

Axis 2: Digital products

Digital products represent a pivotal category in the digital transformation landscape, encapsulating goods and services that are stored, delivered and used in an electronic format. These products, ranging from software and apps to digital media, offer businesses a significant competitive edge due to their scalability and potential for rapid global distribution. As digital products bypass traditional physical limitations, they open avenues for companies to access wider markets more efficiently and at a lower cost. This inherent scalability and reach make digital products not just a transformative force but a critical element in redefining market boundaries and establishing new revenue streams in the hyper-competitive digital economy.

Even within digital products, we can discern various levels of maturity and sophistication. Basic products like e-books, audiobooks, or movies can be effortlessly downloaded or streamed from online platforms such as Amazon and Audible. For instance, a customer might purchase an e-book on a website and download it to their e-reader device. Moving towards more complex solutions, intermediate products that amalgamate multiple formats – such as multimedia, e-books and audio or video files – are accessible on a variety of devices or platforms, including streaming platforms like Netflix. A website might offer a multimedia package that includes e-books and audio or video files that can be utilized across different devices. Advanced electronic products enhance user experience with additional features such as personalization, user interaction, or artificial intelligence. For example, a mobile app may allow users to customize settings and interact with other users, adding a layer of engagement and functionality.

Products can offer interactivity, such as many video games, virtual reality, educational apps or design tools that enable users to actively collaborate on or modify the product. Many video games allow users to interact with a virtual environment and make decisions that affect the game's progress. Expert products leverage innovative technologies like artificial intelligence, machine learning and blockchain to deliver more advanced products, such as intelligent data analysis systems, enterprise software or virtual reality platforms. Online services like e-learning platforms or cloud services also fit into this level. An

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AI-based data analysis system uses machine learning algorithms to process and analyse large datasets.

Digital Products						
Level 5: Expert Level	AI-based application	Level of co-ownership and influence	Level of innovation and product improvement	Make-to-order	Product with global potential	
Level 4: Interactive Level	Interactive application	Level of creativity and co-creation	Level of automation and process personalization	Personalized offer	Product with international presence	
Level 3: Advanced Level	Executable application format	Level of experts and mentors	Level of communication and interaction	Dynamic pricing	Product on global platforms	
Level 2: Intermediate Level	Multimedia format	Level of collaboration and interaction	Level of personalization and customization	Market segmentation	Regional product	
Level 1: Basic Level	Electronic file format	Level of resource sharing	Level of data collection and analysis	Omnichannel	Local product	
	1. Electronic Products	2. Community-based Products	3. ICT-based Products	4. Product Customization to Customer Expectations	5. Product Scalability	

Figure 12

In this area, we analyse the capability of products to transition to, or be developed in, digital formats, which notably enhances their accessibility and distribution efficiency. Community engagement in product development is evaluated to determine how well products foster the user loyalty and engagement that are crucial for long-term success. The connection to the ICT industry is also scrutinized to understand its impact on a company's innovative capacity and competitive edge. Personalization of products is explored to ascertain how effectively products can be tailored to meet the unique demands of individual customers, an increasingly important factor in customer satisfaction and retention. Finally, the scalability of products is examined, focusing on the ability to expand production or services to meet escalating demand without sacrificing quality or performance. This comprehensive approach ensures a thorough understanding of a product's digital maturity and market adaptability. For digital products, a five-tier model has been proposed to assess digital maturity. Due to the wide variety of assessment areas, it was not feasible to assign universally descriptive names to the various stages of digital development. Thus, the progression in digital product development is described simply in terms of advancement from a basic level to an expert level. This progression encapsulates a gradual enhancement in the sophistication and capabilities of the products, reflecting their increasing integration and utilization of digital technologies.

Area 2A. Digital products

Digital products encompass a range of goods or services available in electronic formats that can be downloaded or accessed online. These include, but are not limited to, software applications, music, films, e-books, video games and online educational courses. Such products can be evaluated based on their technological sophistication and the complexity of their features, enabling them to be graded from basic to highly advanced offerings. This categorization helps in assessing the digital maturity of products as they evolve to incorporate more intricate and technologically advanced functionalities.

Level 1. Basic. Products such as e-books, audiobooks or movies can be easily downloaded or streamed from online platforms like Amazon and Audible. For example, a customer purchases an e-book from a website and downloads it to their e-reader device.

Level 2. Intermediate. Products that combine multiple formats such as multimedia, e-books, audio and video are available on various devices or platforms, such as streaming platforms like Netflix. A website offers a multimedia package containing e-books, audio and video that can be played on different devices.

Level 3. Advanced. Electronic products with additional features, such as mobile apps, games or software offer added functionality like personalization, user interaction or artificial intelligence. A mobile app allows users to customize settings and engage with other users.

Level 4. Interactive. Products that offer interactivity, such as many video games, virtual reality, educational apps or design tools that enable users to actively collaborate or modify the product. Many video games allow users to interact with a virtual environment and make decisions that affect the game's progress.

Level 5. Expert. Products leverage cutting-edge technologies like artificial intelligence, machine learning and blockchain to deliver more advanced products, such as intelligent data analysis systems, enterprise software or virtual reality platforms. Online services like e-learning platforms or cloud

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services also fit into this level. An AI-based data analysis system uses machine learning algorithms to process and analyse large datasets.

Area 2B. Community-based products

Community-based products are created and developed with the engagement of a community of users. This approach is built on principles of participation and collaboration by which users not only use the product but also contribute to its improvement. Organizations can thereby enhance product quality and increase user engagement for greater customer satisfaction and company profits. Community-based products are gaining popularity in the digital age and are used across various industries, from computer games to business software.

Level 1. Basic. An online community shares resources such as files, tools or information. Users can collectively utilize these resources and support each other by sharing knowledge and experiences. A community of photographers, for example, share their photos on an online platform, allowing other users to download and use them.

Level 2. Intermediate. An online community actively collaborates and interacts while working on projects, discussions and problem-solving. Users engage in group activities and share ideas, opinions and comments. A platform for developers, for example, enables collaborative work on projects, sharing code, commenting and mutual assistance.

Level 3. Advanced. This level focuses on experts sharing knowledge and expertise and mentoring other community members. Users can receive advice and support from more experienced individuals in their field. A community of programmers, for example, offers mentoring and provides educational materials for beginners in programming.

Level 4. Interactive. The online community actively contributes to creating content such as designs, articles, videos or graphics. Users can collaborate in creating something new, shared and creative. A community of artists, for example, collaborates on an artistic project, combining their skills in various art forms.

Level 5. Expert. This highest level is based on community members' involvement in co-owning and influencing the community's development

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and the products or services it includes. Users can participate in decision-making, express opinions and influence the community's direction. The user community of a social media platform, for example, influences the platform's features, design and improvements by actively suggesting ideas and voting on them.

Area 2C. ICT-based products

ICT-based products operate using information technology and communication tools. These may include management systems, remote-working tools, mobile applications, content creation and publishing software, cloud services, data monitoring and analysis systems, e-learning platforms, and e-commerce solutions. All of these products are built on information technology and allow interaction with users through various web-enabled mobile devices and computers. ICT-based products enhance work efficiency, improve business effectiveness and facilitate access to information and tools.

Level 1. Basic. ICT is used for collecting, processing and analysing customer data. These data may include preferences, behaviours, purchase histories and other information that helps better understand customers. An analytical platform tracks user interactions on an online store's website.

Level 2. Intermediate. ICT enables the personalization of offers to customers based on collected data. Advanced algorithms and analytical tools create personalized recommendations, offers and user experiences. An example of ICT use for personalization is a product recommendation system in an online store.

Level 3. Advanced. ICT is employed to facilitate communication and interaction with customers. Tools such as communication platforms, customer support systems and chatbots allow rapid and efficient information exchange. An example of effective ICT use for communication with customers is an integrated customer support platform that combines various communication channels in one place.

Level 4. Interactive. ICT is used to automate and personalize customer service processes. Advanced Customer Relationship Management (CRM) systems and marketing automation tools deliver messages, offers and responses all personalized to customer needs. An example of using ICT for automating and personalizing customer service processes is an advanced CRM system integrated with marketing automation tools.

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Level 5. Expert. At the highest level, ICT serves as a tool for innovation and product improvement. Technologies such as big data, artificial intelligence, machine learning and predictive analysis are used to generate new ideas, discover trends and create innovative products that better meet customer expectations. For example, a company in the medical equipment manufacturing sector uses artificial intelligence and big data to create more precise and efficient diagnostic devices.

Area 2D. Product alignment to customer expectations

Product alignment to customer expectations is a critical area in the assessment of digital products, focusing on how well a product meets the specific needs and preferences of its target audience. This alignment is essential for ensuring customer satisfaction and loyalty, as it directly influences how consumers perceive and interact with the product. Effective alignment involves tailoring product features, functionality and user experience to cater to the evolving expectations of customers, often using data-driven insights to personalize offerings. As digital markets continue to grow and consumer behaviours shift, maintaining a strong alignment with customer expectations becomes a key driver of competitive advantage and market success.

Level 1. Basic. The product is available through various sales and communication channels, providing customers with consistent experiences, regardless of where and how they engage with it. For example, an e-commerce company collects data on customers' purchasing preferences and analyses them to customize product offerings and recommendations.

Level 2. Intermediate. The product is tailored to different market segments, considering the unique needs and preferences of each customer group to deliver personalized and appealing solutions. In a typical example, a streaming platform adjusts movie and show recommendations based on the viewer's preferences.

Level 3. Advanced. The product uses flexible pricing models that adjust to changing market conditions, customer preferences and competition, ensuring optimal value for different audience groups. The company employs a communication platform that allows customers to contact customer support through live chat.

Level 4. Interactive. The product customizes experiences to individual customer needs, preferences and history by personalizing content, features and recommendations. The company sends automated emails with product offers and recommendations tailored to the customer's preferences.

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Level 5. Expert. The product is customized and manufactured to the customer's order, allowing the customer to tailor it to individual requirements and preferences, leading to greater satisfaction and alignment. The company uses predictive analysis and machine learning to create innovative products that respond as customer needs evolve.

Area 2E. Product scalability

Product scalability is an integral aspect of evaluating digital products, focusing on the ability of a product to expand and adapt to a larger scale of operations or a broader audience without compromising performance or quality. Scalability is crucial for digital products, as it determines their potential to grow and succeed in diverse markets. It involves considerations of architecture flexibility, resource efficiency, and the capability to handle increased loads or expand into new markets with minimal adjustments. Effective scalability ensures that a product can meet growing demand, take on board new customer needs, and maintain efficiency, making it a vital component for achieving long-term viability and success in the competitive digital landscape.

Level 1. Basic. The product is developed and offered locally, focusing on a narrow audience or regional market. There are no opportunities for expansion into other markets. For example, a food ordering mobile app that operates in only one city.

Level 2. Intermediate. The product gains popularity in a specific region and starts expanding into adjacent markets. This may involve expansion into countries with similar preferences and needs. An example is a streaming service available in several countries in the Central and Eastern European region.

Level 3. Advanced. The product leverages global platforms and services such as e-commerce platforms, social networks or cloud services to reach customers in different markets. The product is accessible to customers from various countries but may require some adaptation to local preferences. For instance, there is a range of mobile online shopping apps available on the App Store and Google Play that are targeted to various markets.

Level 4. Interactive. The product has a presence in multiple international markets and is adapted to various regions. This may include content translation, user interface customization and compliance with local regulations and standards. An example is an e-commerce website available in different languages and supporting various currencies and payment methods.

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Level 5. Expert. The product is globally accessible with no geographical constraints. It is widely recognized and used in various markets worldwide. It is customizable to different cultures and languages and complies with local regulations and requirements. This is perhaps best exemplified by a social networking platform that is available worldwide and supports multiple languages and cultural variations in user behaviours.

Axis 3: Digital business models

The axis of digital business models represents a critical component in the framework of digital transformation, as it underpins how companies generate value and interact with the modern digital economy. This axis explores the evolution from traditional business models to innovative digital formats that leverage technology to create, deliver and capture value in unique and dynamic ways. Digital business models enable organizations to respond more effectively to consumer demands and market changes, often leading to increased efficiency and opening up new revenue streams. As we examine this axis, we will be looking at the shift towards models that prioritize agility, customer engagement and continual adaptation to technological advancements. This transformation is not just about adopting new technologies but also about rethinking the organization's approach to business, and making strategic use of digital tools to enhance competitiveness and sustainable advantages in the digital era.

Digital Business Models						
Level 5: Expert Level	Data-driven product store	SAM platform organizer plus community	Full accountability for process outcome	Shared comprehensive business solutions	Data-driven innovations	
Level 4: Personalized Level	Customized offer store	SAM platform organizer	Pay-per-task model	Shared financial resources	Data sales	
Level 3: Advanced Level	Online store with offer customization	Ecosystem platform organizer	Pay-per-asset time model	Shared physical assets	Offer personalization	
Level 2: Intermediate Level	Integrated store with marketplace	Trade platform organizer	Long-term lease	Shared virtual assets	Data analysis	
Level 1: Basic Level	Online store	Platform participant	Short-term rental	Shared knowledge and skills	Data acquisition	
	1. E-commerce Model	2. Platform Models	3. As a services	4. Asset Sharing	5. Data Monetization	

Figure 13

The assessment covers five key areas: the use of e-commerce models, platform solutions, As-a-Service models, asset sharing and data monetization. Each category is crucial for understanding how businesses adapt to and thrive in the digital economy, focusing on scalability, customer engagement and the strategic use of digital tools to develop a competitive edge.