

Review Article

Developing and Adapting Business Models in Technology-Based Startups

<u>Vidya Shankar</u>

Student, Indian Institute of Technology, Kharagpur, West Bengal, India

INFO

E-mail Id: vidyashankar@gmail.com

Orcid Id:

https://orcid.org/0009-0001-4839-1966

How to cite this article:

Shankar V. Developing and Adapting Business Models in Technology-Based Startups. *J Adv Res Technol Entrep Start-Up Incub Ecosyst* 2025; 1(1): 1-8

Date of Submission: 2025-01-25 Date of Acceptance: 2025-03-01

A B S T R A C T

The business model is a fundamental framework that defines how a technology-based startup creates, delivers, and captures value in a competitive marketplace. In the rapidly evolving tech industry, where disruption is constant, developing and adapting an effective business model is crucial to ensuring the long-term sustainability, scalability, and market leadership of a startup. This review article provides an in-depth examination of the core principles, strategies, and frameworks for developing and adapting business models within technology startups. The paper highlights the essential role of market understanding, innovation, and flexibility in the crafting of business models that are resilient to external changes and adaptable to emerging trends. It discusses how technology ventures can respond to challenges such as technological disruptions, fluctuating consumer preferences, regulatory shifts, and intense competition. Furthermore, this review offers actionable insights into how startups can implement successful strategies for business model innovation, adaptation, and evolution to stay relevant in dynamic markets.

The review also explores popular business model frameworks, including the Business Model Canvas, Lean Startup methodology, and value proposition design, providing practical advice on their application in real-world scenarios. In conclusion, understanding and continuously adapting business models are critical for the success of technology-based startups, as it directly influences their ability to capture new market opportunities, sustain growth, and maintain a competitive advantage over time.

Keywords: Business Model Innovation, Technology Startups, Business Model Adaptation, Scalability, Value Proposition

Introduction

The technology industry is characterized by rapid innovation, shifting market demands, and a high level of uncertainty, making it a highly dynamic sector for entrepreneurs. For technology-based startups, developing and adapting a robust business model is not just important but essential for long-term success. A business model

outlines how a company creates, delivers, and captures value, guiding everything from customer acquisition to revenue generation. It describes how a startup transforms its innovative product or service into a sustainable business, whether through direct sales, subscriptions, licensing, or other models. However, as technology continues to evolve and market dynamics shift, the business model

must remain flexible and adaptable to ensure ongoing competitiveness and growth. This review explores the process of business model development and adaptation in technology-based startups. It provides a detailed overview of the key components of a business model, examines the challenges technology startups face in adapting to a rapidly changing environment, and presents strategies for ensuring business model longevity and growth.¹

The Importance of Business Models in Technology Startups

• The business model is a crucial framework that not only defines how a technology-based startup operates but also how it can generate sustainable revenue and grow in the competitive tech landscape. While product innovation and technological advancements are important for creating value, the business model provides the pathway to monetization, growth, and long-term survival. The importance of an effective business model can be understood in the following ways:

Value Proposition

- The value proposition is the foundation of any business model, particularly in technology startups. It describes how the startup's product or service meets customer needs in a way that is different from or better than existing solutions. In technology ventures, this could mean offering a product that significantly improves efficiency, reduces costs, addresses unmet consumer needs, or provides a novel experience. A clear and compelling value proposition is key to attracting and retaining customers in a crowded and competitive market.²
- Startups must carefully identify and understand customer pain points, market gaps, and emerging trends to shape a value proposition that resonates with their target audience. The ability to articulate how their technology solves a specific problem in a unique or superior way is a critical driver of success.

Revenue Streams

- For technology startups, determining how to generate consistent and sustainable revenue is one of the most challenging yet important aspects of business model development. Different technology sectors may rely on various types of revenue models, including:
- Subscription-based models: Common in Software as a Service (SaaS) businesses, this model provides a predictable, recurring revenue stream by offering products or services on a subscription basis.³
- Licensing: Startups can generate revenue by licensing their technology to other businesses, providing them with the right to use, sell, or distribute the technology.

- Transaction-based pricing: In some tech ventures, revenue is generated per transaction or use of the product. This model is often seen in e-commerce platforms, digital marketplaces, or fintech solutions.
- Freemium model: Offering basic features for free while charging for premium features or services is a model often used in mobile apps, software, or platforms to attract a large user base and then convert a segment into paying customers.
- Choosing the right revenue stream(s) requires understanding the market's willingness to pay, customer lifetime value, and the scalability of the revenue model. A robust revenue stream ensures that the startup can achieve financial sustainability, enabling it to reinvest in technology, talent, and growth.
- Scalability
- Scalability is a critical component of any successful business model, especially in the fast-paced technology sector. A scalable business model allows a startup to expand its customer base and increase revenue without a corresponding increase in operational costs. The potential for rapid growth without sacrificing profitability is a hallmark of many successful tech companies.
- Startups should design business models that can grow in both scope and reach, leveraging technology, automation, and efficient processes to scale. For example, SaaS companies benefit from scalability because their product can be delivered to thousands or millions of users with minimal incremental costs. Similarly, cloud-based solutions often provide scalability by enabling businesses to expand services to a larger audience without having to expand physical infrastructure.
- Scalability allows startups to remain agile and competitive in the face of changing market conditions, while also positioning them for future funding rounds, acquisitions, or partnerships.⁴

Customer Segments

- Understanding the target customer segments is vital for developing a successful business model. For technology startups, this means identifying the specific group(s) of consumers or businesses that will benefit most from the product or service. The value proposition, pricing strategy, and distribution channels all depend on a clear understanding of these customer segments.
- For instance, a B2B (business-to-business) tech startup may need to develop a business model that addresses the needs of large enterprises with complex requirements, while a B2C (business-to-consumer) tech startup might focus on mass adoption and user engagement. Moreover, in some cases, a startup may adopt a multi-sided platform model, where the

business serves both consumers and third-party service providers, such as in the case of online marketplaces.

Channels

- The channels through which a startup delivers its product or service are just as important as the product itself. In technology-based ventures, these channels can range from digital platforms (such as app stores, web platforms, or cloud-based services) to traditional sales forces, partnerships, or resellers.
- Effective channel strategies allow startups to optimize their distribution processes and ensure that they reach the right audience. For instance, tech startups can use online advertising, social media, and search engine optimization (SEO) to attract users, while also leveraging partnerships with other businesses for distribution or co-marketing.⁵

Key Resources and Activities

- A startup's business model also depends heavily on the resources and activities required to deliver its value proposition. Key resources may include technology infrastructure (e.g., servers, cloud storage, development platforms), intellectual property (e.g., patents, software code), and human resources (e.g., skilled developers, marketing teams, customer support).
- Key activities include product development, user acquisition, customer support, marketing, and sales. These activities must be aligned with the startup's long-term goals and the overall business model to ensure smooth operations and the achievement of business objectives.

In summary, the business model is an essential aspect of technology startups that serves as the blueprint for creating, delivering, and capturing value in an increasingly competitive and dynamic market. For startups to thrive, they must craft business models that emphasize a compelling value proposition, sustainable revenue streams, scalability, and customer satisfaction. Given the ever-evolving nature of technology, these models must be adaptable to meet changing market conditions, technological advancements, and customer needs. Successful adaptation to these challenges can result in long-term sustainability and growth, helping technology-based startups stand out in a crowded marketplace.

 Through careful business model design, continuous innovation, and flexibility, technology startups can navigate the uncertainties of the tech industry and position themselves for success.⁶

Key Components of a Business Model in Technology Ventures

 The business model for a technology-based startup is a strategic framework that outlines how the company will create, deliver, and capture value in the market. The business model is composed of several key components that help define the path from the initial concept to market success. Understanding and integrating these components is crucial for any tech startup to thrive in a competitive and fast-paced environment. Below is a detailed breakdown of the core components that form the backbone of a business model for technology ventures.

Value Proposition

The value proposition is arguably the most critical element of any business model, particularly for technology-based startups. It articulates the unique value that the startup provides to its target customers and addresses a specific pain point or need in the market. For technology startups, the value proposition can be shaped by several key factors:

- Innovation: Offering unique or groundbreaking technologies that disrupt existing markets or create entirely new ones. This could involve developing software, hardware, or digital services that solve problems more effectively than existing solutions.⁷
- Cost Efficiency: Positioning the product or service as a cost-effective alternative to current solutions. This could mean delivering a more affordable product with better features or improving operational efficiency through automation or optimization.
- Customer Experience: The overall user experience can significantly impact the success of a technology product. Providing a seamless, intuitive, and userfriendly interface or customer journey can increase satisfaction, drive adoption, and build customer loyalty. Creating an experience that not only meets customer needs but exceeds expectations is a vital aspect of the value proposition.
- Quality & Reliability: In the tech industry, the
 performance and reliability of products are often
 paramount. A value proposition that emphasizes the
 quality, durability, and reliability of a product can help
 a startup stand out from competitors in a crowded
 market.
- The value proposition is foundational to the business model as it answers the question, "Why should customers choose this product or service over other alternatives?"

Customer Segments

Identifying the customer segments that the startup aims to serve is essential for designing a relevant business model. Not all customers have the same needs or behaviors, and a one-size-fits-all approach will rarely succeed in the technology space. Startups need to clearly define and prioritize their target customer

- groups. Key considerations in identifying customer segments include:
- Demographics and Psychographics: Understanding who the customers are (e.g., age, gender, income level) as well as what drives their behavior and decision-making (e.g., values, motivations, and lifestyle).⁸
- Market Segmentation: In technology ventures, customer segmentation often goes beyond basic demographics to include segmentation based on business size (e.g., small, medium, or large enterprises), industry (e.g., healthcare, finance, education), or specific technological needs (e.g., software developers, cloud computing users).
- Tailored Solutions: Different customer segments often require different product features or customization. For instance, a software startup targeting enterprise clients may need to offer complex, customizable solutions, whereas a consumer-focused app might prioritize ease of use and affordability.
- Understanding the customer segments enables startups to tailor their marketing, sales, and support strategies to meet the distinct needs of each group, increasing the likelihood of product adoption and long-term customer retention.

Channels

Channels refer to the various pathways through which a startup delivers its product or service to customers. Selecting the right channels is essential for ensuring that the startup can effectively reach and engage its target audience. Common channels for tech startups include:

- Direct Sales: Selling products directly to customers, either through an in-house sales team, online store, or physical retail location. This is often a preferred channel for B2B (business-to-business) startups that need to build relationships with enterprise clients.
- Digital Platforms: Many tech startups rely on digital platforms, such as app stores (for mobile apps), cloud platforms (for SaaS), or e-commerce websites, to distribute and sell their products. These platforms are particularly useful for scaling and reaching global audiences.⁹
- Partnerships and Affiliations: Collaborations with other businesses, distributors, or retailers can help startups expand their reach. Strategic partnerships may include bundling products with complementary services, co-marketing efforts, or leveraging established distribution networks.
- Social Media & Online Marketing: For many tech startups, leveraging online channels such as social media, content marketing, and search engine optimization (SEO) is key to building awareness, attracting users, and generating sales.

Choosing the right channels involves understanding customer preferences and behavior. For instance, some customers may prefer purchasing directly from a website, while others may value the convenience of app stores or digital marketplaces.

Revenue Streams

Revenue streams describe how a technology startup generates income from its products or services. Identifying and optimizing these streams is crucial for ensuring financial sustainability and growth. Common revenue models in the tech industry include:

- Subscription-based Models: This model, often seen in SaaS (Software as a Service) businesses, generates recurring revenue by offering products or services on a subscription basis. Customers pay a monthly or annual fee for access to software, cloud services, or digital content.
- Freemium Models: In this model, startups provide a free version of their product with limited features or usage, while offering a premium version with advanced features or added benefits. This is common in mobile apps, software tools, and digital services.
- Advertising: Many tech startups generate revenue through advertising, either by displaying ads on their platform (e.g., Google or social media platforms) or by using customer data to serve targeted ads. This model is prevalent in social media apps and online platforms.
- Licensing: This model involves licensing technology or intellectual property (IP) to other companies, allowing them to use or resell the product in exchange for a licensing fee.
- Transaction Fees: Some tech startups monetize by charging transaction fees for each user interaction or completed transaction. Examples include digital marketplaces, e-commerce platforms, and fintech solutions.¹⁰

3.5 Key Resources, Activities, and Partnerships

Technology ventures require significant resources and strategic partnerships to develop, deliver, and scale their products. These include:

- Key Resources: Resources critical to the startup's success can include intellectual property (e.g., patents, software code), technology infrastructure (e.g., servers, cloud services), and human resources (e.g., developers, designers, marketers). Startups often rely on their IP as a competitive advantage and key differentiator in the market.
- Key Activities: These activities are the actions that the startup must undertake to deliver its value proposition, reach customers, and operate successfully. This includes product development, software engineering,

- market research, customer acquisition, and providing customer support.
- Key Partnerships: Strategic partnerships are often necessary for scaling a technology venture. These could include partnerships with technology providers (e.g., cloud service providers), distribution partners (e.g., resellers, affiliates), or investors who provide the capital needed to fund operations and expansion.

Forming the right partnerships is crucial for accessing additional resources, expertise, and markets that can propel the startup forward. These collaborations can help startups overcome resource limitations and focus on core competencies.

The key components of a business model in technology-based ventures encompass all aspects of how a company creates, delivers, and captures value. Startups must focus on crafting a compelling value proposition, choosing the right customer segments, selecting effective channels for distribution, developing sustainable revenue streams, and leveraging key resources and partnerships to scale their business. By addressing these elements strategically, technology startups can build a solid foundation for success in a rapidly evolving and competitive market

Adapting Business Models in Response to Change

In the ever-evolving landscape of technology startups, the ability to adapt business models is essential for sustaining growth and maintaining competitive advantage. Technology markets are dynamic, and external factors such as technological advancements, shifting consumer behavior, competitive pressures, and regulatory changes can prompt the need for adjustments. Successful startups must continuously assess their business models to remain relevant, meet customer needs, and stay ahead of competitors. Below is a deeper look into the factors that drive the need for adaptation in business models within tech startups.

Technological Disruption

The technology sector is inherently disruptive. New and emerging technologies often change the competitive dynamics of industries, making existing business models obsolete. For a startup to thrive in this environment, it must embrace innovation, continuously assess technological trends, and be willing to pivot or adapt its business model when necessary. Key strategies for adapting to technological disruption include:

 Embracing New Technologies: Startups should be proactive in adopting or integrating new technologies that offer a competitive advantage. For instance, a traditional software startup might incorporate artificial

- intelligence (AI) or machine learning into its offerings to provide enhanced functionality or automation.
- Pivoting to New Markets: If a particular product or service faces obsolescence due to a new technology, a startup can pivot by identifying new use cases for its technology or adjusting its product offerings to meet emerging needs. This flexibility can help preserve the startup's core value while adapting to changing market conditions.
- Diversification: In response to technological disruption, startups may expand their portfolio to include complementary products or services. For example, a startup that initially focused on hardware may add software solutions or cloud-based services to create a more diversified revenue model.

In the face of disruption, startups that remain agile and open to change are more likely to survive and thrive.

Changing Market Demands

Market demands can shift dramatically, particularly in technology industries where consumer preferences and behavior are influenced by rapid innovation and global trends. Startups must be capable of responding quickly to these changes to stay relevant. Several factors that can drive the need for business model adaptation include:

- Technological Adoption: The speed at which new technologies are adopted by consumers can directly affect the market demand for products and services.
 For instance, the rise of mobile apps and cloud computing has shifted demand in sectors like gaming, healthcare, and education. A technology startup might need to adapt its business model to cater to new user preferences for mobile-first solutions or scalable cloud infrastructure.
- Social and Cultural Shifts: Trends such as sustainability, remote work, and digital transformation often influence consumer behavior. Startups must adapt their offerings to meet these evolving demands. For example, the COVID-19 pandemic accelerated the adoption of remote work, leading many companies to shift their business models from in-person services to digital platforms or subscription-based remote collaboration tools.
- Consumer Expectations: As customer expectations rise, especially with regard to ease of use, personalization, and value for money, startups must adapt by offering more intuitive interfaces, customized experiences, or competitive pricing models. For instance, consumers increasingly demand seamless integrations across different devices and platforms, which may require startups to modify their business models to offer a more integrated, cross-platform solution.

By staying attuned to shifting market demands, startups can make informed decisions about when and how to adjust their business models to meet changing expectations.

Competitive Pressure

The competitive landscape in technology is fast-paced, and new startups frequently emerge with innovative solutions that disrupt established players. Startups must be able to quickly respond to this competitive pressure to maintain their market position. Adapting the business model to stay ahead of competition can involve the following approaches:

- Differentiation: Startups may need to refine or expand their offerings to distinguish themselves from competitors. This could involve developing unique features, improving the user experience, or offering specialized services that competitors do not provide.
- Cost Leadership: In highly competitive markets, startups may need to focus on cost efficiency and competitive pricing. Reducing production or operational costs, streamlining processes, or leveraging economies of scale can help the startup stay competitive by offering lower prices without compromising on quality.
- Strategic Partnerships: As competition intensifies, startups may look for opportunities to partner with other companies to create joint ventures or strategic alliances. This collaboration can help access new markets, share resources, or co-develop new products, ultimately enhancing the startup's competitiveness.
- Product or Service Enhancement: In response to competitors introducing better features or offerings, startups may need to continuously improve their products or services to meet or exceed industry standards. This may involve adding new functionality, refining the user interface, or enhancing security features, particularly for tech-based products.

Adapting to competitive pressure ensures that startups remain relevant in the market, maintain customer loyalty, and continue to grow.

Regulatory Changes

The tech industry is subject to regulatory changes that can have a profound impact on business models. Regulations related to data privacy, intellectual property, cybersecurity, and environmental standards can all influence the way startups operate. Adapting the business model to comply with new laws is essential for avoiding legal challenges and ensuring business continuity. Some key regulatory changes that may prompt a business model shift include:

 Data Privacy Regulations: In response to laws such as the General Data Protection Regulation (GDPR) in the EU, many technology companies have had to redesign their data collection, storage, and sharing practices. This could necessitate changes in pricing models (e.g.,

- subscription-based services), as well as shifts in how personal data is handled and protected.
- Cybersecurity Laws: As cyber threats evolve, regulations governing data protection and network security become more stringent. Startups that deal with sensitive customer data may need to invest in enhanced security measures or comply with specific cybersecurity protocols, which could alter operational costs and resources.
- Environmental Regulations: As environmental regulations tighten, tech startups focused on hardware or energy-intensive solutions may need to adapt their business models to reduce environmental impact, improve energy efficiency, or align with sustainability standards. This could result in adopting greener technologies, redesigning products, or shifting to more sustainable production methods.

Adapting business models in response to regulatory changes not only ensures compliance but also fosters customer trust and can provide new opportunities for innovation.

Customer Feedback and Market Validation

Customer feedback and market validation are critical for refining and adapting business models, particularly for startups in their early stages. Gathering and analyzing feedback allows entrepreneurs to understand how well their products or services meet customer needs and where improvements are necessary. Startups can gather valuable insights through:

- Surveys and Interviews: Regularly engaging with customers through surveys or one-on-one interviews helps collect qualitative and quantitative data about customer satisfaction, preferences, and pain points. This feedback can help identify areas where the business model may need to evolve.
- Pilot Programs: Launching pilot programs or beta testing with a small group of users provides early-stage feedback about product functionality, market demand, and customer expectations. This can also provide data to support decisions about pricing, product features, and market segmentation.
- Customer Behavior Analytics: By tracking customer behavior through analytics tools, startups can gather data on usage patterns, purchasing habits, and engagement levels. This data can offer insights into how the current business model is resonating with customers and help inform adjustments or enhancements.

Incorporating customer feedback into the business model development process helps startups remain agile, align their offerings with market demands, and maintain a strong customer-centric focus.

Adapting a business model in response to changes in the technology landscape is not just an option but a necessity for the long-term survival and success of a startup. Whether driven by technological disruption, changing market demands, increased competition, regulatory shifts, or customer feedback, businesses must be willing to reassess and modify their strategies to stay ahead. By staying agile and proactive, startups can position themselves for sustained growth and ensure their business models remain relevant in an ever-changing environment

Strategies for Successful Business Model Development and Adaptation

Developing and adapting a business model in a technology-based startup is not a one-time process but an ongoing journey. Entrepreneurs need to remain agile and responsive to changes in the market, technology, and customer needs. Implementing strategic approaches that allow for rapid experimentation, continuous innovation, and iterative development is key to creating a sustainable and adaptable business model. Below are some of the most effective strategies that entrepreneurs can employ to navigate this complex process.

Lean Startup Methodology

The Lean Startup methodology, developed by Eric Ries, is a well-regarded framework designed to help startups develop business models with limited resources while maximizing efficiency and reducing risk. It emphasizes rapid experimentation and validated learning to ensure that startups quickly understand what works and what doesn't. By following this approach, entrepreneurs can achieve several key benefits:

- Validated Learning: Startups test hypotheses about their business model by developing minimum viable products (MVPs), gathering feedback from real users, and making data-driven decisions. This feedback loop ensures that the business model is based on actual customer needs rather than assumptions.
- Iterative Development: The Lean Startup methodology promotes building products or services in small, incremental steps. This allows startups to learn from each iteration, reduce risk, and adjust their business models in response to market realities.
- Minimizing Waste: One of the main principles of Lean Startup is to avoid unnecessary development costs and resources. By focusing on what is most important to the customer and iterating based on their feedback, startups can avoid wasting time or money on features or business models that are not aligned with market demand.

This methodology helps startups refine their business models more effectively and quickly, improving their

chances of achieving product-market fit while avoiding costly mistakes.

Business Model Canvas (BMC)

The Business Model Canvas (BMC) is another essential tool for technology startups in developing and adapting their business models. The BMC, introduced by Alexander Osterwalder, provides a visual framework that captures all the essential components of a business model in one place. The tool consists of nine key building blocks:

- Customer Segments: Defines the target customers or user groups.
- Value Proposition: Outlines the product or service's unique value for customers.
- Channels: Describes how the product or service is delivered to customers.
- Customer Relationships: Details how a startup interacts with its customers.
- Revenue Streams: Identifies how the company will earn money from its customers.
- Key Resources: Defines the assets necessary to deliver the value proposition.
- Key Activities: Describes the most important actions the business must perform.
- Key Partnerships: Identifies external companies or organizations that help in the delivery of the product or service.
- **Cost Structure:** Defines the major costs involved in the operation of the business model.

Using the BMC, entrepreneurs can create a comprehensive, one-page overview of their business model that is easy to modify and adapt. It enables them to quickly spot potential weaknesses or areas for improvement, experiment with different strategies, and pivot when necessary. The BMC also serves as a shared reference for team alignment, helping to ensure everyone within the startup is on the same page regarding the company's core strategy.

Pivoting and Iteration

Pivoting and iteration are fundamental strategies for startups, especially in the technology sector where change is rapid and unpredictable. Pivoting refers to making a substantial change to the business model or product offering in response to new market insights or customer feedback. It's about shifting direction while retaining the core vision and value proposition. Iteration, on the other hand, involves making continuous, smaller adjustments based on regular testing and feedback.

 Pivoting: A successful pivot is often the result of failed assumptions or new information about the market. A startup may pivot by targeting a different customer segment, changing its value proposition, altering the revenue model, or reimagining the delivery channels. For instance, a tech company that initially focused on physical retail products might pivot to an online subscription model as consumer behavior shifts toward e-commerce.

Common pivot types in technology startups include:

- Market Pivot: Shifting the target market or customer segment.
- **2. Product Pivot:** Modifying the product or service to better address customer needs.
- **3. Technology Pivot:** Adapting the underlying technology or platform to serve a different purpose or market.
- Iteration: While pivoting is a more significant shift, iteration involves small changes that allow the business model to evolve gradually. Startups can iterate by making tweaks to existing products, refining marketing strategies, or adjusting pricing models. For example, based on customer feedback, a startup might change its pricing structure, add new features, or streamline the user experience to improve retention.

Both pivoting and iteration allow startups to remain agile in the face of market shifts, customer feedback, and technological disruptions. The key to success lies in being responsive to change, continuously testing assumptions, and embracing a culture of learning and adaptation.

Conclusion

Developing and adapting business models is a continuous and dynamic process for technology-based startups. As markets evolve, technology advances, and customer needs shift, startups must remain flexible and open to change. Key strategies like the Lean Startup methodology, the Business Model Canvas, and pivoting/iteration allow startups to remain agile and innovative, which is essential for long-term survival and growth.

Technology startups that develop a solid business model and adapt it based on real-world data, market trends, and customer feedback are more likely to thrive. By focusing on continuous learning, innovation, and responsiveness, startups can navigate the complexities of the technology sector and build scalable, sustainable business models. The ability to adapt quickly in the face of change and to innovate consistently is the defining characteristic of successful technology ventures

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