UNLOCKING YOUR MARKETPLACE PAYMENT GATEWAY

How In-House Payment Processing Will Take You Ahead in the Platform Economy

CoreWallet

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EXECUTIVE SUMMARY

A majority of consumers today prefer to shop online. Digital marketplace platforms are among the most convenient ways of doing so. Over recent years, platform-based shopping has become a major economic factor all over the globe. BigTech companies mostly drive growth here, but many marketplace providers also have established platforms for specific product or industry niches. At the same time, the dawning of new channels of web interaction such as AR, voice assistants and the Internet of Things calls for new marketplace solutions.

Marketplace payment software has to keep pace with the challenges of this modern platform economy. Offering customers a secure and straightforward checkout experience is crucial for all aspiring e-commerce companies. Over 20 % of customers cite problems with payments as one main reason for abandoning their online shopping carts.

The question for marketplace owners is, whether to build or buy a payment gateway for their platform. Off-the-shelf, external payment providers have many advantages such as lower initial costs and easier set-up. On the other hand, self-hosted (and ultimately self-built) payment gateways shine in terms of flexibility and scalability. Also, they provide marketplace owners full control over features, presentation, further development and customer payment data.

Building such a custom marketplace payment gateway can first appear challenging. But with the right strategy and following specific development steps – as outlined in this document – it will be well worth the while.
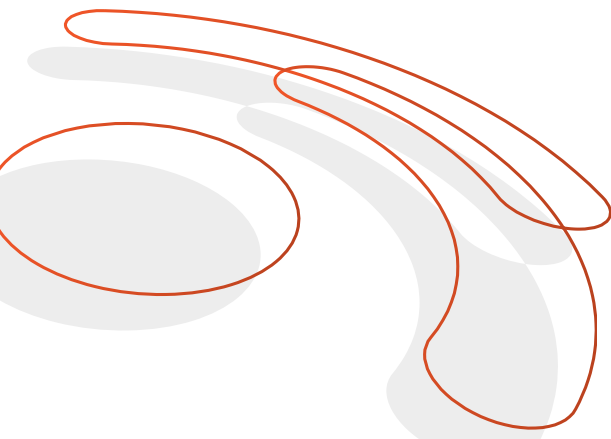
MARKET OVERVIEW

Modern e-commerce environments are ripe with opportunities. Customers adopt marketplaces and online shops as primary shopping channels with ever-greater frequency.

MARKETPLACES IN THE PLATFORM ECONOMY

Marketplace platforms occupy an ever-growing share of the e-commerce sector. The first online marketplace was founded in 1982 by Boston Computer Exchange – to sell old computers peer-to-peer. One decade later, the first online book store sprang up: Book Stacks Unlimited. And in 2021, worldwide online retail sales made for a revenue of around US $5 billion.[1]

Together, all online platforms – commercial or not – constitute the **Platform Economy.**

THE BIG PLAYERS

In it, E-commerce and Retail platforms form the second-largest sector, only surpassed by Internet Software and Services.[2] The biggest e-commerce companies sit in China and the US. B2C marketplaces have superseded single-vendor shops there. Commercial platforms like Amazon, Ebay, JD, Pinduoduo, Taobao and TMall dwarf other providers. In 2019, 58 % of the e-commerce market was dominated by just those 6 companies in terms of market share.[3]

Beneath the top layer we have a versatile assembly of other retail companies. They come in different sizes and have different business models. And they all face challenges specific to their markets.

BRICK-AND-MORTAR COMPANIES BREAK INTO E-COMMERCE

Some companies were originally firmly at home in traditional brick-and-mortar branches. With customers' growing interest in online shopping, they could not risk falling behind. As a result, those companies invested massively in building up web- and mobile-based shopping platforms or marketplaces – e.g. for clothing, furniture or housewares.

A prime example here would be the American supercenter giant Walmart. The company managed to gain a second foothold as an online marketplace – and even acts as a retail technology provider for other companies. In Germany, the Otto Group undertook a similar transformation, having increased sales by 13 % during the financial year 2021/2022.[4] They also decided to abandon their physical catalog.

US **$3.23 TRILLION**

was spent on the Top 100 Online Marketplaces in 2021

Source: Digital Commerce 360, 2022
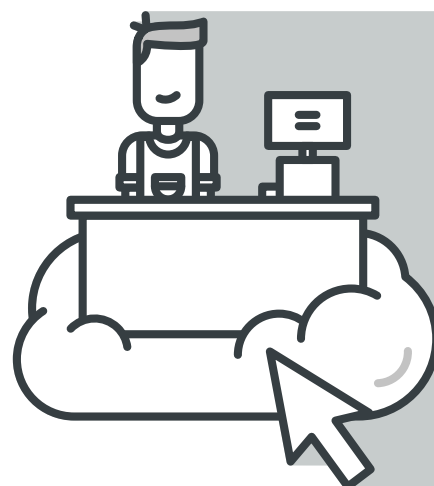
TECH IN THE BACK, UP-FRONT IN E-COMMERCE

Technology companies venturing into the marketplace sector have a competitive edge. Some were successful with other digital products before and understand the specifics of online environments. Retailers of the past often failed to master the technical side of digital marketplace platforms. As customer journeys vary, so do the technological requirements of marketplaces – especially payment operations.

What's more, they already have the technical expertise in place to realize marketplaces. This allows them to quickly outpace the competition. Just take Chinese BigTech companies here. They changed the very model of how customers approach the web as such: Alibaba and Tencent now offer super-apps that act as central access points for all manner of purchasable services and products, from food delivery to newspapers to flight tickets.

GOING VERTICAL WITH B2C AND B2B MARKETPLACES

The prominence of big, tech-driven platforms should not discourage more focused e-commerce companies. Vertical B2C Marketplaces like Airbnb,

55 %
OF CUSTOMERS
prefer online shopping over offline shopping

Source: Raydiant, 2022

Vivino, or Etsy, cater to a specific customer niche. Those specialized platforms find success through a combination of specialized offers, high expertise in their field of commerce, and personalization through data analytics. It pays off: The U.S. Chamber of Commerce cites sources that speak of 35 % of online consumers visiting such niche marketplaces for shopping.[5]

Vertical Marketplaces in B2C are the rule rather than the exception. By its very nature, business-to-business commerce is specialized. However, the potential of the market is largely untapped. In 2020, only 7 % of B2B sales occurred via online marketplaces.[6] That number is expected to double by 2025 – given that B2B companies stay as hungry for opportunities.

Top 10 Online Marketplaces Worldwide by Visits – April 2022
(Source: SimilarWeb, 2022)

Name	Category	Country of Origin	Monthly Visits (in Million)
1. Amazon	General Retail	USA	4 810.0
2. eBay	General Retail	USA	1180.0
3. Rakuten	General Retail	Japan	542.7
4. Mercado Libre	General Retail	Argentina	511.8
5. Zalando	Fashion	Germany	420.0
6. Shopee	General Retail	Singapore	415.7
7. AliExpress	General Retail	China	390.9
8. Walmart	General Retail	USA	387.3
9. Etsy	Arts and Crafts	USA	373.2
10. Taobao	General	China	277.9

MAKING MARKETPLACES ACCESSIBLE

Over the course of the previous years, acceptance of online shopping has gained steam. According to Raydiant, customers' preferences even switched during the pandemic years. In 2022, 55 % of customers preferred online shopping over offline shopping – in 2020 it has been the other way around.[7]

At the same time, almost 25 % percent of customers say they continue to shop offline, so they can see and touch the goods they buy.[8] FinancesOnline even found out that 55 % of overall customers prefer to try out or try on products before purchase.[9] This amounts to a customer behavior we all know: Going to physical shops first before looking for the best bet online. And that's just one problem customers name when dealing with digital marketplaces – complex platforms often suffer from a complex array of pain points.

Online shoppers also frequently criticize:

- Loading times of more than 2 seconds
- Non-pleasing mobile shopping experiences
- Cluttered or confusing user interfaces
- Repeated entering of personal and payment data (address, payment details during visit)
- No support of local payment methods or popular PSPs
- High-friction returning processes
- Feeling not protected enough against fraud…[10] [11]

"CUSTOMER JOURNEYS VARY AND SO DO THE TECHNOLOGICAL REQUIREMENTS OF MARKETPLACES – ESPECIALLY PAYMENT OPERATIONS."

Addressing those pain points will remain a sharp, competitive factor for marketplace providers. And as the e-commerce sector prepares for the arrival of Web3, more will be added to the list.

THE FUTURE OF MARKETPLACES

The coming years promise fundamental disruptions in how digital commerce will operate online. We are approaching a future Web3, which is more decentralized, more AI-driven and sometimes not even reliant on desktops or mobile phones. At the same time, we will see a rise in social commerce, with social media platforms adopting a more central role as facilitators of online shopping.

Besides well-trodden paths, customers will use entirely new platforms to interact with companies. Likewise, they will demand that marketplaces diversify those interactions and improve them with additional features. A few examples:

- **Embedded Financial Services**, allowing customers to take out a loan or insurance related to a purchase

- **Blockchain-Based Marketplaces** for user-generated content, where the ownership is managed via non-fungible tokens (NFTs)

- **VR Branch Stores** of popular brands on the metaverse, selling digital content

- **Superapp** environments on smartphones, glasses and watches, that allow access to order a restaurant table... and a bike to drive there

- **Voice Assistants** with speech-controlled access to audio content shopping platforms

- **Internet-of-Things Appliances**, like smart kitchens that order groceries via subscription

- **Digital Service Platforms** accessed via car computers to rent parking spots or buy repair parts...

Market analysts already hint at the business opportunities that emerge here: CB Insights estimated that the metaverse market alone would be worth US $1 trillion by the end of the decade.[12] To get a share of that pie, e-commerce providers have to invest and think outside of the retail box. Amazon, for example, already leans into augmented reality with its AR Room Decorator. Shopify supports merchants who want to sell digital NFTs.

The foundations for future e-commerce are laid today – and companies get their toolboxes ready.

PAYMENT: BOTTLENECK OF MARKETPLACES

Online marketplaces come in many shapes – from B2C retailers to peer-to-peer "crafts market" platforms to food delivery facilitators. Payment processing is a major pain point for all of them. External PSPs/SaaS solutions and self-built payment systems present two approaches to treating the issue. Which one has the edge?

THE ROLE OF PAYMENT GATEWAYS IN MARKETPLACES

At their most basic level, marketplaces form hubs that manage commercial interactions between business parties. The payment system (also called the **Payment Gateway**) lies at the heart of those interactions: What happens during and after the checkout process plays a huge role in the satisfaction of the involved parties. And that's where it gets complicated: All parties interacting with a marketplace have their own goals and preferences regarding the ideal payment experience:

○ Customers want secure, convenient, low-friction checkout experience with their preferred payment method.

○ Sellers want stable, user-friendly payment systems with high uptime and good reporting.

○ Suppliers (e.g. delivery drivers, etc.) want easy onboarding and instant payouts.

○ Marketplace owners want their payment system to be scalable, flexible, reliable and compliant.

Getting those differing goals all met within one payment system is challenging for external payment processors as well as for marketplaces building their own solutions. One of the most pressing problems lies on the customer side, however.
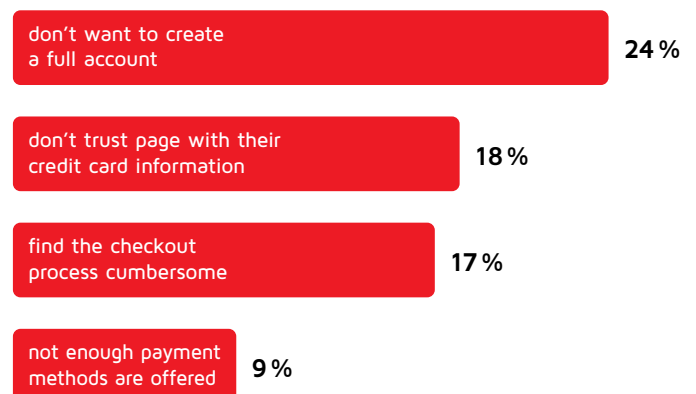
THE PROBLEM OF CART ABANDONMENT

For customers, the checkout page is the bottleneck of marketplaces – every one of them passes it. Unfortunately, without intent, many online marketplaces dig their deepest friction pitfalls here. Statistics show that many customers cancel their shopping process at the checkout stage.
Cart Abandonment causes the e-commerce economy to lose many billions of dollars each year. That's what the Baymard Institute found out.

Problems related to payments rank among the key triggers for this conduct. Customers often complain about complicated checkout processes and obscure payment forms. Moreover, they criticize a lack of payment options and inadequate data security.

Reasons US Customers Abandon Carts
(Related to Payment)

|	
don't want to create a full account	**24 %**
don't trust page with their credit card information	**18 %**
find the checkout process cumbersome	**17 %**
not enough payment methods are offered	**9 %**

(Source: Baymard Institute, 2022)

THE LACK OF COMPREHENSIVE SOLUTIONS

A high number of Payment Service Providers struggle with the challenges posed by the platform economy. The reasons are manifold:

○ **Platforms** face competition and are forced to constantly innovate. Payment systems must react to those innovations.

○ **BigTech Marketplaces** partner up with fintechs. This allows them to introduce their own self-built payment solutions and disrupt the payment market.

○ **Some PSPs** still are rooted in single-merchant online stores and their payment processes. They fail to serve the broader scope of multi-merchant marketplaces.

By the same token, e-commerce companies and marketplaces also feel the pressure to innovate their payments. The evolution from online to mobile to augmented environments will call for new payment technologies. And the available PSPs can not always deliver. AI-driven analytics of shopping is another field, where marketplaces have to keep pace. Artificial intelligence will analyze data sets to detect complex fraud schemes and create detailed customer credit scores and risk assessments.

In the future, payment processes will become more individual. Some payment technologies will even allow more privacy via decentralization: Cryptocurrencies and distributed ledgers. Those will likely play a more significant part in future payments and contracts.
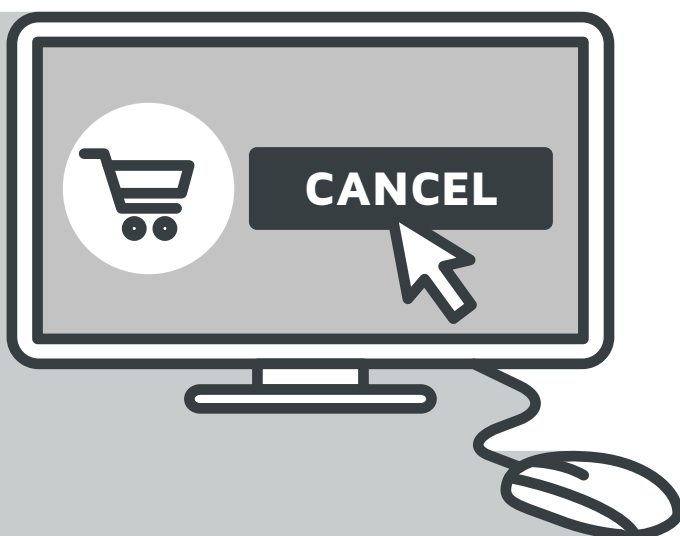
US $260 BILLION

in orders were lost in 2021 due to cart abandonment in the EU and US

Source: Baymard Institute, 2022

GETTING A PAYMENT SYSTEM – THE BUILD-OR-BUY PROBLEM

Customers are picky when it comes to their payments. To improve the online marketplace experience providing an optimal payment system is crucial. Companies have to make sure that this system is secure, high-performing, user-friendly and cost-effective.
Every single one of those attributes comes with considerations. Marketplace owners have to weigh in factors like:

- ○ Budget for set-up and operations

- ○ Business model of the platform

- ○ Currencies and payment methods they want to offer

- ○ Data storage and protection strategy (e.g. PCI DSS or GDPR compliance)

- ○ Estimated number of transactions per day, month and year

- ○ Operation and maintenance strategy (in-house or as-a-service)

- ○ Refund policies

- ○ Regulations in the countries they operate in

- ○ Risk and anti-fraud protection (KYC, AML)

- ○ Team size and expertise

- ○ Need for 3rd party extensions (like data validation and analytics, KYC providers, etc.)...

The consideration of these factors leads to the most fundamental decision for marketplace owners: Settle for a self-hosted Payment Gateway, run in-house? Or settle for an external software-as-a-service company, that hosts and operates the Payment Gateway?

It's the old choice between **Buy or Build.**

40 %
OF CUSTOMERS
are more willing to buy, if multiple payment methods are supported

Source: FinancesOnline, 2022

BUY

THE BUY OPTION: EXTERNAL PAYMENT GATEWAYS

External Payment Gateways are offered by third-party providers. Those providers are often software-as-a-service (SaaS) companies, hosting a turn-key solution. Marketplaces can use the solution on their platform in exchange for a fee. Examples include Adyen or Mangopay.

With external Payment Gateways, the provider takes full responsibility for data security, KYC procedures, and compliance. External hosting also means that customers are typically redirected to an offsite checkout page during checkout. They enter their payment details there. Yet, some companies offer white-label solutions. They enable marketplace owners to customize the checkout sites and put in their branding.

Vendor-Lock In

Dependency on an external provider can lead to so-called vendor lock-in. It's a situation in which companies can't switch their Payment Gateway without massive complications. Also, their online platforms may prove hard to migrate to a new solution, as other Payment Gateways' infrastructures might differ. That can even occur when the costs of a Payment Gateway are too high or its feature range is lacking. It might result in excessive downtime periods or cause payment errors to pile up. One way to cushion the transition is to employ a capable development team.

DOWNSIDES OF EXTERNAL PAYMENT GATEWAYS

Basic Feature Set

Software-as-a-service solutions often revolve around a standard payment feature set. It's often a fairly limited one. And a marketplace can enact only restricted influence to introduce new features. Other clients would have to second such feature requests – there must be high demand for those kinds of functionalities. Else, the Payment Gateway provider will likely not prioritize them.

On another note, if the Payment Gateway provider gets in economic trouble or suffers from security issues, this hurts the reputation of the marketplaces associated with it.

Limited Analytics

Marketplaces store customer data with an external third party. That means this third party decides to what extent they want to allow access to this data. Monitoring customer payment behavior has proven to be one of the most effective ways to identify common aches and pains in the checkout process. Most external Payment Gateway providers have their own payment analytics dashboards or allow 3rd party solutions to be integrated.

However, if a marketplace provider wants to have in-depth analytics of the data, it's easier if they store it themselves. What's more, software-as-a-service providers have to ensure that customer data is stored securely – and marketplaces don't have control over if they really take all necessary measures.

Continuous Fees

Settling for an external Payment Gateway might spare set-up costs first-off. Yet, it could get expensive in the long run – especially if a marketplace scales up and probably will have to renegotiate pricing with the original provider. Also, when vendor lock-in kicks in, marketplaces will find themselves in a position, where they cannot refuse rising fees or changes in a gateway's terms of usage.

BENEFITS OF EXTERNAL PAYMENT GATEWAYS

Aside from the drawbacks, SaaS solutions come with a number of positives as well.

Quick Set-Up

External Payment Gateways are typically set up for basic payment processing out-of-the-box. Instead of putting in development effort, marketplaces can simply integrate external payment solutions or redirect customers to their checkout pages. Thus, marketplaces can launch within a short time window.

Lower Initial Costs

What's true for time is also true for money: Initially, settling for an external Payment Gateway is less expensive for aspiring marketplaces. Developing their own solution may entail huge costs. In addition, maintenance and operation expenses lie with the Payment Gateway.

No Technical Expertise Needed

For online entrepreneurs, who want to take the first steps with their marketplace business, external solutions present an attractive option. SaaS companies often field their own or partner development teams that can help with the integration. This compensates for a lack of technical resources on the marketplace owner's side.

THE BUILD OPTION: SELF-HOSTED PAYMENT GATEWAYS

Self-Hosted Payment Gateways represent the **Build** option – thus, we could also speak of **Self-Built Payment Gateways.** Such Payment Gateways are developed in-house by a company's own software engineers. Alternatively, they can also employ an external development partner. The custom Payment Gateway then runs on servers owned by the company or in the cloud. Subsequently, the marketplace owner has full control over the feature set and usability of the software.

Self-Built Payment Gateways present custom-tailored payment orchestration solutions for online marketplaces. Companies can customize them at will. They are matching the unique payment flows of specific multi-vendor marketplaces by design. Additionally, vendor lock-in gets averted. New Payment Service Providers and payment methods can be integrated, whenever the need arises.

But custom-made Payment Gateways are not always the superior option. Small businesses often lack the resources or the workforce ready to commit to Payment Gateway development. Let's explore advantages and disadvantages of the Build approach.
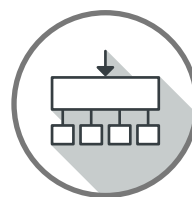
Slower Time to Market
Building a custom Payment Gateway will take longer than integrating a third-party solution. In-house developers should start working on the Payment Gateway as early as possible in the marketplace project. Also, certification processes for compliance with government regulations need to be factored in. Usually, they prove time-consuming.

Full Responsibility
For self-built Payment Gateways, acting developer, hoster and maintainer of a Payment Gateway falls into one. All responsibilities for ensuring the 99,9 % uptime are with the marketplace owner. That means they have to rely on comprehensive testing and continuous maintenance and bug fixing. Furthermore, they are held accountable for compliance and data security. This requires know-how within the company or a reliable external partner.

DOWNSIDES OF SELF-BUILT PAYMENT GATEWAYS

High Expenses
A business must factor in development costs. Recurring spending on maintenance comes on top, as well as legal, insurance, and compliance costs. Missing domain knowledge can also limit Payment Gateway creation. In any case, the marketplace owner will have to employ a development team. A small one might suffice if working with external development partners.

BENEFITS OF SELF-BUILT PAYMENT GATEWAYS

Unified Payment Orchestration Layer
To meet the preferences of specific national markets, companies need to give customers access to a wide variety of payment methods. Thus, a marketplace platform has to integrate various local payment service providers. It's possible to rely on a unique integration for each PSP.

But this leads to a fragmented payment system – inefficient and costly to maintain. In turn, a custom solution can act as a payment orchestration layer, unifying various PSPs within one integration. What's more, companies can add all the payment methods that customers favor.

Custom-Tailored Features

Innovation and smart features separate the successful from truly successful platforms. For unique business models Payment Gateways off-the-rack will perhaps not support all planned features (like recurring payments, support for specific marketing campaigns or cryptocurrency support for example). Building an own solution will give a company the flexibility to update the offering just when customer and merchant demand reaches a critical mass.

Seamless User Experience

Customers have little patience for payment solutions that are inconvenient, complicated or obscure – and therefore not viewed as trustworthy.

Custom Payment Gateways can fine-tune the user experience more easily. Polishing the user interface and the payment flow helps to offer a seamless checkout experience and reduce friction. For example, marketplace owners can allow customers to store their payment details to avoid annoying re-entering them every time during the purchase and offer special flows like a simplified one-click checkout or "buy now, pay later" option.

Streamlined Merchant Management

Merchants are users of a payment platform, too. But they have other needs than customers. Having more control over the payment gateway will allow a business to streamline the merchant onboarding process. For instance, they could fully digitize the registration and verification processes. In the long run, an optimized merchant

UI might help attract new suppliers and sellers – an important condition for growth.

Data Sovereignty

Using a custom-built solution means all the customer data and historical payment data are stored in-house. While additional costs may present themselves here, data sovereignty comes with many advantages. Marketplace businesses can analyze customer payment data to learn more about how a platform is used, what PSPs are popular etc.

Marketplace companies can use the aforementioned learnings to improve. For example, they could tailor products or solutions more to customer preferences, offer specific payment options to specific customer groups, improve their fraud and risk prevention mechanisms, chargebacks predictions and much more.

Long-Term Cost Savings

Many companies shy away from the development costs of a Payment Gateway. But really they should note: They are not so much buying a product now as investing in the long-term growth of their company. Third-party Payment Gateways come with their own costs, taking the shape of sign-up fees and per-transaction charges. In the end, marketplace owners find themselves giving a significant part of their profits to other companies, way after their initial costs have been amortized.

Side Businesses

When a marketplace owner also runs other businesses or holds subsidiaries in need of a Payment Gateway, they can now use their own. Thus, they forego registration fees or additional per-transaction costs. Secondly, they could even run their own Payment Gateway as a side business. This allows them to sell or rent it off to other companies needing a solution with a similar feature set.

BUILDING A PAYMENT GATEWAY

Online marketplaces are complex systems. A proper Payment Gateway must tie smoothly into their day-to-day operations. Only then it will please customers and merchants alike. The development process has to address this, but leave room for innovation.

THE STAGES OF PAYMENT GATEWAY DEVELOPMENT

Developing a custom Payment Gateway poses challenges. But it allows marketplace owners to update and scale the solution as they need. Using existing software frameworks, that's even possible without building everything from the ground up.

The following pages cover the typical stages of building and launching a custom Payment Gateway. Those include:

- ○ Confirming the Need

- ○ Outlining Interactions

- ○ Deciding on Integrations

- ○ Assessing Scope and Scalability

- ○ Planning Features

- ○ Designing the API

- ○ Handling Data

- ○ Maintaining Security and KYC

- ○ Setting up Testing and Quality Assurance

- ○ Maintaining and Updating the Solution Post-Launch

We will get into it on the following pages.

1. CONFIRMING THE NEED

Companies have to ask themselves if the benefits of an in-house Payment Gateway balance the efforts. In the previous chapter, we discussed the advantages of self-built solutions ("Benefits of Self-Built Payment Gateways", page 15).

Marketplace owners might see the need to implement their own Payment Gateway solution if:

○ **The Marketplace Suffers From High-Volume Costs**
Marketplaces that kept using an external payment solution for years might find this setup costly now. The marketplace scaled up, the transaction volume increased – and likewise did the fees. It can be worthwhile to offset the increasing costs against the financial outlay of a self-developed payment solution. Even with continued maintenance costs, it might be cheaper.

○ **The Marketplace Needs to React Flexibly**
As marketplaces evolve, they change. Customers are requesting new features or payment methods. And the marketplace third-party payment solution might not support them. Equally, custom marketplaces will want to keep options open for the future – e.g. for experimentation with new payment methods. Chaining the solution to an external provider might lead to vendor lock-in. This could impair expansion if the provider does not support specific local PSPs or cannot be easily adapted to specific national regulations. Also, relying on a single payment partner reduces a marketplace's resilience, as they may not easily switch to fallback providers in case of payment system outages.
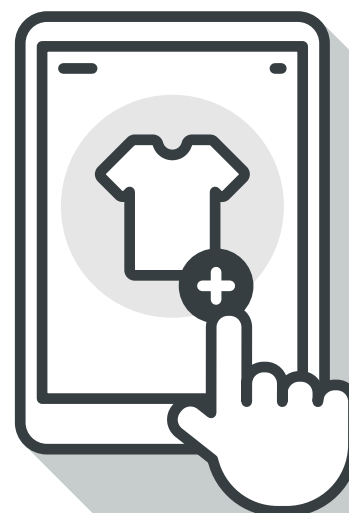
○ **The Marketplace Wants to Commoditize Its Services**
Marketplace platforms that see the potential for their software solution aside from their immediate use case, may turn it into a revenue source. The company can offer the marketplace software to 3rd parties as a full package white label system including payments. Or they can commodify their payment solution as is, aiming at a gap in their specific market.

○ **The Marketplace Prototypes an Unprecedented Use Case**
This might only apply to a few marketplaces at any given time. New technologies are on the horizon, like the metaverse or the internet of things. Companies are already developing e-commerce platforms for them. But finding payment solutions that can support those new technologies often turns out difficult at best. Companies can often not avoid creating their own payment solutions at this stage. The upside: If the solution prevails, it may be licensed to similar companies looking for one.

AND WHEN IN DOUBT: ASK THE TEAM!

To assess the need for a self-built solution, it makes sense to gather intelligence from all departments. Does the product team have information about customer behavior or preferences? Can the operations department confirm the need for improvement in payment processing performance? Will the financial department see cost-saving opportunities in having a custom solution?

Of course, it's perfectly possible that a company comes to the conclusion that an off-the-shelf solution suffices.

THE SHORTCUT: USING PRE-BUILT FRAMEWORKS

Building a whole custom payment gateway from scratch can put pressure on a marketplace company. Software frameworks can be a viable help here. The marketplace owner still designs the payment system as required and has to put in the customization development effort. However, such frameworks already come with functional building blocks for the core feature set of a payment gateway, from transactions to multi-currency support or payment integration. Using a battle-proven payment software framework reduces the workload for the team and the probability of errors in the fundamental features and flows (for more on that see "Key to Your Payment Gateway", page 31).

2. ASSESSING THE EFFORTS

While diving deeper into the project, there are three dimensions that companies should always keep in mind:

DIMENSION 1: TIME

The time needed for the implementation of a Payment Gateway depends on its functionalities, flexibility and scalability. The rule of thumb: The more complex the system and the more smoothly it should scale, the more time it will take to create it. And that means it might launch later.

Product owners will have to decide which features to include as must-haves for the first release. This decision forms the basis for specifying when the product reaches the status of being ready for launch. In agile development terminology, such a product is known as an **MVP (Minimum Viable Product).** The intended scope of the product at launch lies on a spectrum between…

○ **Launching an MVP with a small set of features.** The product will be built to include the absolute necessities only. That means it will lack some features and may even launch to a reduced set of primary customers. The product will then evolve over time, blooming into a complex feature-rich solution.

○ **Making the MVP as feature-complete as possible.** This carries the risk of spending resources on features and infrastructure that idle until the marketplace gains traction. Also, it will increase development time. Thus it's an option that's seldom chosen nowadays.

DIMENSION 2: WORK

Or rather: Workforce. The development team is one of the key resources when creating Payment Gateways. Building financial software of any kind requires care and precision. The finished products will handle the sensitive data of users. Fraudulent actions and cybercrime can result in significant financial and reputational damages. At the same time, the technical architecture of a Payment Gateway system is complex and prone to errors.

The line-up of the development team should address those issues. Developers should ideally have specific domain knowledge in financial services and technology. In addition, quality awareness forms a key skill, as does secure coding experience. For Payment Gateways, the first line of defense of cyber threat prevention runs through the code.

Thus, companies must eventually hire experts in those fields to guide the team or invest in staff training. Bringing in an external company specialized in payment software and having annual secure coding training is also an option.

"FRAUD AND CYBERCRIME CAN RESULT IN SIGNIFICANT FINANCIAL AND REPUTATIONAL DAMAGES. AT THE SAME TIME, THE TECHNICAL ARCHITECTURE OF A PAYMENT GATEWAY SYSTEM IS COMPLEX AND PRONE TO ERRORS."

DIMENSION 3: COSTS

This last dimension results from the estimations given in the other two. The longer development takes, the higher the costs will be. Cost factors include staff expenses for the whole team: not only for software engineers, but also for project and product management, legal department, QA if needed, etc.

Count in infrastructure costs (servers, etc.) as well as license/compliance costs and self-built payment gateways can turn out as a significant cost factor. For companies that have a good financial standing that might not be a problem. Runner-up marketplaces need to calculate more precisely.

Yet, clever planning can provide an outlet. For example, not every function of the Payment-Gateway-to-be needs to be developed from scratch. Relying on well-tested software frameworks can provide a shortcut to a functional payment gateway without sacrificing flexibility. Cutting development time that way will also reduce development costs, even though frameworks need to be licensed.

3. OUTLINING THE PRODUCT

The three dimensions we discussed are all tied to the nature and layout of the project. It's the key question for any product owner: **What do you want your payment system to do?** The answer to that will involve a number of technical and non-technical decisions.

INTERACTIONS (BUYERS, SELLERS, MARKETPLACE OPERATORS)

On the most basic level, marketplace payment platforms manage the transactions between buyers, sellers and the platform operator itself. Those interaction flows have to be properly thought through, so the development team understands the solution-to-be. For starters, it's important to determine who sells what to whom. Typically, three roles exist in a digital marketplace:

Merchant of Record
The Merchant of Record (MoR) has the authorization to call in and trigger a customer's payment. The MoR will be held responsible by financial authorities, too, if something goes wrong. In online marketplaces, this role usually goes to the company owning and running it.
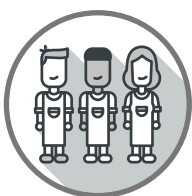
(Sub)merchants
Also known as Merchants. Merchants act as the selling party, while the marketplace fulfills the role of the Merchant of Record. The MoR would collect all the money from purchases and distribute it to merchants periodically (monthly, weekly, etc.). Typically, marketplaces keep a share of the transaction amount as a usage fee.
Marketplace owners also set up merchant onboarding. Merchants must pass through know-your-business / know-your-customer screenings, as well as risk assessment and other security processes. Marketplaces have to make sure that they adhere to regulations there – and keep the process low-friction for merchants at the same time.

Customer
The **Customer** is the third party to consider when designing a transaction flow. Product owners have to answer many questions about this role, like:

○ Will the platform's customer base consist of private customers (B2C), corporate customers (B2B) or both?

○ How much data does the platform need to collect from buyers?

○ Will the marketplace feature C2C transactions, where customers sell stuff to each other (e.g. Ebay…)

○ How do customers onboard? What are the requirements (Know-your-customer, anti-money laundering processes, risk assessment, etc.)?

INTEGRATION

Product owners have to decide how to integrate payment service providers into the Marketplace Payment Gateway. This integration can take two forms:

1. PSP integration via API, with an internal checkout page in the platform's front end.

2. Redirection, leading the user to the Payment Provider's designated, external checkout page.

Specific platforms or devices might dictate one approach and be incompatible with another. Also, some PSPs only support one of these two integration forms.

SCOPE AND SCALABILITY

A well-oiled Marketplace Payment Gateway can handle a sizable number of customers and transactions. And step up its game when needed. The product owner and the development team have to project the workload of the gateway-to-be ahead of time. Those projections should include factors such as:

○ The number of payment transactions the gateway will have to process at once at a given period of time.

○ The anticipated number of transactions in one year, in a few years, etc.

○ The expected maximum peak load in a day, an hour and a minute or at certain times. For example, let's say a marketplace sells fireworks and light show equipment. It will see peaks in the weeks before Christmas, New Year's Eve and on Black Friday.

FEATURES

Payment systems can differ regarding the services offered. Product owners should plan out all they want the payment system to do and prioritize. Not all features will make it into the initial release, that should be clear from the start.
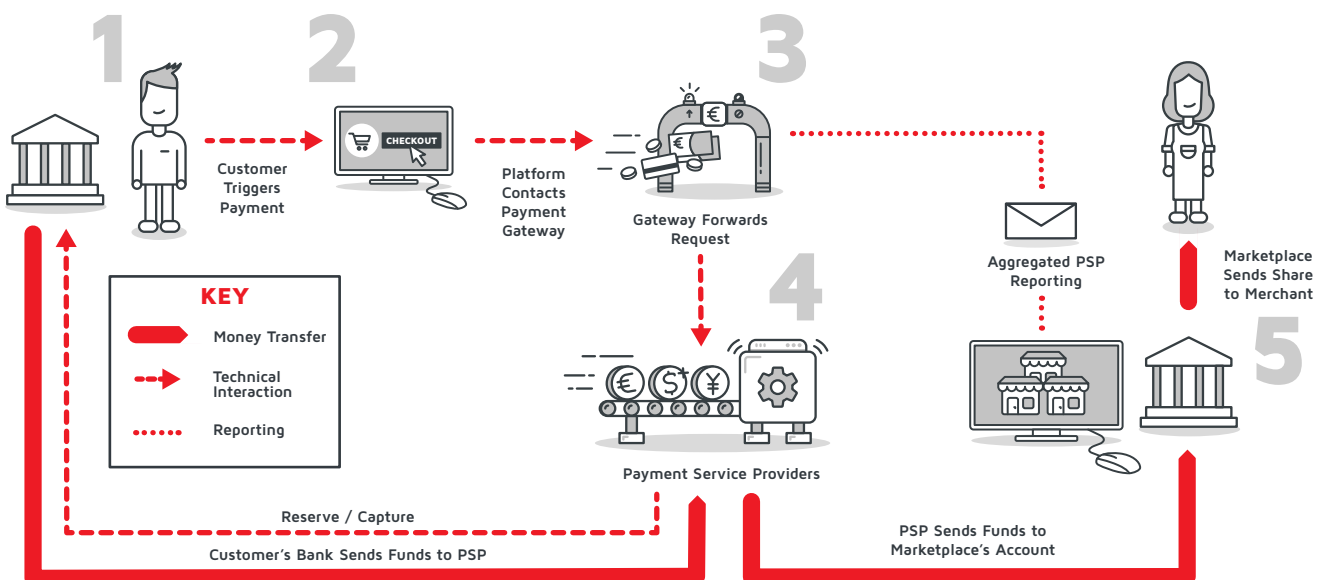
Multi-Vendor Purchases
Any payment system must be able to move money from a user to a seller. Or, in the case of marketplaces that would be: Multiple sellers. Marketplace platforms are designed to enable customers to purchase goods and services from multiple vendors and pay for this multi-vendor shopping cart using a single checkout process.
For a payment system that means organizing the distribution of the collected money and payouts to multiple vendors. Allowing payments to move cross-border complicates this. Currencies will have to be converted and local regulations will demand compliance.

Payment Method & Currency Support
Product owners must choose what payment methods they want to support (credit card, direct debit or other alternative payment methods like e-wallets, bank transfers, BNPL, etc.). Also, they should make clear what currencies will be accepted – an

Sample Payment Gateway Flow for Marketplaces

1 Customer Triggers Payment

2 Platform Contacts Payment Gateway

3 Gateway Forwards Request

4 Payment Service Providers

5 Marketplace Sends Share to Merchant

Aggregated PSP Reporting

KEY
- Money Transfer
- Technical Interaction
- Reporting

Reserve / Capture
Customer's Bank Sends Funds to PSP

PSP Sends Funds to Marketplace's Account

important decision if they want to expand into other countries. Also, some marketplaces may be open to accepting cryptocurrencies or virtual currencies.

Fees

Marketplaces will charge merchants that want to sell goods on the platform. This fee structure should be planned out in detail, as it can turn out very diverse, for instance:

○ Charging merchants a flat usage fee periodically (e.g. monthly, weekly…)

○ Seizing a percentage of each transaction – perhaps with tiered pricing with high-volume merchants paying less per transaction, e.g.

○ Combining the two: a fee for usage plus an additional transaction fee

○ Setting up an entirely different fee structure… the possibilities are really broad

E-Wallet Integration

If the marketplace should include user accounts with their own e-money balances, companies not only need an e-money license – they also need an electronic wallet system, with top-up and withdrawal options.
Such an e-wallet setup will pay out in multiple regards: Customers can pay instantly with their prepaid balance and securely store their payment instruments and customer data. Also, it helps with handling refunds and incentive programs like loyalty points.

Refunding

Customers usually have little patience for convoluted refunding systems. So, product owners should put some thought into it. Typically, money will get refunded to the original payment source. That can take a while, passing through multiple stages, and it also comes with additional transaction costs. Payment systems with e-wallets can feature instant refunds, with the refunded amount being credited to the customer's wallet account.

Loyalty Programs and Vouchers

Marketplaces can offer vouchers and loyalty points to customers. In e-wallet-based systems, those could take the form of real or virtual currencies stored on the customers' accounts. Payment Gateways without an e-wallet system attached to them can instead work with discount codes and the like.

Peer-to-Peer Payments

This will most likely appear in marketplaces that allow re-selling of owned or home-made commodities (think Etsy or Ebay). It implies that any customer on the platform can use their account as a merchant account as well. Marketplace owners have to plan the scope of such transactions and should think if and how they want to charge fees.

Multi-Channel Support

A mobile payment flow may differ from one accessed via desktop, for example. Typing payment information on mobile is even more inconvenient than on PCs. In point-of-sale payments, that is even less of an option. For those cases, marketplaces need proper customer data storage and credit card tokenization. Thus, customers can use stored addresses and payment information during the checkout process using a smartphone. Consequently, companies like Apple and Google offer their own token-based payment solutions already, native to their devices. Integrating them as payment methods will help.
New-tech channels present even greater hurdles for payment systems – especially transaction authentication. Take smart cars featuring marketplaces with in-car payment options, for example. The customer cannot type in their PIN – they are driving the car. Thus, 2-factor authentication with a PIN would not work and other methods have to be defined and implemented.
The emerging solution for such problems may rely on smart contracts and distributed ledger technology. A suitable Payment Gateway thus has to support them.

Sample Payment Gateway System Architecture
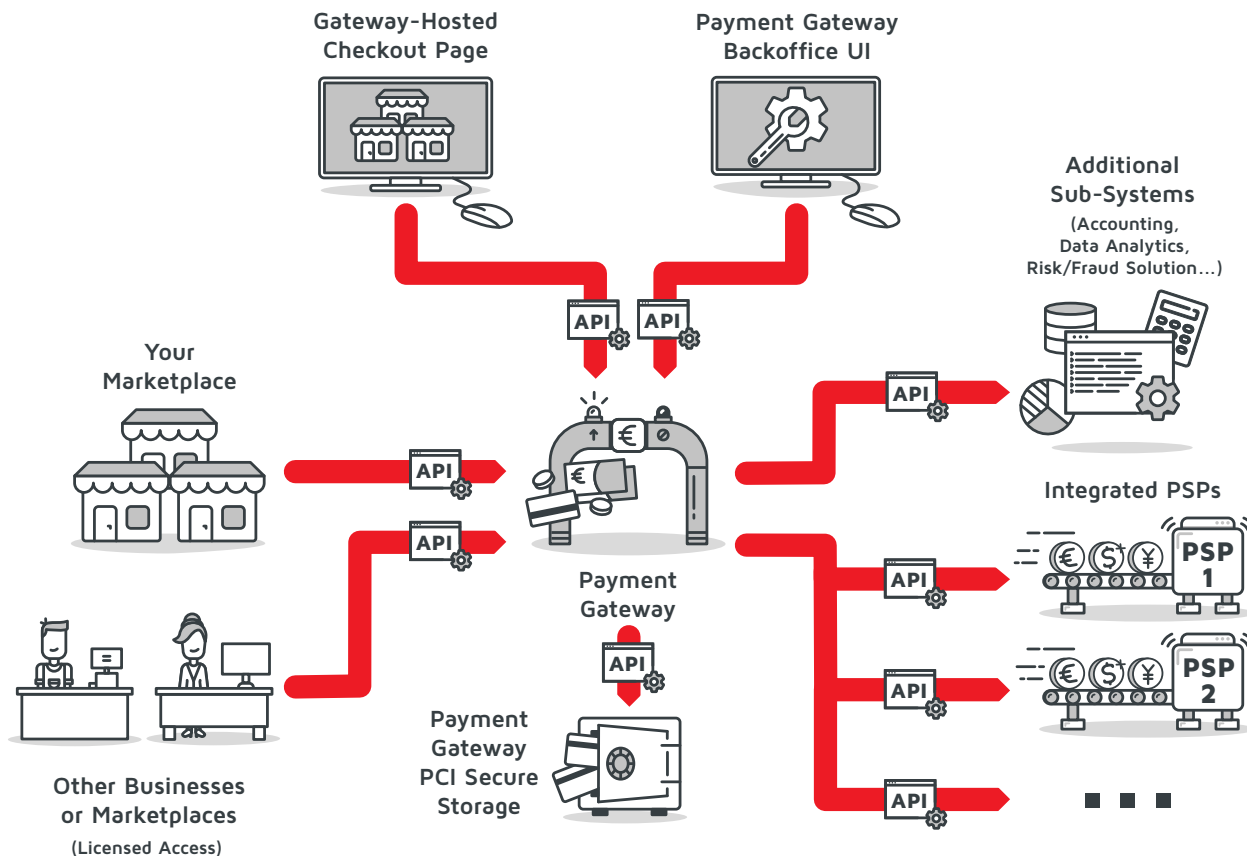
API DESIGN

Designing APIs is one of the most important aspects of Payment Gateway building. It's preferable that one API can process as many different payment methods and data as possible. This renders the Payment Gateway flexible enough to easily bring in new payment methods. The same is true for the onboarding of merchants and customers. Thus, the development team doesn't need to adjust the integration every time changes impose themselves. The Payment Gateway's APIs should always have versioning and change management functions in place, too.

Easy-to-integrate APIs can even act as an additional source of revenue for a company. You can license your Payment Gateway to other marketplace platforms. In return, you demand a usage fee from those marketplaces.

DATA STORAGE AND PROTECTION

Marketplaces that store personal customer data can use it to improve services and processes on the platform. On the other hand, this demands that marketplace owners devise a strategy on how to ensure private and financial data protection. For example, the company must adhere to secure customer authentication rules and feature a solid emergency plan for security breaches. Compliance with local financial regulations and data protection rule sets are also big topics for marketplaces. Some nations require companies to store data in data centers situated within their borders. Marketplaces that operate in multiple nations have to choose:

○ Allow merchants to own a global account.

○ Or have them register one separate account for each nation served.

Specific data policies might force marketplace owners not only to store data securely but also anonymize it and delete it upon user request, for example. Legal consultants will help the product owner to remain on the safer side here.

SECURITY AND ANTI-FRAUD

Fraud prevention and security remain a challenge for e-commerce. Cybercriminals always devise new ways to trick customers – and regulators react. Marketplaces need to adhere to national as well as international regulations. Examples include rulesets such as the credit card industry standard PCI DSS or international requirements for Anti-Money Laundering and Countering the Financing of Terrorism. To meet those regulations, marketplaces have to incorporate Know-Your-Customer (KYC) and Know-Your-Business (KYB) verification, AML/CFT checks, and PCI DSS rules into their day-to-day operations. The same goes for anti-fraud and risk management processes. Product owners must then for example decide if the marketplace will incorporate its own fraud and risk management system. As an alternative, they can integrate third-party solutions via API or roll with the fraud and risk checks of the PSPs the gateway uses.

CODING AND TESTING

Once the features are lined out, the development team gets to work. You need to streamline the process and prevent defects in software.

To do so, it's important to set up functional quality assurance routines such as:

- **Test Automation:** Test automation environments can help to streamline the testing process and spot errors. Examples include automated unit, integration, end-to-end (E2E) and security testing. What's more, establishing a sample Payment Gateway integration will prove useful for testing. It could take the form of an integration environment, on which typical payment flows of the gateway-in-development run. There, executives, developers and potential clients can gain an overview of the payment system.

- **Code Reviews:** To ensure the quality of the solution, regular code reviews are important. Not only do they prevent changes from potentially wrecking your gateway. It will also bring in multiple perspectives on the code and distribute the knowledge in the team, leading to better results.

- **Documentation:** Error messages should be clear and precise – not only for the development team but also for external clients using the payment solution. The same goes for documentation. It requires regular updates, both for internal and for external use.

4. LAUNCHING AND OPERATING THE SOLUTION

Once the MVP is feature-complete, the product can be launched to the public. That's the theory. In practice, the definition of "feature-complete" might change during the last stages of development. Features wanted in the first version of the Payment Gateway might not be ready upon launch or not work as smoothly as anticipated. Automated E2E, security, load and penetration tests are important to prevent bad surprises here. Before inviting customers in, any team must make sure the system will work as supposed.
But still, errors will happen. "Out in the field", user behavior might differ from those anticipated in boardroom meetings. The crux after launch: Making the best of the released MVP and starting an improvement cycle.

" MARKETPLACES MUST ADHERE TO SECURE CUSTOMER AUTHENTICATION RULES AND FEATURE A SOLID EMERGENCY PLAN FOR SECURITY BREACHES. "

OPERATIONS AND MAINTENANCE

The fundamental decision to make ahead of launch will be, by whom the Payment Gateway shall be maintained. We see two options here:

○ **The in-house developers and product managers handle operations and maintenance.** This has the advantage of having the development team grow with the challenges that occur over time. The in-house team will know the product by heart. You will remain in control but also have full responsibility.

○ **External developers operate and maintain the product.** This is an option if the Payment Gateway has been developed by external software engineers. The contract might include continued first- or second-level support, day-to-day operations and maintenance as part of the deal.

PAYMENT SYSTEM MONITORING

To ensure continuous operations, the company in charge must also ensure continuous monitoring. This includes **Technical Monitoring** as well as **Business Monitoring.**
The former means tracking the system's health, checking that all components of your system are up and running at all times. The second refers to watching the number of transactions, new registrations and other events happening on the marketplace. When the numbers differ from the set baselines, analysis might have to follow.

BUGFIXING

There is no such thing as bug-free software. After launch, the product will need continuous improvements. When a bug appears, its severity is determined by the risk it poses to the Payment Gateway's operations:

• **Non-Critical:** Some bugs may be fixed easily, others small enough that the software can go live with them still in the code.
• **Critical:** Those findings may force a product owner to postpone the launch. They are issues that would cause serious financial consequences or damage the reputation of the company. In a continuous delivery environment, critical bugs will also be sorted according to whether they can be fixed in the regular release cycle or if they need to be hotfixed outside of schedule. In payments, critical bugs have to be taken care of on the spot, when they could cause financial damage.

UPDATING

Once a sustainable set-up for Payment Gateway operations and maintenance has been established, it's time to lean back. For the moment, the gate is wide open. But only until customers and the finance or e-commerce industry rush in with new requirements.
The payment landscape is so versatile, new features and payment methods will always require integration. Customers and merchants will demand them. Payment Gateway operators should adhere to the following when expanding the solution:

○ **Schedule and Plan Downtimes:** Or rather: Avoid them if you can. The blue/green deployment strategy might help. Here two separate environments are created. The "blue one" still runs a current version of an application. The "green" one runs the new application version. Thus, the blue acts as a fallback in case of any issues with the new release.

○ **Communicate Updates:** Marketplaces should always inform merchants or clients using the payment solution of any updates. That way, they can plan for technical issues ahead of time and find fallbacks.

○ **Prioritize Security and Compliance:** Following regulations and keeping your system airtight is the most important aspect of operations. Those should always have priority over other feature requests.

○ **Know When Its Time Has Come:** No Payment Gateway will last forever. It's important to notice when major changes have to be made and start the next version of it as a new full-fledged Payment Gateway software project. But having followed the recommendations above, the development team will have a strong foundation to work from.

WHAT'S NEXT?

Following the outline for creating a custom payment gateway helps marketplaces streamline their development efforts.

But in a contested market like that of e-commerce platforms, it's not enough to be functional – companies must be inventive. That means coming up with unique offerings. The payment solution should fit your business model like a glove. Looking at what will drive e-commerce in the future, you should be able to react to changing preferences of your customers. External payment solutions only address the market as it presents itself now. The direction you will take your business may lie out of scope with them.

Will your payment provider be able to handle cryptocurrencies, when decentralization hits?
Can it help you establish an electronic wallet for the shopping environments of the metaverse or the internet of things?
To react to what customers, merchants and regulators want, you must have control over your payment solution, a team of experts at hand and the technological foundation to implement changes quickly. It beats losing revenue waiting for payment companies to meet your requests or the complicated switching of providers post-launch.
So, dare to be in charge. Enable your marketplace vision.

CoreWallet

KEY TO YOUR PAYMENT GATEWAY

CoreWallet is the easiest way to set up your own, self-built payment solution. It is a software framework that comes with all the core functionality to create your specific payment system that can be easily adapted and extended to fit your unique requirements.

- Integrate all your customers' favorite payment methods and currencies.

- Set up smart payment routing to improve transaction success for your merchants.

- Provide electronic wallet accounts to optimize refund handling.

- Meet KYC, AML and CTF requirements with build-in features like document verification.

- Tie in external service providers through APIs and extension points.

- And much more...

Contact us and book a free CoreWallet demo:

info@trimplement.com

SOURCES

1   "The e-commerce market: Handbook 2022", Asendia, 2022,
     accessed 14 November 2022, p. 6. ↗

2   "Unlocking the value of the platform economy", Dutch Transformation Forum, 2018,
     accessed 14 November 2022, p. 11. ↗

3   Koetsier, John (2020), "44% Of Global eCommerce Is Owned By 4 Chinese Companies.", Forbes,
     accessed 14 November 2022. ↗

4   Surholt, Frank (2022), "OTTO's sales increase by 13%", OTTO, accessed 14 November 2022. ↗

5   Power, Denise (2019), "Looking to Get Your Brand Discovered? Why a Niche Online Marketplace
     Might Be For You", U.S. Chamber of Commerce, accessed 14 November 2022. ↗

6   Perez, Oscar (2021), "Online marketplace payments to hit USD 8.7 trillion by 2025", Finextra,
     accessed 14 November 2022. ↗

7   Marhamat, Bobby et al (2022), "State of Consumer Behaviour 2022." Raydiant,
     accessed 14 November 2022. ↗

8   Marhamat, 2022.

9   Gilbert, Nestor (2022), "74 Compelling Online Shopping Statistics: 2021/2022 Data Analysis &
     Market Share", FinancesOnline, accessed on 14 November 2022. ↗

10   Gilbert, 2022.

11   Marhamat, 2022.

12   "The metaverse could be tech's next trillion-dollar opportunity: These are the companies making
     it a reality", CBInsights, 2022, accessed 14 November 2022. ↗

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