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Digital Entrepreneurship
Leseprobe

Unit 1
Introduction

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List of abbreviations

AI	Artificial intelligence
BEP	Best environment practices
CEO	Chief executive officer
CSR	Corporate social responsibility
EBO	Established business ownership
GEM	Global Entrepreneurship monitor
GII	The global innovation index
HTGF	High-Tech Gründerfonds
ICT	Internet and communication technology
IoT	Internet of things
IS	Information systems
ML	Machine learning
NGO	Nongovernmental organization
NPO	Non-profit organization
SMEs	Small and medium-sized enterprises
STEM	Science, technology, engineering and math
SROI	Social return on investment
SRS	Social reporting standard
TEA	Total early-stage entrepreneurial activity
WHO	World health organization
WIPO	World intellectual property organization

1 Introduction

Digital entrepreneurship is a key driver of economic growth and social progress and has increasingly become a key area of study in both academia and practice. Entrepreneurship has historically been a catalyst for innovation, job creation, and competitive dynamics within markets. However, contemporary economic landscapes are witnessing a transformative shift driven by digital entrepreneurship. This evolution harnesses the capabilities of digital technologies to innovate, create value, and capitalize on opportunities in novel and unprecedented ways.

Digital entrepreneurship involves various key activities such as developing and launching digital products or services. It helps utilize digital technologies for marketing and communication, conducting market assessments and analyzing competitors in the digital landscape. In contrast to traditional entrepreneurial endeavors, which often necessitate substantial physical infrastructure and a localized market presence, digital ventures are distinguished by their agility and capacity for rapid global scalability, often with minimal initial investment. This shift represents a transformation of business operations and market dynamics.

This distance-learning module at the FernUniversität in Hagen offers an introduction to the dynamic field of digital entrepreneurship, guiding students through the process of ideating and building a new digital venture. Students will explore key concepts and methodologies essential for the pre-launch, launch, and post-launch phases of a digital business. The course integrates practical examples to illustrate these principles and provides deeper insights into specific application areas within digital entrepreneurship.

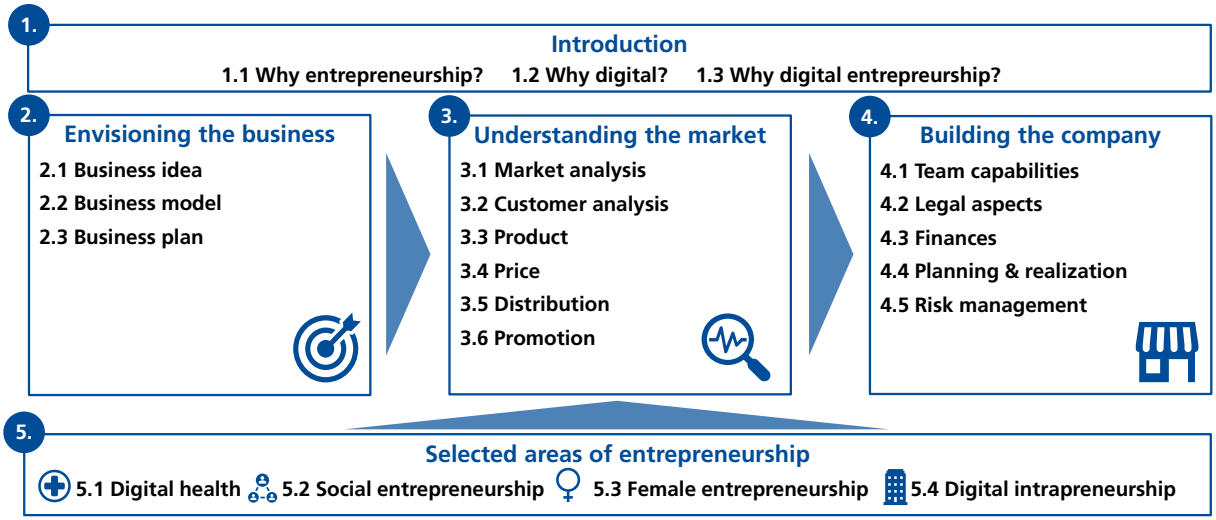


Figure 1: Module overview of digital entrepreneurship

The module structure is depicted in Figure 1. Each of the five units focuses on a different aspect of digital entrepreneurship. Unit 1 (Introduction) introduces fundamental concepts of digital entrepreneurship and lays the foundations for the remaining units. Unit 2 (Envisioning the business) explores the critical elements of conceptualizing a digital venture, from formulating a business idea to developing a sustainable business model and creating a strategic roadmap. Unit 3

(Understanding the market) delves into the dynamics of the market with a focus on market assessment, customer analysis, product, price, distribution, and communication. Analyzing customer behavior, preferences, and demographics can help create a digital venture that meets specific market demands. Unit 4 (Building the company) synthesizes the insights required to bring the entrepreneurial vision to life. This includes delving into legal considerations, planning, financing strategies, and risk management to navigate the complexities of realizing a digital venture. Unit 5 (Selected areas of entrepreneurship) provides specialized insights into digital entrepreneurship, including digital health, social entrepreneurship, female entrepreneurship, and digital intrapreneurship. These insights provide a comprehensive understanding of the challenges and opportunities within each niche.

Learning goals

There are six intended learning outcomes. The first five are primarily addressed through the written materials of the module. The sixth learning objective is primarily addressed through the complementary assignments and group work built into the module. After working through this module, students should have achieved the following goals:

1. Students can clearly define and explain fundamental terms and concepts in digital entrepreneurship.
2. Students can illustrate common strategies for envisioning a business concept, sketching a business model canvas, and developing a business plan.
3. Students can analyze market dynamics, identify key actors, and distinguish the elements of the marketing mix in digital entrepreneurship.
4. Students can critically assess the essential factors for building a company—including the optimal team composition, the appropriate legal form, and viable funding sources—and they can effectively utilize planning and management methods to navigate this process.
5. Students can adapt and apply digital entrepreneurship concepts, methods, and skills to specialized areas, including digital health, social ventures, female-led enterprises, and corporate intrapreneurship initiatives, recognizing the unique challenges and opportunities in each sector.
6. Students can generate innovative business ideas tailored to specific scenarios, craft and deliver persuasive pitch presentations, develop detailed mini-business plans, and offer constructive feedback to peers in the formation of new entrepreneurial ventures.

Contents of unit 1

Unit 1 introduces the concept of digital entrepreneurship and its impact on traditional business practices. It begins by highlighting the critical role of entrepreneurship in driving innovation and societal progress, emphasizing how entrepreneurs contribute to economic growth through novel ideas and solutions. The unit explains the VUCA (volatility, uncertainty, complexity, ambiguity) framework, illustrating the need for adaptability and resilience in today's unpredictable business environment.

The focus then shifts to the essential mindset for successful entrepreneurship, including innovation, opportunity recognition, and risk-taking. The unit explores how digital technologies, such as cloud computing and artificial intelligence, are transforming business practices and creating

new opportunities. It covers the development of digital business models and the digital transformation of value chains, showing how these technologies enhance efficiency and competitiveness.

Digital entrepreneurship is defined as the use of digital technologies to create and transform business ventures. The unit also discusses how digital entrepreneurship is studied within information systems research, providing insights into various perspectives such as traditional entrepreneurship and digital innovation. Finally, it outlines the multifaceted roles of digital technologies in entrepreneurship, including their functions as enablers, outcomes, and contexts. Overall, unit 1 sets the stage for understanding how digital entrepreneurship represents a significant shift in business practices driven by technological advancements.

Learning goals

After working through this introduction, you should be able to:

- describe the fundamental principles of digital entrepreneurship and demonstrate a comprehensive understanding of its key concepts, including how digital technologies drive innovation and transform business practices;
- identify and distinguish the unique features and challenges of digital innovation compared to traditional (non-digital) innovation, and understand how digital technologies introduce new methods and paradigms in the innovation process;
- explain how digital and non-digital value creation differ, and explore how digital technologies reshape value propositions, business models, and customer experiences, highlighting the specific nuances of digital vs. traditional value creation methods;
- evaluate how digital technologies function within entrepreneurial ventures, determining whether they serve as enablers, outcomes, contexts, or a combination of these roles; and understand their impact on business strategies, operations, and overall entrepreneurial success.

1.1 Why entrepreneurship?

Entrepreneurship represents a pivotal catalyst for innovation and societal progress. Entrepreneurs generate novel ideas, products, and services, which drive economic growth and enhance quality of life. Entrepreneurship also helps address societal challenges by implementing innovative solutions, thereby making it an indispensable component of global societal advancement.

Universities and other research institutions play a crucial role in driving innovation for founders. An increasing number of **higher education** institutions have integrated topics related to entrepreneurship into their teaching curricula. Many startups state that they have received support from this environment, be it through individual mentors such as professors or through the provision of networks and contacts. In addition, the establishment of business incubators and other support programs at universities has further increased the support for startups in recent years.

Startups are bringing **new technologies** such as artificial intelligence, cloud computing, and Industry 4.0 into practice. According to the (Deutscher Startup Monitor 2022 2022) AI has a particularly strong impact on business models, with 52 percent of startups stating that AI has a (very) big impact, compared to 47 percent in 2018 (Deutscher Startup Monitor 2022 2022). Tools such as ChatGPT are used by 82 percent of startups, especially in marketing, but the use of generative AI is also increasing in other areas. Startups play a central role in the integration and further development of AI-based innovations by building expertise and establishing best practices.

In an **international comparison** of industrialized countries, the German innovation system for startups ranks roughly in the middle, with specific strengths and weaknesses. The Global Innovation Index (GII) 2022, shown in Figure 2, ranks countries based on their innovative capabilities (Zimmermann 2023). Published annually by the World Intellectual Property Organization (WIPO) in collaboration with various institutions and universities, the GII benchmarks the innovation performance of 132 countries using eighty-one indicators. In 2023, Germany improved by two places, ranking eighth, just ahead of Finland and Denmark.

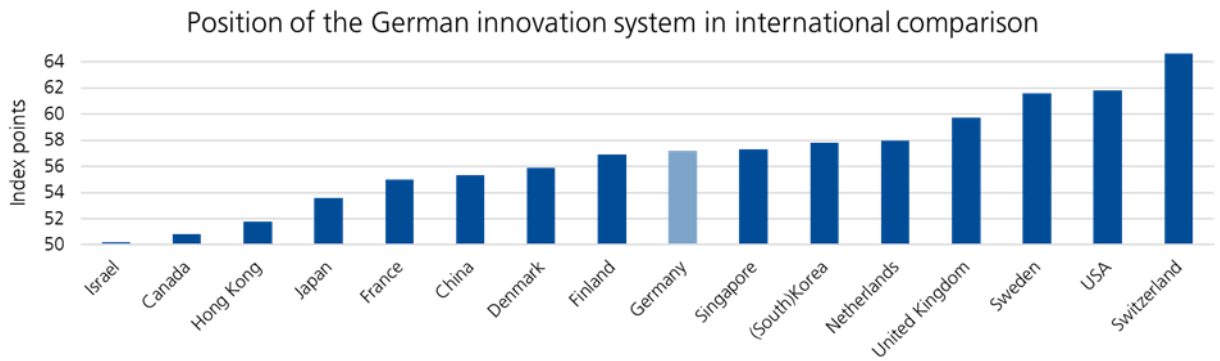


Figure 2: Global Innovation Index 2022, (Zimmermann 2023)

According to the ranking, Germany's innovative strength and diversity are underpinned by the robustness of its **seed ecosystems**. In various urban areas and regions, network organizations such as Berlin Partner, StartHub Hessen, Hamburg Invest, Hamburg.de, Munich Startup, Frankfurt Economic Development GmbH, and Gründerallianz Ruhr actively cultivate local startup ecosystems. Furthermore, private sector initiatives such as ruhrHUB and TechQuartier foster collaboration among stakeholders across different hubs, promoting knowledge exchange. There is no clear separation between the public and private sectors, as they often engage in partnerships to support innovation and startups.

In terms of **funding**, Germany's public sector provides a support system for startups. The federal government's inaugural startup strategy, which was adopted in 2022, provided thirty billion euros to promote the startup sector by 2030 (Bundesregierung 2022). This strategy includes initiatives to streamline bureaucracy, support women entrepreneurs, promote creative industries, incentivize innovation, and integrate entrepreneurship into educational curricula. Other funding incentives include the High-Tech Gründerfonds (HTGF) for seed investments and BayTOU, which grants support to small and medium-sized enterprises (SMEs) for developing technology concepts (Top 50 startups 2020).

Entrepreneurs based in Germany benefit from addressing the needs of the local market and taking advantage of Germany's significant economy – the largest in Europe – and its leadership within the EU to expand into international markets. Although challenges such as bureaucratic hurdles, complex tax regulations, high labor costs, and stringent employee protections persist, the German startup ecosystem remains poised for growth.

Although the ecosystem is robust, it is not without its **challenges**. A significant hurdle is the cultural mindset toward entrepreneurship. Unlike the celebrated entrepreneurial cultures of Silicon Valley and Boston, Germany has historically exhibited a more conservative approach, with less societal encouragement for risk-taking and startup ventures. Another major challenge is the access to venture capital. German entrepreneurs often find it more difficult to secure the necessary funding compared to their counterparts in more established startup ecosystems. This limited access to venture capital can slow down the growth and scalability of innovative startups in Germany. Countries aim to expand their innovation position, and there is a fierce **global competition** to offer entrepreneurs the best framework conditions. As Figure 2 shows, the top spots in innovation are dominated by other countries, most of which (fifteen of the top twenty-five) are in Europe. Only three non-European countries appear in the top ten: the United States, South Korea, and Singapore. China continues its rise, moving up one place to eleventh. China remains the only middle-income economy in the top thirty. As in previous years, Asian countries are becoming increasingly innovative and are catching up with the leading nations in Europe and North America.

Against this background, it is paramount for students in higher **education** to understand entrepreneurship. By learning more about entrepreneurial strategies, innovation management, and the role of digital technologies, individuals and organizations can better navigate the challenges and opportunities in their country's innovation ecosystem, such as the one in Germany. This

knowledge is essential for fostering a culture that supports startups, enhances access to venture capital, and ultimately drives innovation globally.

Important

In summary, entrepreneurship is an indispensable driver for innovation. This is evident, for example, in Germany's dynamic startup ecosystem and its evolving position in global innovation rankings. Through learning about entrepreneurship, students in higher education have the opportunity to conceive novel solutions, implement novel products and services, and thus contribute to economic growth and societal progress.

1.1.1 Understanding the VUCA world

The term VUCA has become a common term in the realm of business and leadership. It stands for volatility, uncertainty, complexity, and ambiguity, encapsulating the multifaceted nature of the modern world. Within a VUCA world, change prevails as a constant element, predictability is a scarce commodity, and leaders face challenges calling for adaptability, creativity, and resilience.

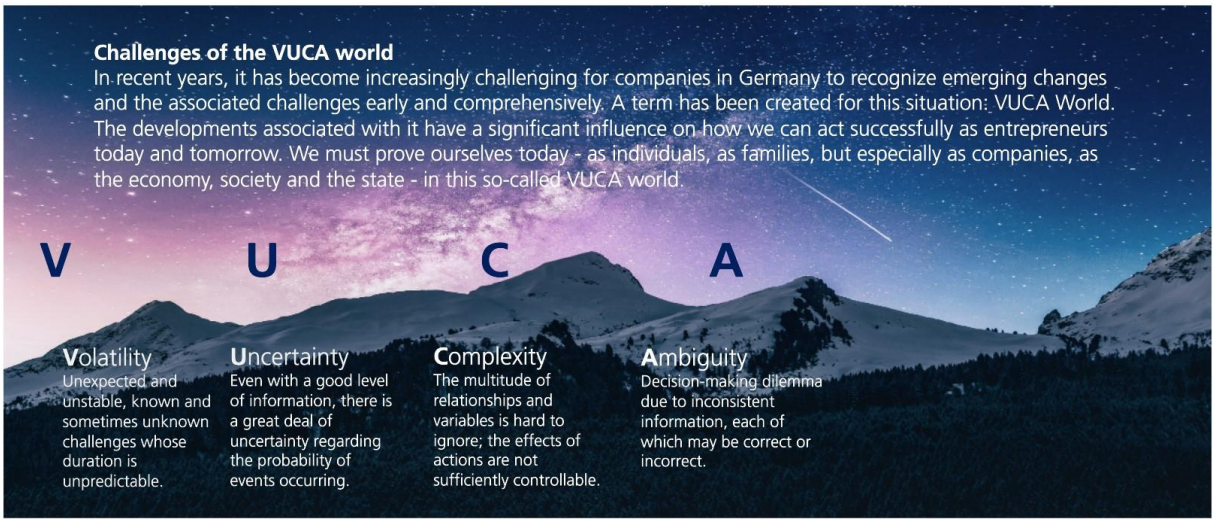


Figure 3: What is a VUCA world? (Bitkom Akademie 2023)

VUCA framework

Figure 3 depicts the VUCA framework, which originated in the military to describe the post-Cold War era. Since then, it has been embraced by various sectors, including business, education, and government. Each element of VUCA stands for a different dimension of the contemporary environment.

Volatility: Volatility refers to rapid and unpredictable changes in a situation or environment. This includes sudden market fluctuations, political unrest, or unforeseen events that disrupt the status quo. Volatile situations require adaptability and quick response to change.

Uncertainty: Uncertainty signifies a lack of predictability or clarity about future events or outcomes. It implies insufficient information to make confident decisions. Dealing with uncertainty often involves risk assessment, scenario planning, and decision-making without complete information.

Complexity: Complexity indicates the presence of multiple interconnected factors and variables, making a situation intricate and hard to understand. It may involve many stakeholders, intricate processes, or a web of interdependencies. Navigating complexity requires systematic thinking, holistic analysis, and managing interconnected factors.

Ambiguity: Ambiguity refers to unclear information and varying interpretations of events or data. Ambiguous situations often lead to confusion, making it challenging to determine cause-and-effect relationships. Coping with ambiguity involves seeking clarity, establishing communication, and fostering a shared understanding.

VUCA applied to entrepreneurship

In entrepreneurship, the VUCA framework reflects the realities and challenges entrepreneurs face while starting and running their businesses. Entrepreneurship is inherently volatile, with markets experiencing sudden fluctuations, rapidly changing consumer preferences, and unexpected disruptive technologies. Entrepreneurs must adapt their business models and strategies in response to unstable market conditions, which may require pivoting, diversifying, or downsizing operations.

The entrepreneurial landscape is characterized by high **uncertainty**. Startups often operate in unfamiliar territory with no assurances of success. With limited information, entrepreneurs must make critical decisions about product development, market entry, and resource allocation. Managing uncertainty and making flexible choices are vital skills for entrepreneurs.

Business founders face **challenges** navigating market dynamics, competition, regulatory requirements, and financial complexities. Due to the complexity of these interrelated elements, problem-solving demands an integrated approach.

Ambiguity is common in the initial stages of entrepreneurial ventures: Founders may lack clear data on customer preferences, market demand, or the feasibility of their ideas. To gain clarity and succeed, entrepreneurs must actively pursue feedback and iterate quickly to reduce ambiguity.

To thrive in a VUCA environment, entrepreneurs need specific **skills and mindsets**. They should be agile, ready to adjust their strategies when circumstances change, and able to react flexibly to new information. The entrepreneurial journey requires resilience to bounce back from setbacks, learn from failures, and stay motivated despite adversity. Successful entrepreneurs identify opportunities in VUCA environments, creating innovative solutions, products, or services that meet evolving market demands. Collaborations with experts, mentors, and peers provide invaluable insights to overcome obstacles. A strategic outlook is crucial to anticipate and prepare for future uncertainties, with scenario planning and risk assessment as essential tools.

In summary, the VUCA framework is crucial in the context of entrepreneurship, where volatility, uncertainty, complexity, and ambiguity are widespread. Thriving entrepreneurs are those who cannot only navigate these challenges but also leverage them as opportunities.

1.1.2 Entrepreneurial thinking

Entrepreneurial thinking refers to a mindset and set of cognitive approaches characterized by innovation, opportunity recognition, risk-taking, and a bias toward action. It is a way of approaching problems and opportunities that is typical of successful entrepreneurs. It also refers to a mindset characterized by a set of attitudes, behaviors, and cognitive approaches that are commonly associated with successful entrepreneurs. Figure 4 contains a selection of **different definitions** of entrepreneurial thinking, each of which emphasizes a specific aspect.

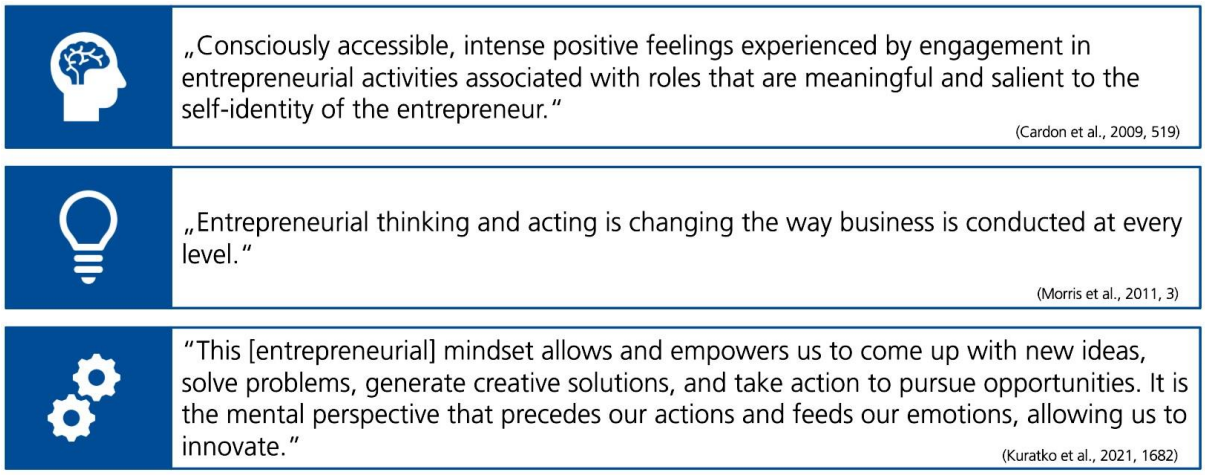


Figure 4: What is entrepreneurial thinking?

Cardon et al. (2009) highlight that when entrepreneurs engage in activities that they find meaningful and that are central to their identity, they experience strong positive emotions. This sense of fulfillment and emotional intensity is linked to the alignment between their entrepreneurial roles and their self-identity. For example, entrepreneurs who see themselves as visionary leaders will feel intense positive emotions when engaging in strategic planning or innovation, as these activities reinforce their self-perception and purpose.

The quote by **Morris** et al. (2011) highlights the pervasive influence of entrepreneurial thinking and acting in transforming business practices across all levels. By fostering innovation, agility, and a proactive approach to opportunities and challenges, entrepreneurial thinking is reshaping how businesses operate and compete in the modern marketplace.

Kuratko et al. (2021) argue that an entrepreneurial mindset is fundamental to the process of innovation. It encompasses a way of thinking that encourages the generation of new ideas and solutions, the proactive pursuit of opportunities, and the emotional motivation to take action. This mindset is not just about having innovative ideas; it is about the mental framework that makes innovation possible. It empowers individuals to navigate challenges, seize opportunities, and ultimately drive change and progress through their actions.

These definitions collectively illustrate that entrepreneurial thinking is a dynamic and multifaceted mindset that empowers individuals to find and act on opportunities, navigate uncertainty, and drive innovation and progress in various contexts. It is a mindset that is not limited to

starting new businesses but can be applied in diverse settings to effect positive change and achieve ambitious goals. In the scope of this module, we define the term as follows:

Definition

Entrepreneurial thinking is a dynamic and multifaceted mindset that empowers individuals to find and act on opportunities, navigate uncertainty, and drive innovation and progress in various contexts (Davidson and Vaast 2010).

1.1.3 Who are entrepreneurs?

When exploring the entrepreneurial mindset and asking *who* entrepreneurs are, it is necessary to begin by examining definitions, characteristics, and behaviors of an entrepreneur.

Definition

Entrepreneurs are individuals who initiate, organize, and manage business ventures or projects to create value in the form of goods, services, or innovative solutions. Entrepreneurs are recognized for their willingness to undertake calculated risks, capacity to recognize opportunities, and capability to innovate (Amini Sedeh et al. 2022).

Figure 5 provides an overview of the motivations for starting a business in Germany and a breakdown of startup founders in Germany by their academic degrees.

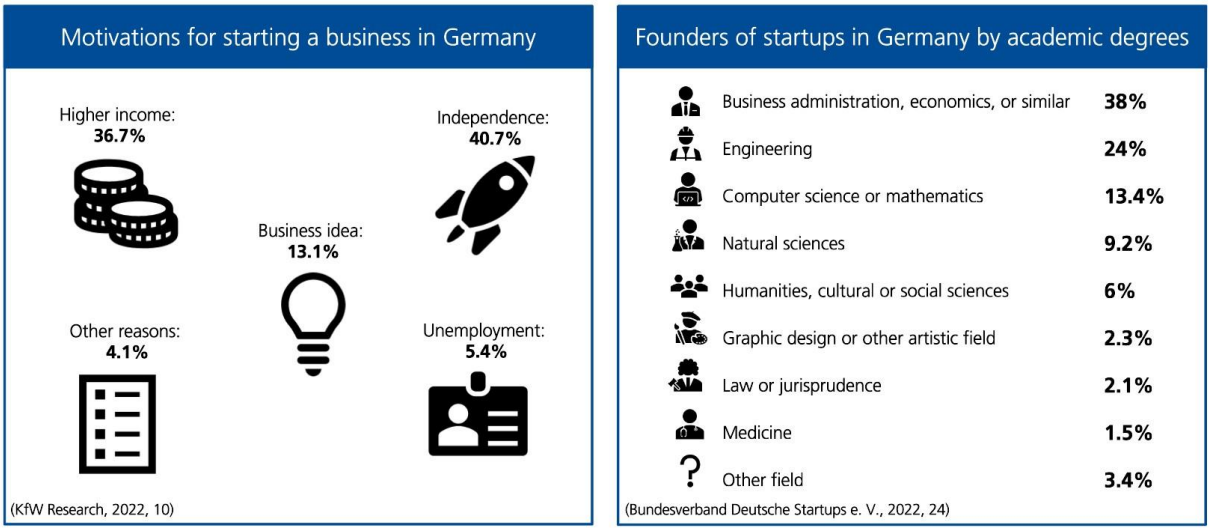


Figure 5: Who are entrepreneurs?

Motivations of entrepreneurs

What motivates someone to become an entrepreneur? This varies from person to person and can be influenced by a combination of personal, professional, and external factors. Here are some common motivations that drive individuals to pursue entrepreneurship (Metzger 2022)

Independence is a crucial and highly prized aspect of entrepreneurship, attracting many individuals due to the opportunity to achieve autonomy in various professional areas. Nevertheless, despite motivating many entrepreneurs, this independence necessitates taking on several responsibilities and challenges. As a result, entrepreneurship demands that individuals undertake multiple roles and wear diverse hats within their businesses. While successful entrepreneurship may result in increased **income**, it is important to note that individuals venture into such pursuits for diverse reasons. Only 13 percent of all business founders initiate their enterprise with a

distinct business idea in mind. Hence, the incentives for commencing one's own business can vary significantly.

Academic degrees of founders

The **academic qualifications** of founders have a profound impact on the startup ecosystem. Around 84.5 percent of startup founders possess an academic degree. Significantly, nearly two-thirds of founders in Germany have achieved a master's degree or higher qualification. Within this group, half hold a degree in STEM (science, technology, engineering, or mathematics), with business-related programs coming in second place.

The remarkable number of scholars and the broad range of degrees earned emphasize the significant role universities play in the overlap between innovation and entrepreneurship. Of particular importance in this context are the networks and connections that emerge within university environments. They play a crucial role in supporting the development of ideas, fostering collaborations, and providing support to aspiring entrepreneurs. These networks offer valuable opportunities for the exchange of knowledge and experiences, as well as for the creation of innovative concepts.

In general, the strong link between academia and the startup ecosystem creates a fertile environment for inventive ideas and business ventures. The variety of academic backgrounds contributes to the creation of innovative solutions in diverse industries, guaranteeing the sustained expansion of the startup landscape. The most prevalent academic background for startup founders in Germany is business administration and economics, constituting 38 percent of such founders, with computer science following at 24 percent, and information systems at 13 percent. These results indicate that a considerable number of German startup founders possess technical, engineering, and business-oriented qualifications.

Many entrepreneurs possess expertise in technology, engineering, and business management, which are essential areas for launching and expanding prosperous startups. This tendency highlights the demand for a mixture of technical abilities, business acumen, and economic comprehension among German startups. This multidisciplinary approach can be advantageous when addressing the complex challenges and opportunities that startups face in today's dynamic business landscape.

Age of founders

The average **age of startup founders** in Figure 6 varies by sector, with an overall average of 35.5 years. Entrepreneurship transcends age boundaries, with successful startup founders emerging from various stages of life. It is common for young entrepreneurs to establish startups, with many prosperous ventures founded by individuals in their twenties or early thirties. Prominent examples include Mark Zuckerberg, who co-founded Facebook at nineteen, and Evan Spiegel, who co-founded Snapchat in his early twenties.

However, entrepreneurship is not exclusive to young founders. People in their thirties to fifties frequently initiate businesses, driven by industry expertise, a broader network, and financial stability. These attributes often provide a solid foundation for starting and growing a startup. With years of experience, these entrepreneurs can navigate industry complexities more effectively and leverage professional connections for support and growth.

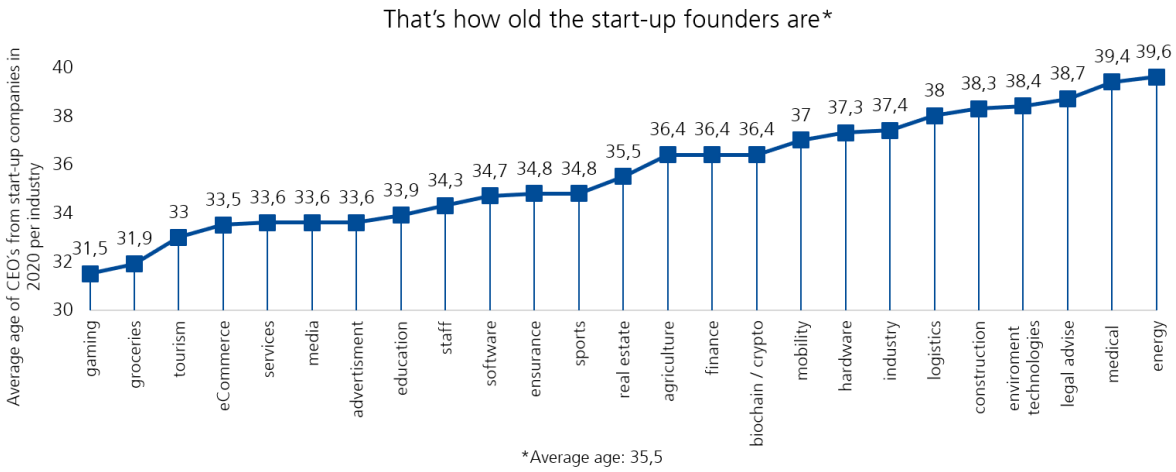


Figure 6: Age of startup founders (Top 50 startups 2020)

Additionally, some individuals choose to embark on their entrepreneurial journey later in life, often in their forties or fifties. After gaining extensive experience in their respective fields, these aspiring entrepreneurs use their expertise and industry contacts to establish thriving businesses. Their accumulated knowledge and skills can be critical assets, especially in fields requiring specialized knowledge.

The age of startup founders varies significantly among different sectors and industries. For instance, technology and gaming startups are typically founded by younger individuals who bring new perspectives and innovative ideas. Conversely, older founders are more prevalent in the healthcare and energy industries, where expertise and specialization are crucial.

It is important to recognize that the entrepreneurial landscape is constantly evolving, and the age of founders can shift over time. There is no set age to begin a startup. Successful entrepreneurship relies on several factors, including innovative concepts, market timing, determination, and access to resources. While the conventional image of an entrepreneur is often a young student in their early twenties pursuing bold and clever business endeavors, this stereotype mainly applies to tech startups.

As the startup landscape continues to evolve, it becomes clear that entrepreneurship knows no age limits. The diverse age range of founders highlights the fact that the potential for success is not confined to any particular stage of life. Whether entrepreneurs are young or old, the key elements of entrepreneurship remain the same: creativity, resilience, and the ability to seize opportunities.

1.2 Why digital?

In this section, we explore how the digital revolution has fundamentally transformed products, services, and business models, while also altering the nature of value creation. We begin by examining the nature of digital innovations, which are characterized by their rapid development, widespread connectivity, and significant impact on efficiency and scalability. Digital technologies

have enabled new ways of creating and delivering value, leading to more personalized customer experiences, streamlined operations, and the emergence of entirely new business models. This shift has made digital transformation an essential component of competitiveness in the modern economy.

1.2.1 Digital innovation

Digital innovation

The term digital innovation describes the potential to create new products by integrating physical elements with digital technologies (Yoo et al. 2010).
Given that digitalization allows for a significant transformation of traditional product experiences, digital innovations are crucial for businesses to gain a competitive edge. Broadly defined, digital innovation involves the creation of new combinations of digital and physical components to produce novel products or services. It represents a change in thinking, especially when compared to non-digital or traditional innovation, where the focus is primarily on physical products.

Digital innovation is "the carrying out of new combinations of digital and physical components to produce novel products" (Yoo et al. 2010).

Definition

At the core of digital innovation is the emergence of a layered modular architecture, a fundamental framework that has redefined the way one can approach innovation.

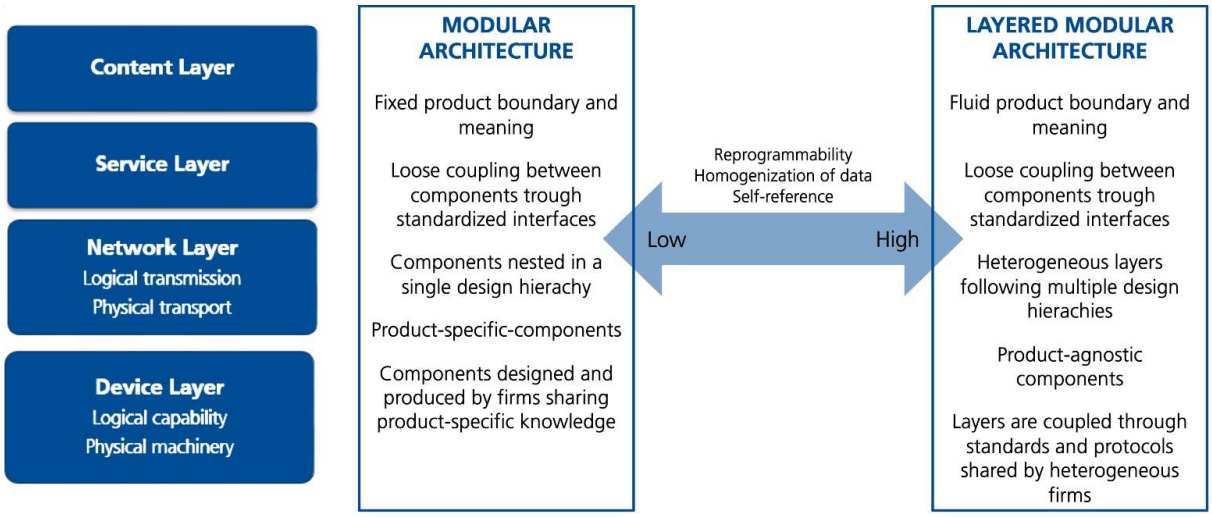


Figure 7: Modular architecture vs. layered modular architecture (Yoo et al. 2010)

Figure 7 compares the modular architecture with the layered modular architecture. Digital innovation is about the art of combining digital and physical elements to introduce new and transformative products or services. These innovations give rise to a unique product architecture characterized by its layered and modular nature, setting it apart from the traditional innovation landscape.

The layers of digital innovation

- **Content layer**: At the top of the architecture, the content layer is concerned with the data itself – be it images, text, or other media. It is the content that enriches the services and applications provided by digital innovations.

- **Service layer**: The service layer encompasses the functionality of applications directly serving end users. This is where the real-world value of digital innovations becomes apparent.
- **Network layer**: This layer deals with the physical transport of data and the logical transmission methods. It includes the physical infrastructure such as cables and transmitters, as well as the network standards that enable data exchange across digital systems.
- **Device layer**: This is the foundational layer, consisting of the physical machinery, such as computer hardware, that forms the basis of digital systems. It is the tangible infrastructure on which digital innovations are built.
- **Logical capability layer**: Sitting atop the device layer, this layer encompasses the operating system and software components that provide the logical framework for digital innovation. It is the software that brings hardware to life.

Layered modular architecture: The layered modular architecture of digital innovation is a defining characteristic that sets it apart from traditional innovation. In this framework, components can be rearranged in numerous ways, and elements of products or services can be reused and recombined with flexibility. Digital innovation components are inherently product-agnostic, and there exists a loose coupling between them. Standardized interfaces facilitate communication between these components, and the boundaries of the final product are fluid, allowing for adaptability and customization.

Standards and protocols: The layers of digital innovation are interconnected through established standards and protocols, enabling different companies and stakeholders to share and reuse these components. This interoperability is a driving force behind the rapid pace of innovation in the digital sphere.

Unique characteristics of digital technologies: Digital innovation is profoundly influenced by the distinctive traits of digital technologies. These include (1) programmability, enabling the alteration of functionality through software; (2) a self-referential nature, where digital systems can reflect on their processes; and (3) the homogenization of data, ensuring uniformity in data handling.

Understanding the layered modular architecture of digital innovation is pivotal for businesses and researchers alike. It allows us to appreciate the dynamic nature of digital entrepreneurship and how digital technologies are reshaping the landscape of innovation. In the sections that follow, we will delve deeper into the implications of this architecture, explore real-world applications, and dissect the factors driving digital innovation in contemporary society.

1.2.2 The digital revolution: Transforming products and services

The transition from analog to digital has revolutionized the way we access products and services, making them more convenient and accessible than ever. This section delves into the shifts brought about by the move toward digital offerings, using the evolution of home entertainment as an example.

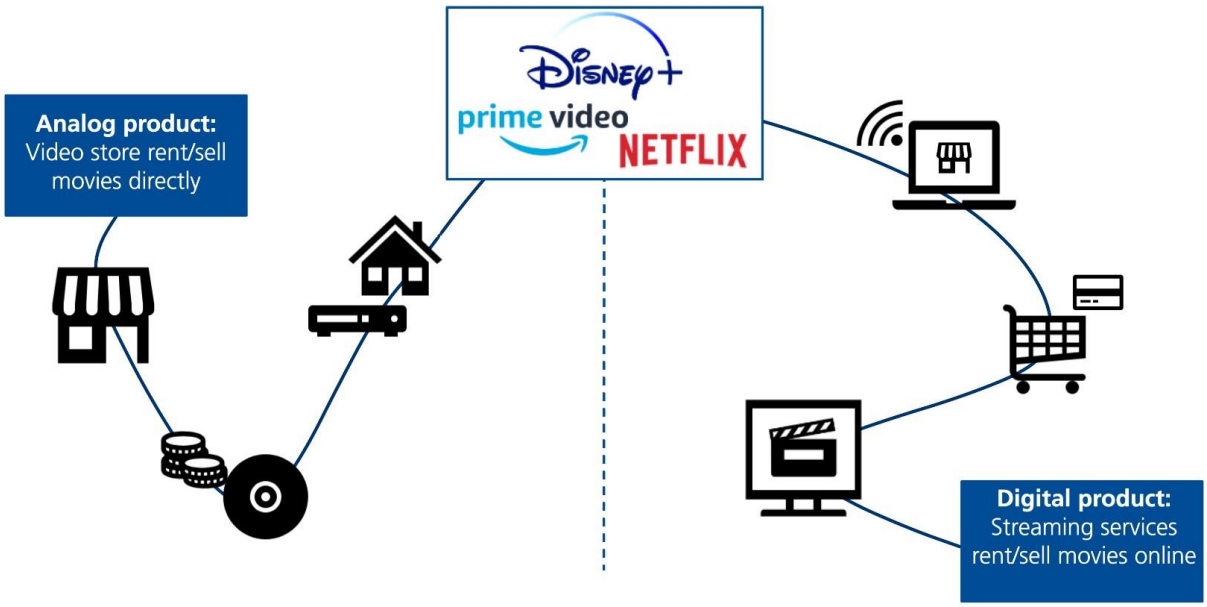


Figure 8: The transition from analog to digital products

Digital products

Figure 8 illustrates the evolution from analog to digital products in the context of home entertainment. During the analog era, obtaining a physical medium rental required visiting a video rental store. These establishments offered a wide range of tangible media options for lease, including DVDs, Blu-rays, and classic VHS tapes. The rental process was straightforward: You selected your preferred movie, paid a fee for borrowing rights, and took the physical disc or tape home. The item had to be returned within a specific period. The traditional film rental model was a long-standing practice that became deeply entrenched in our daily lives.

Nevertheless, the rise of digital transformation has shifted this paradigm. Digital products and services have emerged as a new form of entertainment, greatly changing the industry's landscape (Yu et al. 2022). Advancements in technology have revolutionized the entertainment industry, with companies and brands such as Disney, Amazon Prime Video, and Netflix transforming the traditional movie rental business model. In today's era of digitalization, physical stores, tangible media, and late fees have become antiquated. Digital products and services offer unique benefits, such as on-demand access, and have made physical presence unnecessary.

1.2.3 Digital business models

The business model literature is relatively young, having emerged in the past twenty years and expanded rapidly in the last decade (Foss and Saebi 2017). The concept of digital business models is in its early stages but is growing fast. The theoretical foundation of business models has been weak, often overlapping with the strategy concept. Typically, business models are defined as the firm's value creation, delivery, and capture logic. Casadesus-Masanell and Ricart (2010) describe a business model as "a reflection of the firm's realized strategy," emphasizing its role in achieving strategic vision through value-related means. A formal definition of the term business model will be provided in Unit 2 (see section 2.2.1).

A digital business model is a structured strategic plan employed by businesses or organizations, informed by extensive research and market analysis, to leverage digital technology and online resources for the creation, delivery, and monetization of value in the digital economy (Wirtz 2018). Business models are designed based on insights gathered from thorough market research, consumer behavior analysis, and industry trends. They dictate how a company generates revenue, interacts with its target audience, and manages its resources in an era defined by digital transformation. Digital business models are characterized by their reliance on digital tools, platforms, and networks, which may include the development of digital products, services, or experiences. They are informed by comprehensive research into customer needs, preferences, and pain points, enabling businesses to tailor their offerings to the evolving demands of the market.

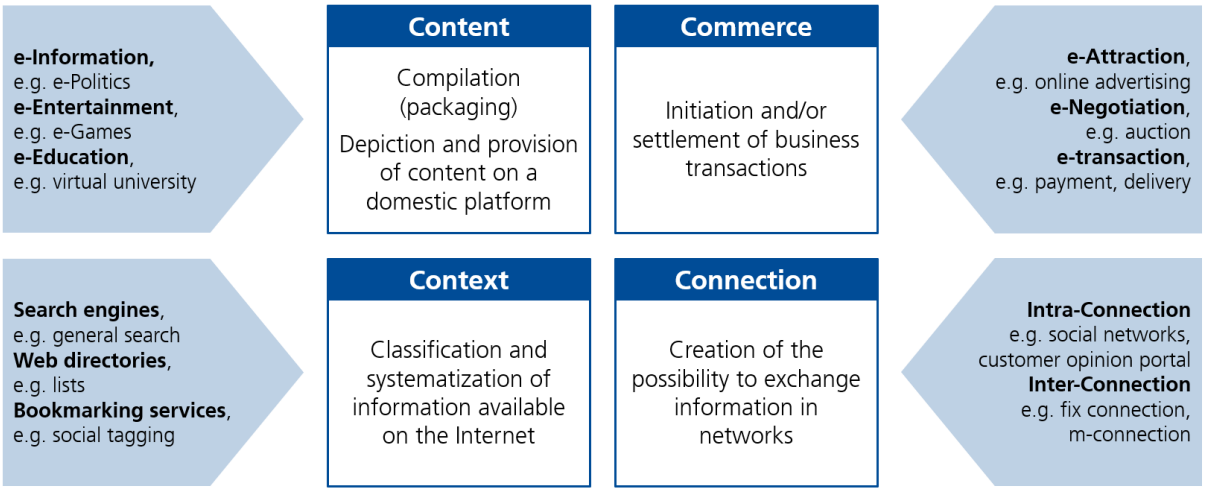


Figure 9: Digital business models (Wirtz 2018)

In today's business environment, the digital revolution has revolutionized not only the products and services on offer but has also led to a new age of business models. In the digital era, the fundamental way of earning has transformed, creating innovative digital business models. Figure 9 distinguishes four characteristic types of digital business models.

The **content business model** is one of the leading digital business models. This model prioritizes the creation and delivery of valuable content through digital platforms. The content can be in various forms, including articles, videos, podcasts, and more. One example are the streaming providers as illustrated earlier in Figure 8. Another example of this model is a virtual university, where the primary focus is on developing teaching materials and delivering them to students via the internet. Specialized knowledge and educational resources are offered by these enterprises, which they make profitable through subscriptions, one-time purchases, or advertising revenue. The digitization of information has facilitated the creation of novel revenue streams and educational opportunities through the content business model, which has a broad global reach.

The **commerce business model** is a prominent participant in the digital sphere. Its function is to facilitate and initiate commercial transactions in the online space. The model creates digital marketplaces, channels, or platforms that connect buyers and sellers, allowing them to engage in various forms of e-commerce. This includes online payment systems, e-commerce websites,

and auction platforms. The commerce business model has transformed the retail industry, revolutionizing how businesses sell and consumers purchase products and services due to the surging growth of online shopping. Amazon, eBay, and Shopify are prime illustrations of how firms capitalize on the digital terrain to establish flourishing marketplaces.

The **context business model** centers on organizing, systematizing, and categorizing internet information. Prominent digital entities in this realm comprise search engines and web directories. Leveraging algorithms and data analytics, these platforms arrange and display information in a user-centric manner. Consequently, these enterprises enrich the user experience by extracting insights from the copious digital data. Search engines such as Google provide targeted search results, while web directories categorize websites, facilitating efficient searching for users. Revenue is typically generated through advertising, as contextual ads are presented alongside search results or directory listings.

The **connection business model** facilitates the exchange of information within digital networks. Social networks, instant messaging platforms, and various communication tools exemplify this model. These platforms facilitate connections among individuals, permitting them to exchange information, communicate, and collaborate – frequently in real-time. Platforms such as Facebook, Twitter/𝕏, and LinkedIn have harnessed the influence of the connection business model to generate substantial and engaged communities. Their monetization strategies comprise advertising, premium functionalities, and data analytics that provide valuable insights to firms aiming to target audiences.

In conclusion, digital business models differ from traditional models in their approach to value creation. Instead of relying on physical inputs, processes, and outputs, digital business models harness the power of digital technology to create value in innovative and often transformative ways. These four distinct types of digital business models which are content, commerce, context, and connection, exemplify the broad spectrum of opportunities and possibilities that the digital age has brought with it. Businesses that adapt and leverage these models effectively are poised to thrive in the ever-evolving digital landscape.

1.2.4 Digital transformation of value chains

To gain a deeper understanding of digital value creation, it is useful to compare the traditional value chain model proposed by Porter and Jaeger (1986) with the digital value chain specific to the content business model. These comparisons will elucidate how the transformation into the digital landscape has redefined the methods through which value is created.

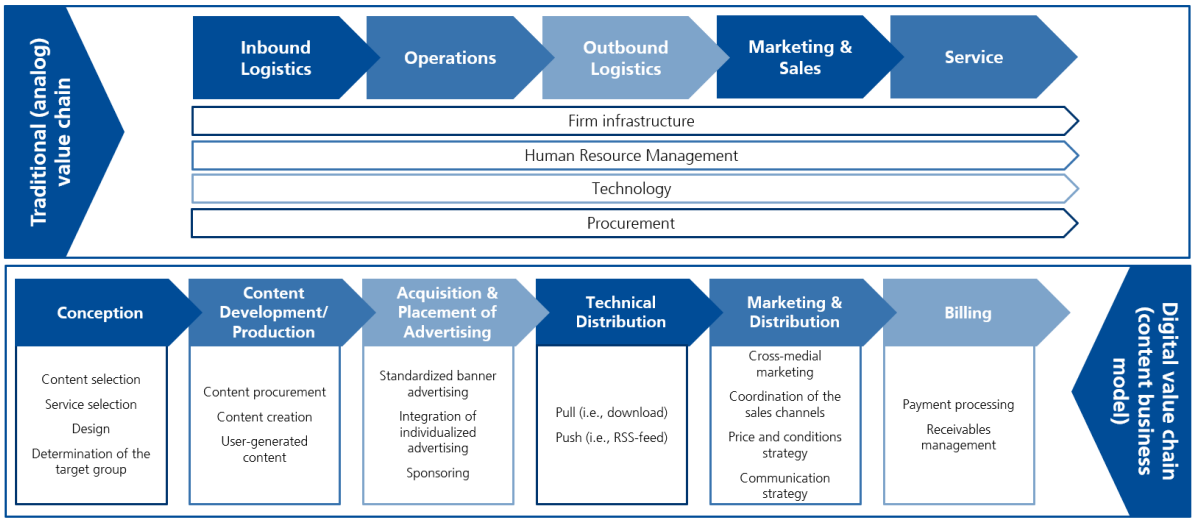


Figure 10: Traditional (analog) value chain vs. digital value chain

Traditional value chain

The **traditional value chain**, as conceptualized by Porter and Jaeger (1986), illustrated in Figure 10, consists of five primary activities and four support activities that work in concert to create value for a company. Using the example of a furniture manufacturer, we can illustrate how these activities interlink to form a cohesive value creation process.

The **primary activities** begin with inbound logistics, where the furniture company receives and stores raw materials such as wood. Operations follow, transforming these materials into finished products, such as tables, through various manufacturing processes. Outbound logistics then takes over, managing the storage and distribution of the finished furniture to retailers or end customers. Marketing and sales activities promote the furniture through various channels, perhaps utilizing television commercials or online marketing to build brand awareness and drive sales. The final primary activity, service, involves after-sales support, addressing customer concerns, and maintaining product quality to ensure customer satisfaction.

These primary activities are underpinned by four crucial **support activities**: Firm infrastructure provides the backbone for the entire operation, including management and planning functions. Human resource management ensures the company has the right talent in place across all departments. Technology supports the entire value chain, from design software in operations to customer relationship management systems in sales. Finally, procurement activities secure the necessary inputs for the business, from raw materials to office supplies.

This integrated approach to the value chain allows the furniture manufacturer to coordinate efforts across all activities – from sourcing wood to customer service – thereby maximizing operational efficiency and customer satisfaction. By optimizing each link in the chain and ensuring smooth integration between primary and support activities, the company can create a competitive advantage and deliver superior value to its customers.

Digital value chain (content business model)

A **digital value chain** for a content business model, in contrast, encompasses a set of interconnected activities, as depicted in Figure 10. The process begins with the conception phase, where content and service selection occur alongside design and target group determination. For an educational video creator, this might involve choosing topics, deciding on format, and identifying the intended audience.

Following the conception phase, the content development and production phase takes place. This activity includes content procurement, creation, and potentially incorporating user-generated content. In our educational video example, this could involve researching topics, writing scripts, and perhaps integrating viewer submissions or feedback.

The next activity focuses on the acquisition and placement of advertising. Here, the business considers standardized banner advertising, integration of individualized advertising, and potential sponsorships. An educational video creator might partner with relevant educational tool companies or textbook publishers to place ads within or alongside their content.

Technical distribution follows, utilizing both pull and push methods. Pull distribution might involve making videos available for download on a learning platform, while push distribution could include sending new content alerts via RSS feeds or email notifications to subscribers.

The marketing and distribution activity is crucial for reaching and engaging the audience. This encompasses cross-medial marketing strategies, coordinating various sales channels, developing pricing and conditions strategies, and planning communication efforts. The video creator might promote their content across multiple social media platforms, set pricing for premium offerings, and actively engage with their audience to build community and loyalty. (Distribution and pricing will be treated in more detail in Unit 2 of this module.)

The final stage in this digital value chain is billing, which involves payment processing and receivables management. For the educational content creator, this could include handling subscriptions, processing one-time purchases for specific content, or managing revenue generated from advertising partnerships.

Important

A comparison between the traditional and digital value chains reveals significant differences in value creation. The traditional model, exemplified by Porter and Jaegers (1986) framework, focuses on physical products with linear processes from inbound logistics to service. In contrast, the digital value chain for content businesses emphasizes intangible assets and nonlinear processes, starting with the conception phase and ending with billing.

Digital business models require a shift in mindset, leveraging digital tools and intangible assets to generate value. The digital chain adapts to technological advancements, changing audience behaviors, and expanding digital opportunities. Key differences to the traditional model/value chain include the emphasis on content creation, digital distribution methods, and innovative monetization strategies.

Understanding these distinctions is crucial for designing effective digital business models. By recognizing how each stage contributes to value creation in the digital context, businesses can ensure their models are not only innovative but also successful in the dynamic digital landscape.

1.3 Why digital entrepreneurship?

Digital technologies have revolutionized entrepreneurship, creating unprecedented opportunities and challenges. This intersection of digital innovation and entrepreneurial spirit has given rise to digital entrepreneurship—a phenomenon that merits careful examination. In this section, we'll explore the concept of digital entrepreneurship, its significance in information systems research, and how digital technologies are reshaping entrepreneurial activities across industries.

1.3.1 Digital entrepreneurship definition

There are a variety of perspectives and definitions regarding digital entrepreneurship. This section presents differing interpretations of digital entrepreneurship and highlights the distinctive features that set it apart from conventional business practices. We will explore how experts and scholars define and understand this ever-changing industry.

> **Digital entrepreneurship** embraces all new ventures and the transformation of existing businesses through novel digital technologies. Digital enterprises are characterized by a high intensity of utilization of novel digital technologies (particularly social media, big data analytics, mobility, cloud and the digitization of manufacturing) to improve business operations, invent new business models and engage with customers and stakeholders (Jafari-Sadeghi et al. 2021).

Digital entrepreneurship is fundamentally characterized by the adoption of novel digital technologies. These technologies encompass a wide spectrum, including cloud computing, big data analytics, social media platforms, the digitalization of manufacturing processes, and artificial intelligence. The objective is to leverage these technologies to enhance business operations, invent innovative business models, and establish connections with new customers and stakeholders. The following points provide a focus on the concept of digital entrepreneurship, each offering a unique perspective on its definition, characteristics, and implications. They collectively describe digital entrepreneurship as a multifaceted concept that fundamentally alters traditional business practices through the adoption of innovative digital technologies.

1. The digitization of traditional business:

> Digital entrepreneurship is a subcategory of entrepreneurship in which some or all of what would be physical in a traditional organization has been digitized (Hull et al. 2007).

Hull et al. (2007) explain that digitizing traditional business involves transforming physical elements of a traditional organization into digital formats, fundamentally altering how businesses operate. This encompasses digital entrepreneurship, where digital technology is central, affecting aspects such as inventory, sales, and customer interactions. Communication within and outside the organization shifts to digital platforms, and financial transactions move to e-commerce and digital payment systems. Core operations, including marketing, customer service, and supply chain management, as well as interactions with the external environment, are conducted through digital means.

2. A new era of business creation:

> Digital entrepreneurship is defined as the reconciliation of traditional entrepreneurship with the new way of creating and doing business in the digital era (Le Dinh et al. 2018).

Le Dinh et al. and Davidson and Vaast emphasize digital entrepreneurship as a new approach to creating and conducting business in the digital age. It entails pursuing innovative opportunities that arise from emerging internet technologies. This perspective underscores the ever-evolving nature of business and the need to adapt to the unique dynamics of the digital era.

3. Radical, risk-taking, and innovative endeavors:

> Entrepreneurship […] is […] defined as occupying niches, monetizing business opportunities, as well as being innovative, radical, and risk-taking (Richter et al. 2017).

Richter et al. view entrepreneurship, including its digital form, as inherently radical, risk-taking, and innovative. This perspective underscores the entrepreneurial spirit that drives individuals to explore uncharted territories and develop groundbreaking solutions. In the digital context, this spirit is harnessed to navigate the complexities of the digital landscape.

5. Generating revenue from digital goods:

> [Digital entrepreneurship is] the creation of ventures to produce and generate revenue from digital goods across electronic networks (Guthrie 2014).

Guthrie's definition of digital entrepreneurship centers on the generation of revenue from digital products and the establishment of digital ventures. This perspective highlights the financial aspect of digital entrepreneurship, underlining the potential for profitability within the digital domain.

6. A comprehensive digital venture:

> Digital entrepreneurship may be defined as entrepreneurship in which some or all of the entrepreneurial venture takes place digitally instead of in more traditional formats. (Hair et al. 2012)

Hair et al. offer a comprehensive view, asserting that all aspects of the entrepreneurial venture take place digitally. This perspective encompasses not only digital products or support by digital means but the entirety of the entrepreneurial process being conducted in the digital realm.

> In conclusion, digital entrepreneurship is a complex concept with various definitions and perspectives. What unifies these definitions is acknowledging that digital entrepreneurship represents a fundamental change in how businesses operate, innovate, and interact with customers in the digital age. It is identified by embracing innovative technologies, digitalizing traditional practices, and pursuing creative opportunities in the digital era. Digital entrepreneurship encompasses innovation, risk-taking, and transformative practices, shaping a new era in the business world.

1.3.2 Digital entrepreneurship in information systems research

Digital entrepreneurship has become a prominent area of interest for information systems (IS) researchers. In the following, we examine the different perspectives used to analyze digital entrepreneurship in IS research, including traditional entrepreneurship and digital innovation, as illustrated in Figure 11. Additionally, we introduce the emerging digital entrepreneurship perspective, which highlights the complex and multifaceted nature of this evolving field.

	Entrepreneurship	Digital innovation	Digital entrepreneurship
Focal phenomenon	Focuses on creating new economic activities	Focuses on creating new and improved products, processes, or services through digital technologies	Focuses on creating new economic activities embodied in or enabled by digital technologies.
Dominant assumptions	Entrepreneurial agents exploit opportunities by assembling resources in new ventures	Digital technologies give rise to new or improved products, processes, services, or business models	Digital technologies blur boundaries of entrepreneurship processes and outcomes. Digital technologies disperse entrepreneurial agency across a broader range of actors
Primary levels of analysis	**Individuals and ventures:** ▪ Entrepreneurial agents ▪ New ventures, typically referring to emerging, independent, and professionally funded firms ▪ Entrepreneurial ecosystems	**Artefacts and organizations:** ▪ Digitized products, processes, services, and business models ▪ Incumbent organizations ▪ Both new and established markets	**Artefacts, ventures, and outcomes:** ▪ Digital technology objects, such as artefacts, platforms, or infrastructure ▪ Entrepreneurial endeavors ▪ Digital environments, such as ecosystems ▪ Societal outcomes
Selected foci in the literature	▪ Entrepreneurial opportunities ▪ Founder characteristics ▪ Modes of organizing ▪ New venture characteristics and performance ▪ Entrepreneurial strategies ▪ Ecosystem characteristics	▪ Development and adoption ▪ Technology architectures ▪ Tech. appropriation and recombination ▪ Organizational structures and change ▪ Business value ▪ Competitive dynamics ▪ Digital platforms	▪ Development and commercialization ▪ Technology characteristics ▪ Techn. appropriation and recombination ▪ Modes of organizing ▪ Distribution and scaling ▪ Digital platforms ▪ Business and social outcomes

Figure 11: Digital entrepreneurship research (von Briel et al. 2021)

Within IS research, digital entrepreneurship is commonly viewed from the **perspective of traditional entrepreneurship**, which highlights the establishment of new economic activities. Scholars in this field predominantly concentrate on individuals and ventures, and key tenets revolve around entrepreneurial agents' functions, such as recognizing opportunities, gathering resources, and creating new ventures. This lens explores the traits of entrepreneurs and startups, illuminating the dynamics of entrepreneurship within the digital domain.

The **perspective of digital innovation research**, which is well established in IS, focuses on the creation of innovative products, services, or processes through digital technologies. The main emphasis is on artifacts and organizations. The perspective assumes that digital technologies are leading to enhancements in products and services. Scholars examine the development and adoption of digital innovations and study their impact on organizations and industries. This perspective extends beyond the creation of new ventures to the evolution of existing entities through digital innovation.

Digital entrepreneurship research in IS combines traditional entrepreneurship and digital innovation perspectives to explore the creation of new economic activities facilitated by digital technologies. The predominant belief is that these technologies blur the boundaries of entrepreneurship processes and outcomes. Consequently, researchers analyze artifacts, ventures, and outcomes across multiple levels of analysis to gain a comprehensive understanding. The focus can encompass various aspects, such as technology characteristics, organizing methods, and their impact on digital entrepreneurship.

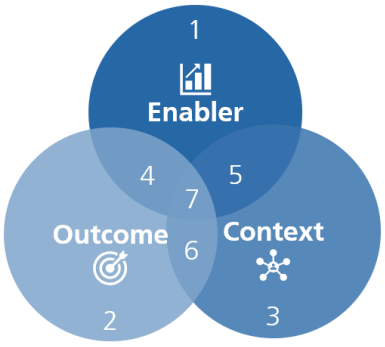
Within the scholarly literature, each of these research streams narrows its focus. Traditional research on entrepreneurship examines the characteristics of founders, new ventures, and the entrepreneurial process. Digital innovation research studies the development and adoption of digital innovation, digital platforms, and their impact on organizations. Digital entrepreneurship research investigates the technical aspects of technology and the methods of organizing within the digital realm and analyzes the outcomes of digital entrepreneurial initiatives.

Important

In conclusion, information systems research offers different perspectives for studying digital entrepreneurship. These perspectives include creating new economic activities, promoting innovation using digital technologies, and the emerging concept of digital entrepreneurship. By examining different perspectives and areas of focus, scholars in the field of information systems increase our understanding of the opportunities, challenges, and trends that exist within the realm of digital entrepreneurship.

1.3.3 Role of digital technologies for entrepreneurship

In the realm of digital entrepreneurship, the interplay between digital technologies and entrepreneurial activities is both intricate and multifaceted. In this section, we will explore the pivotal role of digital technologies within the context of entrepreneurship. Researchers have identified at least three primary ways in which digital technologies intersect with digital entrepreneurship, each offering unique insights into this dynamic relationship (von Briel et al. 2021). Figure 12 gives an overview of the role of digital technologies in different categories.



1…**enablers** of entrepreneurial endeavors
2…**outcomes** of entrepreneurial endeavors
3…**contexts** in which entrepreneurial endeavors take place
4…**enablers and outcomes** of entrepreneurial endeavors
5…**enablers and contexts** of entrepreneurial endeavors
6…**outcomes and contexts** of entrepreneurial endeavors
7…**enablers, outcomes, and contexts** of entrepreneurial endeavors

Figure 12: Digital entrepreneurship research – role of digital technologies (von Briel et al. 2021)

1. **Digital technologies as enablers**: Digital technologies play a crucial role as enablers in digital entrepreneurship. These technologies empower entrepreneurial endeavors by providing tools, platforms, and solutions that facilitate the creation, management, and scaling of new businesses. Entrepreneurs leverage a variety of digital technologies—such as artificial intelligence, digital platforms, and e-commerce solutions—to drive sales, streamline operations, and enhance customer experiences. By harnessing these capabilities, entrepreneurs can effectively bring their innovative ideas to fruition, thereby transforming their business visions into reality.

2. **Digital technologies as digital outcomes**: In some cases, digital technology itself represents the realized value proposition of entrepreneurial activities. Virtual products in video games serve as a prime example. Here, digital technology is not merely a means to an end but is the end itself—a product or service that holds intrinsic digital value. Entrepreneurs in this space

focus on creating digital artifacts that cater to the demands and preferences of a digitally savvy audience.

3. **Digital technologies as digital contexts**: Digital technologies can also be viewed as the contextual backdrop within which entrepreneurial endeavors unfold. These technologies form an integral part of the external environment in which businesses operate. For entrepreneurs, understanding and adapting to the digital context is vital. This may include navigating the intricacies of digital marketing, data analytics, or the evolving digital landscape. Digital technologies set the stage for entrepreneurial activities, influencing market dynamics, consumer behavior, and competitive forces.

4–7. Combined roles of digital technologies: The relationship between digital technologies and digital entrepreneurship is not confined to a single role. Instead, these roles can intermingle and overlap. Digital technology can simultaneously serve as an enabler, an outcome, and a context (4–7). For instance, a digital platform that enables online transactions (1) can also represent the realized value proposition itself (2) and operate within the larger context of the digital marketplace (3). This versatility highlights the dynamic and interconnected nature of digital entrepreneurship in the digital age.

Important

In summary, the role of digital technologies in digital entrepreneurship is multifaceted and cannot be attributed to a single dimension. These technologies enable outcomes and form the digital context within which entrepreneurial activities thrive. Entrepreneurs navigate these multifarious roles as they harness the power of digital technologies to innovate, create value, and drive success in the ever-evolving digital entrepreneurial landscape.

1.4 Key takeaways

This introduction established the fundamental concepts of digital entrepreneurship and laid the groundwork for the subsequent units. We explored three critical questions: the importance of entrepreneurship, the significance of digital technology in this context, and the rationale for a specific focus on digital entrepreneurship in research and practice.

Entrepreneurship is crucial for innovation and societal progress in countries like Germany, which boasts strengths such as a dynamic startup ecosystem but faces challenges in maintaining its position in global innovation rankings. In an increasingly volatile, uncertain, complex, and ambiguous (VUCA) world, entrepreneurial thinking is essential for seizing innovation opportunities. Contrary to common stereotypes, entrepreneurs from diverse age groups and backgrounds are driven by motivations to be independent, realize their business ideas, and make a meaningful impact.

Digital innovations integrate physical elements with **digital technologies** and they can be described using a layered model, ranging from content layers to device layers. The unique characteristics of digital technologies include programmability, self-referential nature, and data homogenization. Digital business models, such as the content, commerce, context, and connection models, have disrupted traditional value chains, such those in entertainment, and continue to reshape industries.

Various definitions of **digital entrepreneurship** acknowledge a fundamental shift in how businesses operate, innovate, and interact with customers in the digital age. Digital entrepreneurship has emerged as a growing field of research in Information Systems, building on and combining streams from digital innovation and traditional entrepreneurship research. Digital technologies can be conceptualized as an enabler, an outcome, and a context for entrepreneurship.

The convergence of entrepreneurship and digital technologies creates new opportunities and challenges, requiring a distinct approach to business creation and growth. As we progress through this module, we will explore how digital entrepreneurs leverage these technologies to create innovative solutions, disrupt existing markets, and address complex societal issues in our increasingly connected world.

With this in mind, we hope you feel prepared for the remaining units and wish you every success as you work through the stages of digital entrepreneurship: Envisioning the business, understanding the market, and building the company (Units 2–4).

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