-term impact of these initiatives, extending their benefits well beyond the project's duration.

Change2Twin Network - C2T project aims to leverage collaboration among European Digital Innovation Hubs (EDIHs) focused on digital twin initiatives; this network will serve as a central hub for ongoing collaboration and knowledge exchange within the digital twin domain. By establishing this network, the resources and funding invested in the C2T project is enhanced. Furthermore, the C2T project specifically targets the digitalization efforts of small and medium-sized enterprises (SMEs) and Digital Innovation Hubs (DIHs), collaborating with existing networks like the European DIH Catalogue and the AI4EU platform to create a comprehensive pan-European knowledge network. These networks are crucial in fostering innovation and driving progress across Europe. Additionally, by collecting data on the activities and characteristics of stakeholders within these networks, we can enable informed decision-making regarding innovation strategies and policies[2].

Figure 1 Growth Phases of European Innovation Networks

Objectives

- Define the core building blocks and functionalities of innovation networks, specifically focusing on community platforms, highlighting their significance in online marketplaces meeting the diverse needs of providers and users.
- Analyse existing marketplace to discern the factors contributing to their success, emphasizing their evolution over time, their relation to the core building blocks, and the critical role played by stakeholders.
- Explore the motivational drivers behind user engagement within marketplaces, with a particular focus on how these drivers intersect with the marketplace.
- Develop strategies for creating and maintaining a sustainable public marketplace that effectively serves the needs of its target audience while delivering tangible value to stakeholders.

[2] Rodin Paper - D1.3 European Infrastructure Assets

[3] Change2Twin WP2-WP6 Technical Review, February 09th, 2024

Impact

The objectives outlined aim to drive significant impact within the context of EU public marketplaces. Through defining core attributes and functionalities, we aim to give the reader a deeper understanding of effective marketplace design, facilitating more informed decision-making processes. By analysing existing marketplace models, the reader of this report can draw insights from successful examples, enabling them to identify best practices for specific situations which also could help to avoid potential pitfalls. Moreover, exploring the motivational drivers behind user participation promises to enhance engagement. This feeds into the development of an aligned business model with corresponding building blocks, where we will take Change2Twin marketplace as an example. Finally, the focus on these business models, and sustainable marketplace development could ensure the creation of robust pan-European innovation networks built for long-term viability and success, ultimately leading to impact of EU initiatives beyond their funded periods.

Change2Twin Impact - The C2T marketplace holds the potential for broader benefits, extending the DIHs networks beyond national boundaries. DIHs could explore establishing their own regional marketplaces and integrating them with the larger European marketplace. This development not only serves the interests of DIHs, but also strengthens a robust digital twinning network across Europe. This network benefits knowledge dissemination throughout the continent and enables the rise of a broader digital twinning ecosystem.

Positive Aspects - Change2Twin participants view the marketplace as a valuable addition for accessing providers in situations where there is a knowledge gap or when suitable companies are lacking in the (local) DIH network. Over time, the marketplace has shown positive evolution, with an increased range of offerings and a more refined focus.

Approach

Our research started with defining the core attributes and functionalities of repository-based community platforms, identified through desk research. Subsequently, we focused on the marketplace to identify its most essential building blocks. Further, we conducted interviews and additional desk research to delve into these platforms in more depth, aligning building blocks with elements in the business model and laying emphasis on the design choices made for the different marketplaces. For this analysis, several marketplace stakeholders were examined, including those focused on businesses similar to Change2Twin, marketplace software developers, and marketplaces that offer products and services to consumers.

The analysis will encompass the following marketplaces by desk research:

1. GitHub Marketplace connects developers with a variety of third-party tools and services, enabling seamless integration into their GitHub workflows to enhance productivity and collaboration.
2. AppSource acts as a digital marketplace where businesses can discover, trial, and purchase applications and services that integrate with Microsoft products, connecting users with software vendors.
3. Thingiverse is a platform where creators can share and download free 3D printable models, fostering a community-driven exchange of designs between makers and enthusiasts.
4. Kaggle provides a marketplace for data science competitions, datasets, and collaborative tools, linking organizations seeking data solutions with a global community of data scientists.
5. UpWork a freelancing marketplace that connects businesses with freelancers offering a wide range of services, facilitating project-based work and remote employment.
6. Indiegogo a crowdfunding platform that enables project creators to raise funds from backers around the world, effectively connecting innovators with financial supporters.
7. Alibaba Cloud offers a comprehensive range of cloud-based software solutions, connecting business customers with independent software vendors to enhance their IT capabilities.
8. Envato Market an extensive digital marketplace where designers, developers, and creatives can sell their digital assets, directly linking content creators with buyers in need of high-quality resources.
9. Coursera operates as an online educational marketplace, partnering with top universities and companies to connect learners with a wide range of courses, specializations, and degrees.
10. F6S a global platform that connects startups with funding opportunities, accelerator programs, jobs, and resources, bridging the gap between early-stage companies and potential investors and supporters.

The analysis consist of four interviews with the following marketplaces:

1. FundingBox: FundingBox is a European platform that offers funding and community support for companies simplifying the funding process and promoting growth across various sectors such as AI, manufacturing, and IoT and help them to get access to (European) funding.
2. Andugo.io: Andugo.io is a digital marketplace that connects manufacturing companies with automation providers, optimizing performance and reducing costs through tailored B2B functionalities and industrial collaboration
3. Industryapps: Industryapps provides industry-specific software and services, helping businesses streamline operations and enhance productivity by offering advanced technological solutions tailored to their unique needs through an platform with multiple integrated applications.
4. Clesgo/Change2Twin: A digital platform that connects European SMEs with cutting-edge digital twin solutions, educational resources, and expert providers, fostering innovation and enhancing operational efficiency through access to advanced technologies.

2. FRAMEWORK

Repository-based community platforms and its context

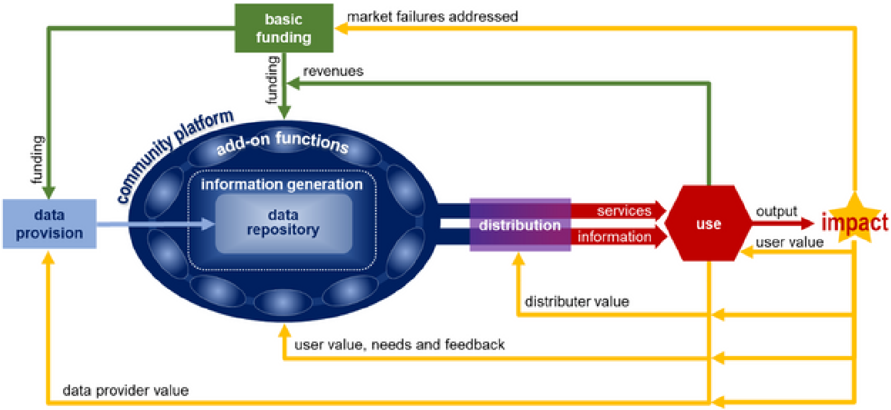

Figure 2 Repository-based Community Platform

The primary goal of the community platform[4] is to unite organizations and provide them with essential information through effective data collection. At the heart of this process is an information repository that gathers data about products and services from various providers. This data is then stored in a central repository, creating a comprehensive information base. Consequently, the community platform serves as a virtual space where customers and stakeholders can interact and socialize. The platform's value ultimately arises from its usage by providers and users.

The framework's core is a robust internet infrastructure that supports the community platform's technical aspects: the distribution, collection, mapping, and provision of information. To develop the platform effectively, it must facilitate user interaction and meet user needs. The repository-based platform comprises various elements and interactions, as illustrated in Figure 2 Repository-based Community Platform. The infrastructure provides the foundation for presenting information to users, supported by add-on functionalities (e.g., marketplace, brokerage, networking, wiki) that enhance the platform's effectiveness and usability. By offering these add-on functionalities, the platform enables users to innovate, leading to tangible impacts. These functionalities transform the information repository into a fully functional community platform. A user-centric approach is critical to ensure that the information provided is impactful (see more on user perspective at building blocks).

[4] DIHNET Academy Primer Paper on Repository-based Community Platforms

Crucial to the platform's sustainability is its ability to generate revenue. Beyond creating value, the platform must also capture this value through various revenue streams to generate additional benefits for its members. Revenue is derived from the platform’s usage, its add-on functionalities, and basic funding. The value generated from the platform and its impact benefits data providers, users, and distributors alike. The accompanying figure illustrates how collected data and engaged stakeholders interact on the community platform to produce value and drive impact.

Transforming an information repository into a community platform, a repository-based community platform (RbCP), yields several key outcomes. Repository-based community platforms fosters collaboration and knowledge sharing among users, emphasizes a user-driven approach, and strategically positions the platform within its network. Efficient distribution channels are essential for reaching the target audience effectively, while a multilayered approach ensures engagement across various levels of stakeholders. Planning for long-term sustainability and viability is crucial from the platform's inception, involving strategies for ongoing funding, user loyalty, and adaptability to market changes.

Info from the RODIN Paper D1.3 European Infrastructure Assets - The RODIN project, funded by the EU, is a key initiative designed to coordinate activities among robotics digital innovation hubs (DIHs) across critical application areas to accelerate the adoption and integration of robotic technologies in Europe. This project is relevant to this paper and the C2T project as it illustrates how structured, coordinated networks can drive technological advancement and industrial digitization.

Central to this framework is the collection and mapping of information to create a comprehensive information repository, which has been fundamental to many European initiatives. This process involves both organizational and technical infrastructure.

The effectiveness of collective data collection and mapping lies in its ability to reduce the effort required to locate information (efficiency) and improve the quality of decisions based on this information (effectiveness).

The collection and mapping activities can be viewed as part of a three-step approach to facilitate better decision-making. This approach involves: 1) gathering data from various sources such as desk research, surveys, or direct submissions; 2) structuring and mapping this data to form a comprehensive information repository; and 3) presenting the information in a manner that supports informed decision-making. Mapping initiatives focus primarily on the data collection and structuring phase, creating a repository accessible via a website. Given that data provision often involves external organizations, agile mechanisms are necessary to ensure timely and high-quality data. Ultimately, the success of these initiatives depends on the effective use of the collected and mapped information.

Building Blocks

Building blocks are fundamentals essential for the functionality and effectiveness of a system or framework, like a repository-based community platform. These building blocks serve as foundational pillars upon which the entire structure is built, each playing a crucial role in achieving specific objectives. In the case of such a platform, key building blocks encompass various aspects:

- **The user perspective**
- **Distribution (and dissemination) of the information**
- **Data/information collection and mapping**
- **Data and information provision**
- **Financing**

Firstly, the **User Perspective** building block focuses on understanding the needs and requirements of users, ensuring that the system is user-friendly and aligns with user expectations. This should be a prerequisite before developing the repository-based community platform. Without this user-centric approach, the impact of the investment is significantly limited. To achieve this, data must be systematically managed and actively collaborated on, creating value for data providers and incentivizing their continuous engagement. The next three building blocks play an important role in this process. **Distribution (and Dissemination) of Information** involves strategies for efficiently sharing information within the repository to reach its intended audience. It's not only about attracting users to the platform but also about keeping them engaged and ensuring they return. Effective distribution leverages available information for widespread outreach. **Data/Information Collection and Mapping** bridges the gap between users and data providers, creating value for both sides. It encompasses processes for gathering, categorizing, and structuring data and information within the repository, facilitating easy access and retrieval.

Data and Information Provision entails presenting and delivering information to users in a clear, organized manner that addresses their diverse user needs. This aspect benefits from a longer-term vision to ensure sustained relevance and utility. Lastly, **Financing** refers to the financial resources and mechanisms required to sustain the operation and development, ensuring continuous business sustainability of the information mapping.[5]

Add-on functionalities

In the context of repository-based community platforms, the addition of specific functionalities plays a crucial role in enhancing the user experience and maximizing the value of the collected data and information. These add-on functionalities to the information repository are designed not only to enrich the collected information and data, but also to transform it into a more dynamic, interactive, and user-centric platform. By integrating these features, the platform can effectively increase the utility and accessibility of its data, making it more relevant and valuable to its diverse user base. The following categories of add-on functionalities are pivotal in achieving this enhancement:

- **Marketplace and Brokering Services:** This includes buying/selling features and sophisticated matchmaking search engines, facilitating financial transactions and connecting users with complementary needs and offerings.
- **Collaborative Learning and Communication Tools:** Incorporates peer-learning forums, discussion functionalities, and taskforces for specific topics. Complemented with communication tools like newsletters and event announcements, it fosters a collaborative and informed community environment.
- **Data Management and Reviewing Mechanisms:** Encompasses essential uploading/downloading mechanisms for data exchange and user-driven reviewing systems to ensure the credibility and relevance of the information.
- **User Support and Interaction:** Combines a helpdesk for detailed platform guidance with a chat function for real-time communication, enhancing user support and engagement.

[5] Rodin Paper - D1.3 European Infrastructure Assets

- **Co-Development and Self-Assessment Features:** Facilitates joint development of information or products and includes self-assessment tools for users to gauge their knowledge or skill level relevant to the platform's content.
- **Event Management and Networking:** Supports event-related functionalities, such as information dissemination and registration processes, while promoting networking and professional relationship building among users.
- **Customized Content Delivery and Planning Tools:** Offers subscribed content delivery based on various revenue models and development roadmapping for strategic planning and activity scheduling, ensuring personalized and organized user experiences.

Integrating these functionalities transforms the repository from a mere data store to a dynamic, interactive platform that caters to a broad spectrum of user needs and preferences, enhancing the overall value and effectiveness of the community platform.

We will focus specially on the marketplace, and also link how these can strengthen the repository-based community platform.

Focus: Marketplace

Connection to the building blocks

The marketplace (MP) serves as an additional functionality of repository-based community platform (RbCP), implying that it inherently relies on the previously mentioned building blocks to operate effectively. In addition to these fundamental components, we have identified an additional building block crucial for supporting digital services and connecting with potential users within the marketplace, thereby facilitating transactions and commerce. We refer to this building block as the "buyers and sellers mechanism" (B/S). This component comprehends the management of supply and demand within the marketplace, allowing users to engage in transactions seamlessly within the community platform. In our research, we will examine the buying/selling functionality of the marketplace, considering whether additional building blocks should be incorporated.

MP=RbCP+B/S

Definition

A marketplace, traditionally defined as a physical space for individuals and companies gather to exchange goods and services, typically located nearby or inside town, has evolved significantly in the digital age. Nowadays, within the context of digital transformation, the marketplace has transitioned into a feature on online platforms. Here, suppliers of digital services are supported in connecting with a wide range of potential users facilitating transactions. The digitalisation does not only make the marketplace more accessible and independent, but it also possesses strong network effect capabilities which could further enhance the benefits and lead to new business models and collaborations.

Broader scope

A marketplace however is not the only option to be discovered since other aspects are important as well. On a marketplace, information is collected and categorised which requires aspects of an information repository. Moreover, since interactions between marketplace users are possible as well and this could be extended with more functionalities, the marketplace suddenly becomes a sort of community platform as well. This means that in the broader scope of this paper, the marketplace will be considered as a repository based community platform with a buy/selling mechanism that enables the transactions taking place on the platform allowing for the marketplace functionalities.

Stakeholders

The stakeholders involved in a marketplace, aside from the marketplace owners, are either suppliers or consumers of value.[6] We refer to the suppliers as providers, who in the case of the RbCP, deliver data. Users can include a wide range of entities, such as universities, research and technology organizations (RTOs), (E)DIHs, educational institutions, SMEs, industrial service providers, system integrators, large enterprises, and governmental organizations, including regional and national authorities and the European Commission.[7] Additionally, intermediaries, who are not marketplace owners, can play crucial roles as mediators, brokers, supporters, facilitators, aggregators, or distributors. In this paper, we primarily focus on SMEs as both users and providers, and the role of intermediaries.

[6] PDT Platform Design Toolkit - Boundaryless
[7] RODIN paper D1.3 European Infrastructure Assets

Challenges

1. Marketplaces are **rarely utilized by SMEs (as provider or user) for innovative or more complex services**, as they tend to rely on regional networks and familiar contacts for information. However, expanding these marketplaces could offer significant benefits by helping SMEs extend their networks beyond national borders. Additionally, intermediary support organizations can also leverage these platforms. Despite this potential, engaging DIHs or SMEs remains challenging, as SMEs often do not view these marketplaces as valuable distribution channels. When SMEs recognize a problem, finding the right solution can be difficult. Expert guidance, such as that from a DIH, could help them identify and resolve their challenges more effectively, as SMEs may understand their challenges but often need help mapping them to appropriate solutions.
2. The limited quality and value of marketplaces often stem from outdated information and misalignment with the target audience's needs. This issue arises primarily because **there is no incentive to update the information**. This lack of incentive may be due to several factors: the marketplace might not be perceived as a strategic channel, potentially because it has insufficient traffic or few business deals are concluded; the process of updating information may be perceived as too much effort; or the marketplace may be in a relatively underdeveloped or niche sector, particularly in highly innovative or specialized fields.
3. European marketplaces face sustainability challenges due to the absence of a revenue model and intense competition targeting similar niches. The **poorly defined business models of most marketplaces** hinder their effectiveness, as they are often viewed as additional tools rather than a necessary functionality of wider platform-based networks.

Therefore, a comprehensive understanding of marketplace evolution and the motivations driving user engagement is essential for ensuring the sustainability and impact of initiatives beyond their funded periods.[8]

[8] Change2Twin WP2-WP6 Technical Review, February 09th, 2024

Do's

From the challenges mentioned, we can deduce the "do's" of a marketplace:

- **Integrate into platform-based network:** Embed the marketplace as an integral part of a wider platform-based network to enhance its effectiveness and connectivity.
- **Understand stakeholder landscape:** Gain comprehensive insights into the broader stakeholder landscape, including entities beyond users, to foster meaningful connections and partnerships.
- **Align information with customer needs:** Ensure that marketplace information is tailored to meet the specific needs and preferences of customers, enhancing engagement and satisfaction.
- **Recognize underlying business model:** Understand the underlying business model and building blocks of the marketplace, emphasizing its evolution over time and the critical role played by key stakeholders. This ensures the development of the marketplace as essential functionality rather than an additional tool.

Business Model

For the successful development of a marketplace and its RbCP, crafting the right business model is essential. This framework serves as the blueprint for understanding how the marketplace creates, delivers, and captures value. It provides clarity on identifying and engaging with key customer segments, choosing the most effective distribution channels, and outlining the core activities needed to operate the marketplace efficiently. By laying out these strategic elements, a well-defined business model offers invaluable insights into maximizing value for both users and the marketplace, increasing the chances of long-term sustainability and growth. The business model canvas is used in this paper for the business model development and analysis of the different marketplaces. [9]This consists of 9 elements:

Business Model Element

Business Model Element	Explanation
Value Propositions:	Defines the unique benefits and services offered to users, emphasizing the platform's role in meeting specific needs and solving problems within the community/innovation network.
Customer Segments	Identifies the platform's diverse user base, including users, service and product providers, designing strategies to meet their distinct needs.

[9] https://www.strategyzer.com/library/the-business-model-canvas

Business Model Element	Explanation
Channels:	Describes the pathways and distribution channels for communicating with users and delivering value, ranging from online interfaces, social media and events.
Customer Relationships	Highlights the methods for building and maintaining user engagement and loyalty, including personalised support and interactive community platform features.
Revenue Streams	Details the financial mechanisms, such as subscriptions, fees, and advertising, that sustain the platform's operations and growth.
Key Resources	Points out the essential assets, like technology infrastructure and human capital, crucial for the platform's success.
Key Activities	Enumerates the core processes and actions, from content curation to marketplace management, vital to delivering the platform's value proposition.
Key Partnerships	Recognizes the strategic alliances and partnerships that augment the platform's offerings and enhance its market position.
Cost Structure	Analyses the major expenses involved in operating the platform, ensuring a comprehensive understanding of its economic foundation.

Linking the building blocks with the business model
For the success and sustainability of the marketplace, thinking only about the building blocks and technical functioning of the marketplace could not suffice. Also, when developing the business model for the marketplace, the technical possibilities and functionalities of the repository-based community platform can be kept in mind. Therefore, it is proposed to link the business model elements and overall business model of the marketplace with the building blocks. In this way, the marketplace can be shaped in such a way that the technical design and functionalities align with the business model of the platform. This will not only improve the functioning of the marketplace, but it also helps during the design of the community platform by offering a systemic approach and framework.

- **User Perspective:** This building block focuses on understanding user needs and aligning the platform's offerings and design accordingly. It involves tailoring the business model elements to match customer segments and customer relationships, thereby defining the value proposition of the platform.
- **Distribution and Dissemination of Information:** This building block is concerned with effectively sharing and delivering information and services to the target audience. The choice of channels for distribution plays a crucial role in defining the strategy for reaching and engaging the audience.
- **Data/Information Collection and Mapping:** This building block emphasizes input side of the platform - the collection and mapping of data. This data is important to creating value through the platform and is a core component of its key activities and key resources.
- **Data and Information Provision:** Complementing to the collection and mapping phase, this building block focuses on the output side of the marketplace. It involves providing the collected data and information—key resources of the platform—to customers, forming a critical part of the platform's key activities.
- **Financing:** The financing building block addresses the financial aspects of the platform. It involves aligning revenue streams and the cost structure to ensure the platform's financial sustainability. Establishing a revenue stream that covers the platform's costs is vital for its long-term viability.
- **Buying/Selling Functionality:** This building block deals with the core operational aspect of a marketplace—facilitating the buying and selling of goods or services. It ensures that the platform supports seamless transactions between users, and could be part of the key activities.

3. RESULTS - FOUR STRATEGIES

Intro

Our desk research gave us some new insights. The table with these insights can be found in the appendix. We will focus on four key strategies that emerged. Notably, the critical role of key stakeholders has been highlighted as a new fundamental building block. Initially, there was no direct connection between stakeholders and the business model's building blocks, but our interviews revealed their crucial importance. **New building block: key stakeholders.**

We will explore four strategies that consistently surfaced across various interviews. For each strategy, we will provide: 1) a brief description, 2) illustrative examples, 3) their connection to the building blocks, 4) their evolution over time, 5) strategies to associated challenges, and 6) additional information. The following common strategies are central to developing a robust and effective marketplace strategy.

The common strategies we found:

1. Establishment of a Knowledge Centre: Central to this approach is the creation of a knowledge hub that serves as a repository of comprehensive information, resources, and support tailored to the needs of users, particularly SMEs. The knowledge centre not only provides guides, best practices, and industry news but also utilizes semantic understanding and standardized terminology to enhance communication and user experience. Partnerships with providers and educational institutions enrich the knowledge centre, ensuring it remains relevant and aligned with industry standards.

2. Focus on the Customer Journey: Optimizing the end-to-end user experience, from initial awareness to post-purchase support, is crucial. This involves streamlining onboarding processes, automating governance, and integrating add-on functionalities to enrich user engagement. Understanding user expectations and pain points is foundational to designing a customer journey that fosters satisfaction and trust, thereby enhancing marketplace adoption and retention.

3. Involvement of Key Stakeholders: Key stakeholders ranging from public institutions to industry experts play pivotal roles in marketplace validation, development, and growth. Their insights and collaboration are essential for shaping the strategic direction of the marketplace, ensuring alignment with user needs, and expanding the marketplace effectively.

4. The Role of Intermediaries: Intermediaries act as facilitators between buyers and sellers within the marketplace, providing expertise, infrastructure, and trust-building mechanisms. They play critical roles in overcoming barriers like awareness creation and fostering partnerships that enhance marketplace visibility and usability. Public organizations, providers, and industry experts often serve as intermediaries, contributing to marketplace credibility and outreach.

The Establishment of a Knowledge Centre

Strategy description: A knowledge centre is a centralized hub that provides comprehensive information, resources, and support to users. For an online marketplace, the knowledge centre would include detailed guides, best practices, industry news, FAQs, and tutorials tailored to the needs of users, in particular SMEs. It could also feature case studies, success stories, and forums for community interactions.

From a data management and governance perspective, the knowledge centre would employ semantic understanding and a common language through the conceptualization of data. This ensures that all information is presented in a consistent and easily understandable manner, regardless of the user's background or expertise. By standardizing terminology and leveraging semantic technologies, the knowledge centre can facilitate better communication and understanding among users, making it easier for SMEs to navigate the marketplace, and find relevant information. This approach enhances the overall user experience, making the marketplace more accessible and effective for all users.

Desk research highlights the importance of establishing partnerships with providers and educational institutions. These partners contribute to the development of the knowledge centre as they possess semantic understanding and speak the common language of the platform users. Their involvement is crucial in enhancing the knowledge centre's functionality, ensuring it remains a robust resource hub aligned with industry standards and user needs. Active collaboration with these stakeholders strengthens the overall community platform, driving engagement and innovation across the users.

Priming example

Imagine a knowledge centre for an online marketplace that acts as a comprehensive resource hub for SMEs. This platform includes detailed guides on how to create and manage digital twins, a comparison of various digital twin options, and a clear breakdown of associated costs. By providing case studies of successful implementations, interactive tutorials, and a community forum for peer support, the knowledge centre demystifies digital twins, highlights affordable solutions, and helps users make well-informed decisions. This is closely connected the customer journey, as these strategies are supporting each other. On the backend, the knowledge centre utilizes advanced semantic technologies to standardize terminology and organize data effectively, ensuring that information is consistent and easily searchable. This system continuously updates with new insights and feedback, keeping the content relevant and valuable.

Building blocks

The knowledge centre is crucial for **data/information collection and mapping** because it ensures consistency and clarity, making data more accessible and interpretable. This facilitates accurate mapping of information across different systems, enhancing the efficiency and effectiveness of data integration and utilization. Participation of experts from the industry can support creating this knowledge centre as they speak the language of both user and provider.

Evolution over time

Current marketplaces are focusing on further developing the knowledge centre, recognizing it as a key strategy for bridging information gaps and enhancing the customer journey. They believe that continuous improvement and expansion of the knowledge centre are crucial for meeting user needs and maintaining the marketplace's relevance. A significant aspect of this development is the integration of new AI technologies, particularly in the areas of data conceptualization and semantic understanding. Data provided is transformed into meaningful information by creating semantically rich data structures. This advancement not only enhances the current offerings but also lays the groundwork for the development of more sophisticated applications, in addition to the marketplace or as new functionality on the overall platform.

Solve challenges

A knowledge center effectively addresses key marketplace challenges by ensuring that all information remains up-to-date and aligned with the specific needs of target audiences. By continuously refreshing content and incentivizing updates, it prevents the stagnation of information. The use of standardized terminology and semantic technologies ensures that users can easily understand and find relevant information, addressing issues of misalignment, such as mismatched offerings and pricing discrepancies. This tailored approach enhances the overall user experience, ensuring that the marketplace provides valuable and relevant functionalities to all users.

A Focus on the Customer Journey

Strategy description: The customer journey encompasses the end-to-end experience of all users interacting with the marketplace to consume value, from initial awareness to post-purchase support (retention) (see more the service adoption model – page 26). This strategy involves optimizing each touchpoint to enhance user satisfaction and streamline processes, ensuring a seamless and efficient experience. It is essential to treat the community platform and its marketplace as a product. Engaging closely with users to identify and prioritize the technical capabilities, tools, and processes most beneficial to them is critical. Building a community platform around the marketplace and these needs through collaborative efforts between marketplace owners and users can significantly improve the customer journey. Establishing a culture that fosters regular interaction for each add-on functionality, including the marketplace, allows for peer-to-peer knowledge exchange. This approach ensures that the marketplace evolves in response to user feedback and needs, optimizing each touchpoint of the customer journey to enhance overall satisfaction and engagement.

Industry Cloud Platforms (ICPs) are customized cloud solutions tailored to specific industries, with the flexibility to adjust and enhance platform functionalities, ultimately streamlining the customer journey. ICPs are an emerging trend, offering adaptable and relevant industry solutions while significantly accelerating cloud adoption. Acting like an "exoskeleton," ICPs complement existing marketplace applications without immediately replacing current capabilities. Instead, they allow the introduction of new functionalities that provide significant customer value alongside the marketplace, enhancing the overall customer journey.

ICPs are primarily focused on enterprises, where SaaS, PaaS, and IaaS solutions are integrated into enterprise environments. For C2T, implementing ICPs can benefit the marketplace by enhancing the customer journey through more tailored solutions and seamless integration of additional services that address specific industry needs.

In essence, repository-based community platforms and Industry Cloud Platforms (ICPs) share the goal of creating centralized data management and scalable environments that foster innovation and customization, making them conceptually aligned—especially in their ability to enhance digital marketplaces. Both platforms support seamless integration of tools and promote community-driven enhancements that evolve with user needs. ICPs can serve as a technical solution for RbCP by enabling marketplace owners and providers to deliver more tailored user experiences through customizable and industry-specific functionalities. [10]

Priming Examples:

• **Spreading of Awareness though Multiple Channels:** The development of awareness among customers and users of the platform is the starting point towards success. To attract the users the platform wants, it is needed to align with the user needs and via various distribution channels. This can be done through social media and newsletters, but also physical activities like industry events and conferences are mentioned as an important channel to not only reach the marketplace users, but also to meet them and build trust. This building of trust and relationships is a very important factor for the success of the marketplace. Distribution channels can also be created by key stakeholders and intermediaries (see the involvement of key stakeholders and the role of intermediaries on the next pages)

[10] What Are Industry Cloud Platforms and What Do They Do? (gartner.com)

• **Full Automatization of Governance:** By automating governance processes given the customer on the marketplace more control, marketplaces can maintain quality without manual oversight, resulting in more consistent operations, while giving more rights to the customer. Automating governance processes involves a set of policies, procedures, and guidelines designed to align new initiatives with the marketplace's strategic goals, ensure adherence to regulations and standards, and execute them in a consistent and controlled manner. For marketplace users, this provides a degree of operational freedom, allowing them to offer products or applications to potential customers more efficiently. In addition, desk research also shows that providing easy access to these tools can help with the customer journey and aids to the overall value proposition of a platform.

• **Streamlined Onboarding Process:** Automated and standardized onboarding simplifies the registration and initial setup for both providers and users on the marketplace, reducing friction and encouraging participation. While automation is key, a bit of personalized intake or consultancy can significantly enhance the onboarding experience, offering tailored support that addresses specific needs and concerns of users of the marketplace. The balance of automation and human touch helps in building trust and satisfaction among users.

• **Added functionalities:** Add-on functionalities can enhance interaction between providers and users on the marketplace while improving overall customer engagement. These features facilitate easier connections between users and providers, making the marketplace a more attractive platform for customers entering this digital environment. Examples of such functionalities include blog posts, chat functions, and review options. A successful community platform relies on a robust internet framework that securely gathers and converts data into meaningful insights, forming the foundation for the platform's essential repository functions and delivering tailored information to users. To maximize user engagement, the platform can incorporate various enhancements such as a marketplace, brokerage services, networking tools, and a wiki. These additional features enrich the platform's capabilities and enhance the relevance and usefulness of its data for a diverse range of users. Consequently, this integrated approach promotes greater utilization of both collected data and generated insights, fostering a more vibrant and impactful platform experience.

Building blocks

- **The user perspective:** The customer journey focuses on understanding and enhancing the overall experience and satisfaction of users as they interact with the marketplace.
- **Distribution (and dissemination) of the information:** Ensuring that users receive timely, relevant information at each touchpoint is crucial for improving their engagement and decision-making throughout the customer journey. Moreover, the distribution channels through which the awareness of the platform is spread to reach its target audience is where the customer journey starts.
- **Data and information provision:** Providing necessary resources and support enables users to make informed decisions, enhancing their overall satisfaction and trust in the marketplace.
- **Key stakeholders:** Key stakeholders play a crucial role in the customer journey. The intermediaries can facilitate this journey, starting with some consultancy intake. Their involvement and feedback help shape the platform, ensuring that it meets the needs and expectations of its users.

Evolution over time

Building a customer journey is crucial for attracting and maintaining customers on your platform. The groundwork for understanding user expectations and customer pains, which inform the design of the customer journey, should be done at the very beginning. Building automated systems for governance and onboarding (see above) starts afterwards; the foundational elements must be in place first before these can be developed to create a smooth user experience. Feedback from early users is used to refine and improve the customer journey, addressing any customer pains in the onboarding and governance processes. To encourage active participation among participants, the focus lies in ensuring they become engaged members of the community. Desk research also shows that in early stages providing easy access to add-on functionalities of a platform can help with the customer journey and aids to the overall value proposition of a platform. Marketplaces emphasize the provision of user-friendly digital interfaces, promptly incorporating and responding to customer feedback, and fostering transparent communication within their growing community. [11]

[11] Platform Strategy - A Framework Guide for Businesses | Bain & Company

Optimizing the Customer Journey for the C2T Marketplace - Currently, not all users of the C2T marketplace clearly understand what a digital twin is, the available options, or the potential cost range. This lack of clarity leads to misconceptions, with many users assuming that digital twins are too expensive to consider. Providing clear and concise information on these aspects is crucial to help potential customers grasp the value and feasibility of digital twin solutions. Addressing these gaps can significantly enhance the customer journey, making it easier for users to make informed decisions—ideally even before they become members. Another essential element is the customer journey on the platform, which should guide users from their initial entry to the final transaction. This requires a thorough understanding of the customer, their motivations for using the platform, and the potential guiding strategies available. Adding an intermediary on the platform can facilitate this process, along with conducting a more thorough analysis or assessment of customers' needs and goals to provide better-tailored advice. Additional options that enhance information accessibility or foster interaction among customers could further improve the overall customer journey.

Solve challenges

A well-designed customer journey can significantly enhance the effectiveness and utilization of marketplaces by SMEs. By mapping out the customer journey, marketplaces can identify critical touchpoints and align their strategies to integrate seamlessly with SMEs' existing habits and preferences, demonstrating broader benefits and international network access. This approach helps redefine the marketplace's value proposition, transforming it into an essential platform component rather than an additional tool. Furthermore, understanding the customer journey allows marketplaces to develop tailored marketing strategies and optimize distribution channels, effectively attracting and retaining users. This comprehensive understanding ensures the marketplace is sustainable, competitive, and highly valuable to its target audience.

The Involvement of Key Stakeholders

Strategy description: Importantly, the value of a marketplace extends beyond the immediate value it delivers. It also provides value to a broader group of key stakeholders, ranging from public institutions to industry experts. Key stakeholders are individuals or entities with a significant interest or influence in the establishment and success of a marketplace. In the context of online marketplaces, these stakeholders may include highly relevant users and providers, but also investors, regulatory bodies, technological partners, and other influential parties. Their roles are pivotal in shaping the marketplace's growth, governance, and long-term sustainability.

Platform business models don't generate value in a vacuum [12]

Market validation and the identification of key stakeholders are essential steps at the outset of any online marketplace. This involves thoroughly researching and analysing the market landscape to validate the viability of the marketplace concept and to identify the individuals or groups who will have a vested interest in its success. By involving key stakeholders early in the development process, their insights and perspectives can be integrated into the design, ensuring that the marketplace effectively meets the needs and expectations of all parties involved. This approach is supported by desk research, which highlights different customer segments, key partnerships, and customer relationships.

Key stakeholders should not only be considered in the business model during marketplace development but can also be actively engaged to ensure alignment with the community platform's targeted audience and services. Their involvement is crucial for tailoring the marketplace to meet the specific needs and expectations of its intended users. Establishing these initial partnerships is essential for launching and scaling the marketplace effectively. Collaborating with key stakeholders during the early development phase can refine the marketplace and enhance its value proposition. This can significantly benefit early providers on a marketplace, and to some extent, the first users as well. Early providers often understand that their value proposition is closely tied to the value they deliver to others. This collaborative approach emphasizes the notion that successful business models thrive on the contributions and engagement of their key stakeholders.

[12] Elevate Your Business With a Platform Strategy | Accenture

Priming examples

- **Co-Design with Providers:** Collaborating with providers during the design and development phase of the marketplace can yield innovative and effective functionalities. By involving these experts in the co-design process, their insights and expertise can be leveraged to create a marketplace that is both technically sound and user-friendly, meeting the needs of all stakeholders involved.

- **Customer Control of Data via Own Data Space:** Empowering customers to have control over their data through their own data space is a crucial aspect of building trust and fostering transparency in an online marketplace. By providing users with the ability to manage and protect their personal information within a secure data space, the marketplace can enhance privacy and facilitate ownership, ultimately improving the overall customer experience and driving engagement and responsibility.

- **Key Partnerships for Marketplace Growth:** Working together with key stakeholders to spread the word about the marketplace, create high quality content, collect feedback and success stories is an important factor for the growth of a sustainable marketplace. This increases the overall visibility and trust for the platform thereby attracting new users. This means that these key partners also play a crucial role in distributing the marketplace and spreading awareness. Especially when these partners are respected industry leaders, they can significantly build trust and attract potential customers.

Building block: The involvement of key stakeholders is directly related to the new building block of key stakeholders because their engagement provides essential insights and support for marketplace validation, development, and growth. Their collaboration ensures the marketplace aligns with user needs and effectively expands its community, highlighting their fundamental role in shaping and sustaining the marketplace.

Evolution over time

The involvement of key stakeholders in an online marketplace evolves over time as the platform matures and adapts to changing market dynamics and technological advancements. Initially, during the conception and launch phase, key stakeholders such as marketplace owners, investors, and regulatory bodies play a prominent role in setting the strategic direction. As the marketplace gains traction and expands its user base, the involvement of providers and users becomes increasingly significant. These stakeholders provide valuable feedback on the platform's usability, features, and overall user experience, shaping its evolution. Their engagement can lead to the introduction of new functionalities, customization options, and enhanced service tailored to users to meet their evolving needs and preferences. Moreover, as the marketplace grows, important providers could become key stakeholders, and industry experts that are key stakeholders become crucial for scaling, optimizing performance, and staying competitive in the market.

Solve challenges

Key stakeholders in the European marketplace ecosystem can collaborate to significantly boost the utilization of marketplaces by SMEs. This can be achieved by offering targeted support and incentives to encourage SMEs to join and actively participate. Currently, marketplaces are rarely used by solution-providing SMEs as distribution channels because these businesses typically rely on regional networks and familiar contacts for information. By showcasing the broader benefits and extending the reach of marketplaces beyond national borders, stakeholders can help SMEs expand their networks and access new opportunities. To address the sustainability challenges faced by European marketplaces, stakeholders need to work together to develop robust revenue models and enhance marketplace value. This includes exploring diverse revenue streams such as subscription fees, transaction fees, and premium listings. Additionally, forming strategic partnerships with industry bodies, government agencies, and technological partners can help increase visibility, build trust, and attract new users. Early engagement in the development process of key stakeholders via these partnerships ensures that the marketplace evolves in response to user feedback and market trends, laying a strong foundation for long-term viability and competitiveness.

The Change2Twin Key Stakeholders - C2T marketplace is designed to connect providers and users. However, many SMEs using the platform lack the technical expertise to identify what they need. This challenge arises when an SME does not have the required expertise in-house or within its own network. As a result, these SMEs often do not access the platform independently and rely on DIHs for guidance. In such cases, the DIH becomes a key stakeholder, understanding both the users' and providers' needs and helping to further develop and position the C2T marketplace effectively.

Another challenge is that while providers are eager to be part of the marketplace, they are concerned about increased competition if SMEs with similar capabilities also join as providers. Additionally, cultural and language differences within European marketplaces can create barriers to collaboration and hinder finding the right match. This highlights the importance of building a strong network of key stakeholders from various regions and countries to establish trust and promote collaboration from the beginning.

The Role of Intermediaries

Strategy description: Intermediaries are entities or individuals that facilitate transactions between buyers and sellers within a marketplace. They act as middlemen, connecting providers and users and could also provide essential services to streamline transactions. They offer expertise, infrastructure, and trust-building mechanisms to ensure smooth and efficient trade within the marketplace. Through their role, intermediaries contribute to the overall functioning and success of the marketplace and its community platform.

Intermediaries can play a crucial role in aiding organizations' shift from closed to open business models, particularly supporting marketplace owners and users of a marketplace, mainly SMEs, in overcoming limitations in resources and expertise. Acting intermediaries in marketplaces, play a vital role in connecting entities and facilitating the commercialization of technologies, although their effectiveness can be influenced by the functioning of existing networks and policies.[13]

[13] How Necessary are Intermediary Organizations in the Commercialization of Research? (researchgate.net)

Intermediaries are defined as "organizations that provide a supportive role for collaboration between two or more parties during various stages of the innovation process".[14] Intermediaries exhibit a range of roles, assisting in the innovation search process[15], contributing to sustainable development[16], and establishing connections between external and internal knowledge sources for further development of innovations.

Marketplaces should recognize that they do not need to handle every aspect independently. Instead, they can actively pursue partnerships with intermediaries to incorporate essential capabilities vital for expansion. Intermediaries can provide cost-effective solutions and expertise, which are especially beneficial when companies lack in-house resources. [17] For example, governmental bodies often act as intermediaries in Public-Private Partnerships (PPPs), bridging gaps between public and private entities and supporting innovation in specific sectors. This collaborative approach helps marketplaces leverage external expertise and infrastructure.

Priming examples

•**Identifying Future Intermediaries:** A strategic approach to building a marketplace involves identifying potential customers who align with your long-term vision and could eventually transition into intermediaries. By nurturing relationships with such customers early on, you lay the groundwork for future collaboration and partnership, leveraging their expertise and networks to enhance the marketplace's reach and effectiveness.

•**Engaging Public Organizations as Intermediaries:** Public organizations can serve as valuable intermediaries within a marketplace ecosystem, especially in sectors with regulatory complexities or public service components. Collaborating with public organizations not only adds credibility and trust to the marketplace but also enables access to resources, expertise, and networks that can drive growth. Leveraging these partnerships can unlock new opportunities and expand the marketplace's impact in serving broader societal needs.

[14] doi:10.1016/j.respol.2006.03.005 (ausicom.com)
[15] Innovation search: the role of innovation intermediaries in the search process (port.ac.uk)
[16] Towards a typology of intermediaries in sustainability transitions_ A systematic review and a research agenda (sciencedirectassets.com)
[17] Platform Strategy - A Framework Guide for Businesses | Bain & Company

Building block: the critical role played by key stakeholders

Evolution over time

As a digital platform evolves, intermediaries play a vital role at each stage. In the beginning, they help gather initial participants and facilitate early collaborations, ensuring a solid foundation is built by leveraging their expertise in forging connections and integrating technologies. For instance, they assist in the innovation search process by identifying potential collaborators and resources.[18] During the platform's development phase, intermediaries can contribute to sustainable development,[19] while scaling operations and processes. At the growth stage, they support the platform in optimizing performance and expanding its user base by bridging gaps between external and internal knowledge sources. In the mature stage, intermediaries could maintain innovation and help the platform adapt to changing market conditions, ensuring sustained relevance and competitiveness by continuing to streamline the commercialization of new technologies.

Solve challenges

Awareness creation has been a significant challenge as marketplaces are rarely utilized by solution-providing SMEs as a distribution channel; they typically rely on regional networks and well-known contacts for information. With the support of intermediaries, SMEs can overcome this challenge by accessing targeted marketing strategies, educational resources, and networking opportunities tailored to their specific needs and preferences. DIHs often facilitate connections between SMEs and local IT suppliers or vendors within their own (regional) network. If they do not have these connections, they sometimes move to the marketplace. This means that these DIHs function as an intermediary that brings new customers to the marketplace as well as a distribution channel that brings new companies to the marketplace. In this role as intermediary they also help connecting the DIH with the required service at the marketplace. The research showed that in an optimal future the role as intermediary would be either automated or replaced by a seamless customer journey with the help of certain tools to identify and match the customers' needs with tailored functionalities on the marketplace.

[18] Innovation search: the role of innovation intermediaries in the search process (port.ac.uk)
[19] Towards a typology of intermediaries in sustainability transitions: A systematic review and a research agenda - ScienceDirect

The Change2Twin community benefits from the C2T marketplace's pivotal role in providing SMEs with information on digital twins and end-to-end solutions for their implementation, thereby facilitating transactions. The primary objectives of the C2T marketplace include integrating offerings from other regional marketplaces, establishing a complete digital value chain beyond digital twinning, and entrusting governance to the DIHs managing it. Various stakeholders contribute to the Change2Twin network, such as DIHs, manufacturing entities, SMEs, consultants, research organizations, value-added resellers, and users and providers. Currently, DIHs serve as intermediaries on the Change2Twin marketplace. When neither the SME nor the DIH can find the required expertise within their own regional network, the DIH can turn to the Change2Twin marketplace to identify suitable expertise. Given this intermediary role, it is crucial to clearly define the DIHs' responsibilities and offer them support to enhance their effectiveness in guiding SMEs through the marketplace.

Change2TwiN Community platform and marketplace

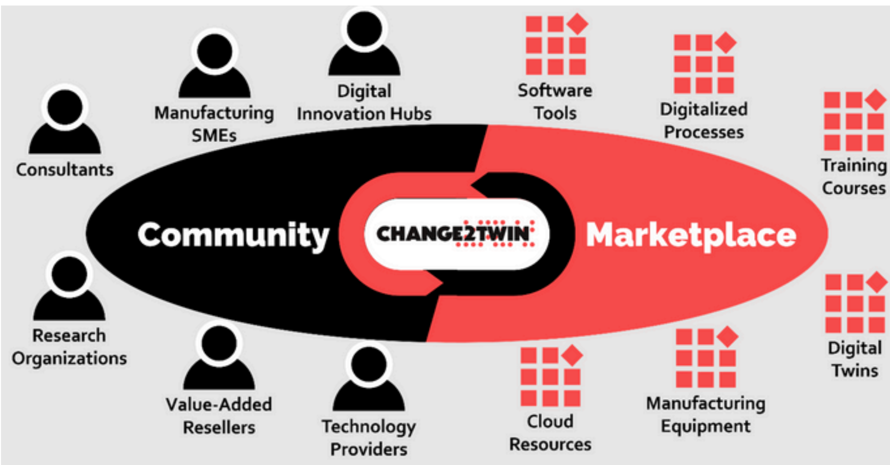

Figure 3 Stakeholders of the Change2TwiN Community platform and marketplace

4. RESULTS - TRANSLATE STRATEGIES TO PRACTICE

The service adoption model

In the previous chapter, we discussed several priming examples that illustrate effective strategies for marketplace development.

It is still a challenge to understand the motivational drivers behind user participation within marketplaces, with a particular focus on how these drivers intersect with the marketplace and other functionalities. We were able to link these strategies with the user engagement process to give a first insight in which way these strategies could contribute to attract users to the platform. The user engagement process that we used is a service adoption journey model. We looked at the service adoption journey of Rogers to understand the customer journey from a customer perspective.[20][21] We see a strong link with the challenges. Moreover, the customer journey is reflected in all of the building blocks mentioned and is an integral part of the RbCP (see appendix).

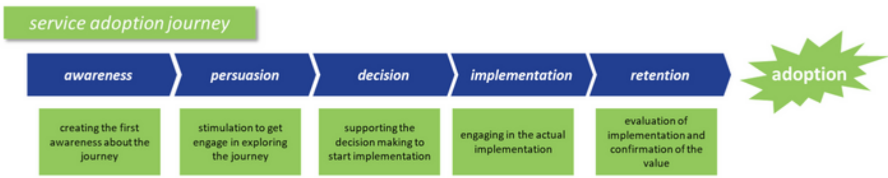

Figure 4 The service adoption journey

In short, much is known about the implementation of the platform. The interviews have given us insights into the persuasion and decision parts of the process. We obtained some initial insights into the awareness and retention part. Awareness creation has been a significant challenge as marketplaces are rarely utilized by solution-providing SMEs as a distribution channel; they typically rely on regional networks and well-known contacts for information. For tackling this challenge, these regional networks and organisations can be involved as an intermediary. Read more about the role of an intermediary in the previous chapter. The retention part is a recurring issue, with the limited quality and value of marketplaces stemming from outdated information and misalignment with target audiences' needs. The creation of a knowledge centre could help address this challenge by centralizing information and resources, thereby enhancing the customer journey (also mentioned in the previous chapter). Initial insights suggest that enhancing the customer journey to make it more comprehensive and engaging is crucial. Additionally, it's important to keep the platform updated and closely aligned with the specific needs of its target audience. More information could be find in the previous chapter.

[20] Rogers, E.M. (2003) The diffusion of innovations, fifth edition. New York: The Free Press.

[21] DIHNET Academy Primer Paper on Repository-based Community Platforms

By focusing on the adoption journey—from initial awareness to retention—stakeholders can create and sustain dynamic, user-centric marketplaces tailored to the evolving needs of SMEs, DIHs, and other diverse stakeholders. Aligning these priming examples with the service adoption journey ensures that each phase, from awareness through to retention, is supported by robust strategies designed to enhance marketplace functionality and user experience. In the following figure we connect the examples of the four strategies to the service adoption model:

- KC: The establishment of a knowledge centre
- CJ: a focus on a customer journey
- KS: The involvement of key stakeholders
- I: The role of intermediaries

Awareness	**Persuasion**	**Decision**	**Implementation**	**Retention**
I - Identifying Future Intermediaries	KS - Customer Control of Data via Own Data Space	KS - Customer Control of Data via Own Data Space		KS - Key Partnerships for Marketplace Growth
I - Engaging Public Organizations as Intermediaries	CJ - Added functionalities	CJ - Added functionalities	CJ - Added functionalities	CJ - Full automatization of governance
KS - Co-Design with Solution Providers		KC - Knowledge center	KC - Knowledge center	
CJ - Streamlined onboarding process				

How strategies can supported the do’s; for an integrated strategy

We can also incorporate and link the examples from the previous page to illustrate how they influence the marketplace "do's" outlined in Chapter 1.

Integrate into platform-based network

Embed the marketplace as an integral part of a wider platform-based network to enhance its effectiveness and connectivity

Identifying Future Intermediaries (I): By identifying intermediaries early within the network, the marketplace extends its reach and credibility. These intermediaries advocate for the marketplace, driving awareness and adoption among their networks. Leveraging these intermediaries enhances connectivity and effectiveness. It facilitates integration with the wider platform-based network aka the RbCP.

Co-Design with Providers (KS): Collaborating with providers ensures that marketplace services meet standards and user expectations. Co-design efforts help tailor offerings to better fit potential users, significantly enhancing the overall user experience. This approach improves connectivity with a broader audience and supports the development of a strong value proposition.

Key Partnerships for Marketplace Growth (KS): Forming strategic partnerships within the network brings additional resources, expertise, and user bases. Joint initiatives amplify marketplace reach in the network. These partnerships expand marketplace influence and capabilities, fostering deeper integration and connectivity. They optimize effectiveness by leveraging synergies and resources for sustained growth and competitiveness.

Added Functionalities (CJ): Continuous addition of new functionalities based on user feedback enhances marketplace attractiveness and utility within the network. Enhanced features improve engagement, satisfaction, and retention. Bolstered by enhanced functionalities, the marketplace maintains competitive edge and attractiveness. Addressing user needs, ensuring sustained connectivity with the wider platform- based network.

Understand stakeholder landscape:

Gain comprehensive insights into the broader stakeholder landscape, including entities beyond users, to foster meaningful connections and partnerships.

Identifying Future Intermediaries (I): By identifying intermediaries early within the stakeholder network, the marketplace gains valuable insights into the broader landscape, beyond the potential users. Leveraging these intermediaries deepens the marketplace's understanding of various stakeholders, facilitating integration and accelerating engagement through established trust and influence. This approach could fosters meaningful connections and partnerships.

Co-Design with Providers (KS): Working with providers in the early phase offers valuable perspectives on stakeholder needs beyond users, especially during Implementation and Retention stages. This collaboration helps tailor the functionality of the marketplace offerings to meet diverse stakeholder requirements, fostering strong connections and ensuring a better understanding of the stakeholder landscape.

Key Partnerships for Marketplace Growth (KS): Forming strategic partnerships with various stakeholders provides insights into the broader landscape, including non-user entities, which becomes particularly important for Retention. These partnerships help the marketplace understand new and different stakeholder needs, build meaningful connections, and leverage additional resources for growth and impact.

Align information with customer needs:

Ensure that marketplace information is tailored to meet the specific needs and preferences of customers, enhancing engagement and satisfaction.

Co-Design with Providers (KS): Co-designing a knowledge center with providers early on ensures that marketplace information is tailored to meet the specific needs and preferences of users. This collaborative approach improves the quality of customer-centric content by aligning it with the insights and expertise of providers. By delivering well-organized and relevant information, the knowledge center addresses users' challenges more effectively, enhancing their engagement with the marketplace. This proactive strategy helps users find solutions easily, reducing frustration and boosting retention and satisfaction. The knowledge center, therefore, plays a crucial role in aligning information with customer needs, ensuring a more personalized and impactful user experience.

Customer Control of Data via Own Data Space (KS): Ensuring that customers have robust control over their data and preferences during the persuasion and decision phases enhances their sense of security and alignment with the marketplace. By providing transparent and user-friendly data management options, the marketplace builds trust and demonstrates respect for personal privacy. This empowerment helps users feel more connected and confident, as they perceive the marketplace as responsive to their individual needs and preferences. Ultimately, this approach aligns with the goal of tailoring information to meet customer needs.

Full Automation of Governance (CJ): Implementing full automation of governance processes, when designed with customer feedback in mind, can initially require significant time and resources. However, this investment ultimately supports longer-term customer engagement by ensuring that policies and procedures are adaptable to evolving user needs. By automating governance while incorporating user insights, the marketplace enhances its responsiveness and flexibility. This approach builds trust and satisfaction, as customers experience a well-managed and efficient environment that aligns with their preferences, leading to improved retention and long-term loyalty.

Streamlined Onboarding Process (CJ): Implementing a streamlined onboarding process that incorporates personalized guidance and customization for different customer segments is crucial for addressing varying user requirements effectively. By tailoring the onboarding experience to the specific needs of users from diverse backgrounds or industries, the marketplace ensures a more relevant and engaging introduction. This personalized approach is vital to set up at the beginning, as it enhances initial satisfaction and helps build a strong foundation for long-term engagement. Users who feel that their unique needs are addressed are more likely to remain committed and actively participate in the marketplace.

Added Functionalities (CJ): Introducing new functionalities without aligning them with customer needs may result in features that do not enhance the user experience. If added functionalities are perceived as irrelevant or unnecessary, they can detract from overall satisfaction and hinder active engagement with the marketplace. Ensuring that new features address user expectations is crucial for maintaining satisfaction and encouraging ongoing participation.

Recognize underlying business model:
Understand the underlying business model and the building blocks of the marketplace, emphasizing its evolution over time and the critical role played by key stakeholders. This ensures the development of the marketplace as essential functionality rather than an additional tool.

Each of the four strategies within the marketplace is closely linked to its underlying business model ensuring a cohesive strategy for value creation and delivery. The knowledge center, for instance, acts as a fundamental component, providing crucial resources and supporting key activities. It plays a vital role in data collection and mapping, maintaining clarity and consistency in information management, which is essential for delivering value.
Similarly, the customer journey is central to defining customer segments, customer relationships, key activities and key resources within the business model. By enhancing the user experience and aligning offerings with the customer journey, the marketplace boosts overall satisfaction and strengthens its value proposition.

Key stakeholders and intermediaries are integral to this framework. They shape the marketplace by influencing its structure and dynamics, and they play a crucial role in strengthening distribution channels. By leveraging their networks and expertise, they expand the marketplace's reach, and enhance overall connectivity. Their involvement fosters valuable connections and partnerships, reinforcing the RbCP and driving sustainable growth.

5. CONCLUSION

Marketplaces face challenges such as limited use by SMEs due to reliance on regional networks, outdated and misaligned information, and sustainability issues stemming from poorly defined business models. These challenges hinder their effectiveness, leading to their perception as optional tools rather than essential components of broader platform-based network . A successful marketplace requires an understanding of its evolution and drivers of user engagement. This entails analyzing building blocks such as user perspectives, information dissemination, data collection, and financing. Our approach allowed us to derive strategies for building sustainable marketplaces. Through desk research and interviews, we identified four compelling strategies:

1. The establishment of a knowledge centre: A knowledge centre serves as a centralized hub offering comprehensive resources such as guides, industry news, FAQs, and tutorials tailored to user needs, particularly SMEs. By standardizing terminology and utilizing semantic technologies, it enhances accessibility and understanding, ensuring consistent information across the marketplace. Partnerships with providers and educational institutions are essential for its development, aligning its offerings with industry standards.

2. A focus on the customer Journey: The customer journey refers to the complete experience of users interacting with the marketplace, from initial awareness to post-purchase support. Optimizing each touchpoint is vital for enhancing user satisfaction and ensuring a seamless experience. Treating the community platform and marketplace as a product is essential, requiring close engagement with users to identify and prioritize their needs.

3. The involvement of key stakeholders: Key stakeholders, such as providers and industry experts, are essential for the marketplace. Involving these stakeholders early in the development process ensures that the marketplace addresses the needs and expectations of its users. Their insights not only help validate the marketplace concept, but also align its offerings with the requirements of all parties involved enhancing the overall value proposition.

4. The role of intermediaries: Intermediaries act as facilitators within the marketplace, connecting providers and users while facilitating efficient transactions. By providing expertise, infrastructure, and trust-building mechanisms, they could enhance capabilities and access external resources. Their involvement can be crucial for SMEs in resource-limited environments and enhancing collaboration during the innovation process.

To establish a robust and integrated marketplace strategy, it is crucial to align strategies with key elements such as embedding the marketplace within a broader platform-based network aka a repository-based community platform, understanding the stakeholder landscape to identify key stakeholders, and consider all of the building blocks. Recognizing and evolving the underlying business model of these building blocks helps position the marketplace effectively. The strategies can be aligned with the service adoption journey—from initial awareness to retention— as the customer journey seems an integral part of the business model that ensures the marketplace remains dynamic and responsive to user needs. By integrating these foundational aspects, a marketplace can be built that drives engagement, satisfaction, and long-term success.

Reflections on the four strategies in the context of the Change2Twin marketplace

Establishment of a Knowledge Centre

New technology could easily be adopted if the beneficiaries of the technology are educated and are in the position to assess the impact of the technology and the different variations or customizations for their individual requirements. As such, a marketplace could significantly streamline the adoption process if resources and functionalities are devoted to educate the community and empower them to make the best possible decisions. To this end, a Knowledge Center in combination with (online) training courses would have the potential to flatten the learning curve for the users, allowing them to better understand the available information and to make educated decisions. In the context of the Change2Twin marketplace; a functionality is included to support the creation of community-written insights (e.g. success stories, use cases, best practices, news, press releases, etc.). This functionality let the community creates the content and classify it into relevant sectors, techniques, challenges (to be supported soon), and genre. Although the content is created by the community, the operator(s) of the marketplace is responsible for curating the content from the point of view of context, quality, and scope, increasing the added value of the contributed content.

The operator cannot edit the content but suggest modifications and withhold the approval until the standards of the marketplace are satisfied;
only content approved by the operator is visible to the other users. Complementary, the underlying platform also offers functionalities to create and offer online training courses (similar to Massive Open Online Courses - MOOCs); hence, domain experts with the appropriate knowledge and material could create an online course through the platform and offer it online to further contribute to the education of the community. The online courses are also subjected to the same approval process as the insights.

Focus on the Customer Journey

One of the challenges of any software solution is to find the right balance between functionality and usability. Especially technical software solutions tend to be more complex, because of a richer and granular amount of functionalities that allow the user to better refine and control the results generated via the software solution. Marketplaces suffer in a similar manner, because the users have different levels of expertise, backgrounds, and objectives; hence, one single workflow or customer journey will not be able to satisfy all the needs. Thus, the developers of the marketplace would need to design a software that supports as many functionalities as possible, but at the same time offers a higher degree of freedom in terms of user-defined customizations of the graphical interface or the support of dedicated workflows that will guide the user according to her context and background through the required steps to efficiently achieve her goals. In the context of the Change2Twin marketplace, the user interface automatically adapts to the role of the user (provider or user); in addition, a new functionality to create workflows within the platform by the operator is being developed, in order to allow the operator to determine the steps that a workflow should offer depending on the most common usages of the users within the platform. This functionality will allow the operator to remove, adapt, or create new workflows to reflect the collected feedback and the evolution of the marketplace and its users over time.

Involvement of Key Stakeholders

Marketplaces facilitate interaction among various user groups, such as serviceproviders and service consumers. Identifying representatives from these groups and defining incentives for their engaged involvement are crucial for the successful development, operation, and evolution of a marketplace.

Engaged user representatives are fundamental for obtaining early feedback, testing new functionalities and strategies, and enhancing the marketplace's scope and vision. In the context of Change2Twin, its marketplace combines buying and selling mechanisms with innovation. Providers, such as digital twin experts and manufacturing consultants, offer their expertise, while manufacturers act as users who interact with the providers and vice versa. The marketplace also provides functionalities that allow providers to create their own services—such as cloud-based software applications, online training courses, or digital consulting projects—and offer these services through the platform. The involvement of key stakeholders in this process is beneficial as it ensures that the services offered align with market needs, leading to increased user satisfaction and higher adoption rates. Additionally, the Change2Twin project, along with others like CloudiFacturing, DIGITbrain, CO-VERSATILE, and PULSATE, includes partners who serve as key stakeholders. These partners represent various groups, including technology experts, engineering offices, innovation hubs, value-added resellers, research organizations, and marketing specialists. They were involved in feedback loops during the platform's development and acted as early adopters, playing an integral role in the marketplace's ongoing development and growth.

The Role of Intermediaries

Technology-oriented marketplaces are generally confronted with the barriers that the promoted technology (e.g. digital twins, laser technology, AI) intrinsically comprises. An educated community through a knowledge center and training courses contributed to lower the barriers; nonetheless, there are some cases were only trusted intermediaries with enough knowledge on both sides (the provider and the consumer sides) are able to overcome. These intermediaries are essential in the connection and translation between the providers and the consumers, streamlining the adoption of the technology and fostering the benefits for the consumer. In the context of Change2Twin, these intermediaries were identified as (European) Digital Innovation Hubs and they were trained and certified to effectively facilitate the adoption of the technology by moderating among technology providers and consumers. These intermediaries also play an important role within the Change2Twin marketplace, since they will also have a dedicated space to present themselves and they will have the possibility to actively process calls for solutions posted by the manufacturers. Furthermore, these intermediaries will also act as multipliers within their regions, given their deep knowledge of the culture, the language, and the individualities of the local industry.

APPENDIX: FURTHER INFO

Building blocks of marketplace

Building blocks by RODIN for an information repository:

- **The user perspective**
- **distribution (and dissemination) of the information**
- **Data/information collection and mapping**
- **Data and information provision**
- **Financing**

·MP=IR+B/S instead of B/S

Desk Research insights

These are high over insights based on scanning and analyzing the platform while also finding information about these platforms. The result of this analysis is a broad overview of possible means to fill in the different business model elements for a marketplace to be developed. This provides possible means for the described elements in the previous chapter. In the table underneath the broad overview is presented from which the key takeaways will be considered during the strategy development of the marketplace in the final part of this chapter.

Value Proposition	**Emphasize easy access to tools**, curated applications, community engagement, competition hosting, global talent access, crowdfunding, software solutions, digital assets, online courses, and resources for startups.
Customer Segments	Focus on developers, software tool providers, business customers, 3D designers, hobbyists, educators, data scientists, businesses, freelancers, project creators, backers, ISVs, content creators, individual learners, startups, accelerators, investors.
Channels	Utilize platforms, websites, social media, digital marketing, email marketing, collaboration, SEO, mobile apps, events, workshops, and various sales channel.
Customer Relationships	Foster self-service support, community interaction, direct engagement, personalized matching, and partnerships. Provide documentation, forums, and dispute resolution mechanisms.

Revenue Streams	Derive revenue from commissions, subscription fees, listing fees, indirect sales, service fees, platform fees, advertising, premium memberships, degree tuition fees, and partnerships.
Key Resources	Leverage platform infrastructure, **large user bases**, technology, community of creators, educational resources, **partnerships**, and a content library.
Key Activities	Focus on curating tools and applications, **maintaining platforms, community management**, marketing, hosting competitions, and developing features.
Key Partnerships	**Collaborate with providers, educational institutions**, industry leaders, payment providers, service providers, accelerators, investment funds, and corporate partners.
Cost Structure	Include costs for platform development, marketing, community management, customer support, partnership development, and revenue sharing.

Overview of the potential business model elements based on desk research to existing online marketplaces

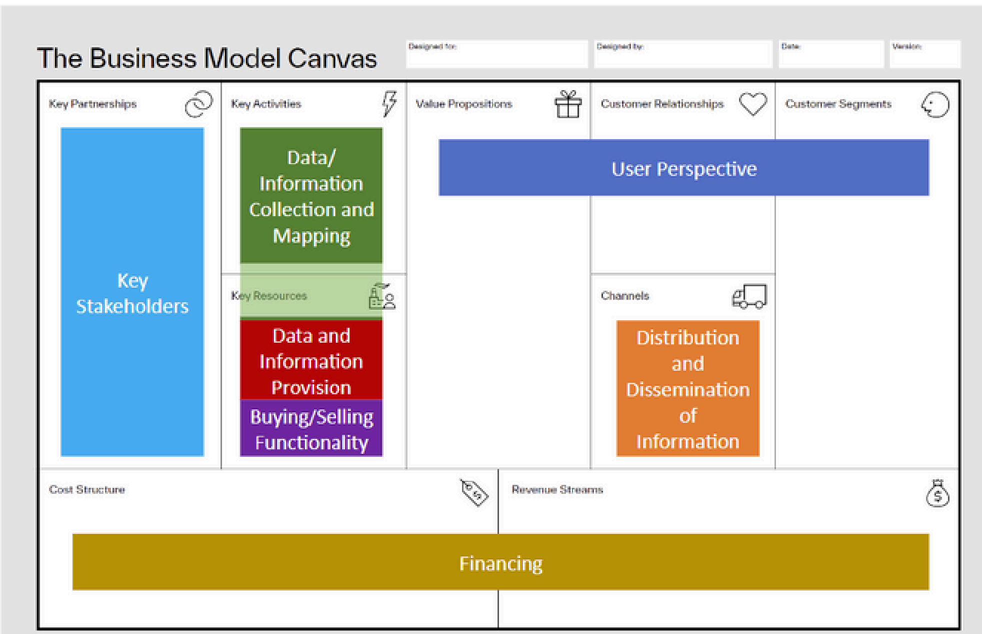

Figure 5 The building blocks mapped with the business model canvas [22]

[22] https://www.strategyzer.com/library/the-business-model-canvas

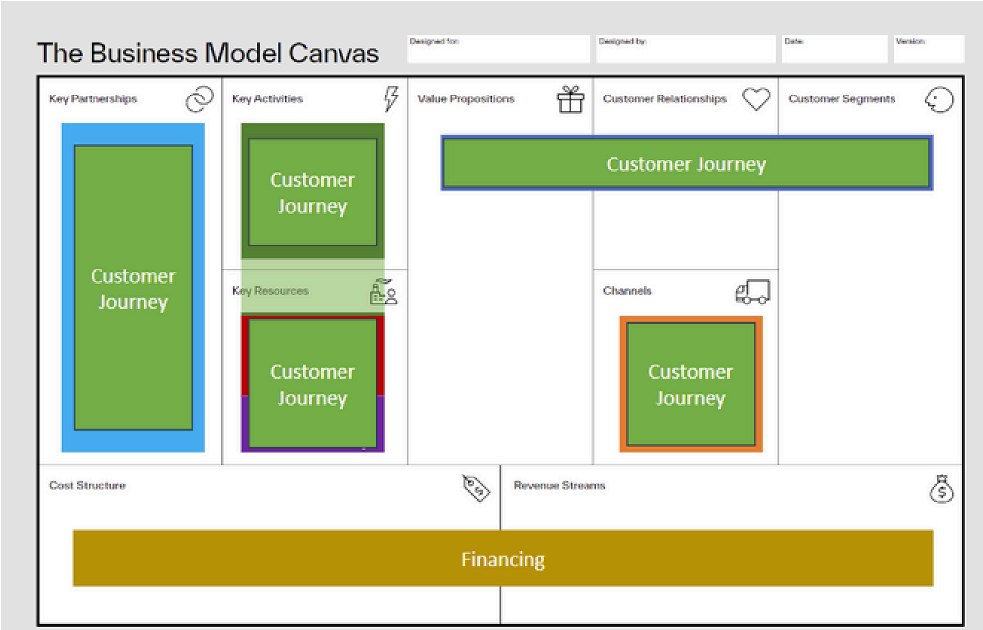

Figure 6 Customer journey as an integral part [23]

[23] https://www.strategyzer.com/library/the-business-model-canvas

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