Beyond POS

WHITE PAPER

Going Beyond POS to a Unified Commerce Platform

The New Path Forward for Enterprise Restaurants

July 2022

Executive Summary

This white paper explains why the restaurant industry needs a unified commerce platform if it's ever going to get closer to data-driven experiences that enable speed, convenience, and personalization.

The industry is ripe for reinvention like never before. Disjointed systems and data, an overly complex technology stack, and evolving guest preferences—plus a global pandemic—have set the table for new ways of doing business.

A unified commerce platform forms the foundation upon which to build or rebuild to ensure agility and scalability for years to come.

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Introduction to Next-Gen Cloud Architecture

Today's guests demand more convenience, speed, and personalization than most restaurants can deliver. To meet these needs, next-gen cloud systems must become the go-to model for restaurants.

The pandemic accelerated and cemented the trend towards faster, more digital ordering in the restaurant industry. As guests demanded new ordering modes, brands added these technologies around their Point of Sale (POS), continuing to build on top of an already shaky foundation.

Each new order channel introduced different data repositories and incompatible data silos, further delaying any hope of optimizing revenues and costs in a timely manner.

For large restaurant brands running on outdated client-server technology (while also supporting a myriad of digital order channels) the situation is untenable.

Moving toward a more unified and connected platform approach built on next-gen cloud architecture is no longer "optional" but a clear "must have" for brands looking to grow and thrive.

Many brands are running on first-gen cloud architectures that mirror the challenges of legacy client-server technologies.

Part One

The New Restaurant Mandate: Unify the Physical and Digital Experience

Unification is the most common theme running across all enterprise restaurant brands.

With the impact of the pandemic firmly baked into guest buying behavior, there is a rising preference for digital ordering, mobile apps over desktop, and off-premises dining. But the fact remains that more than 50% of sales will still come from **physical stores.**

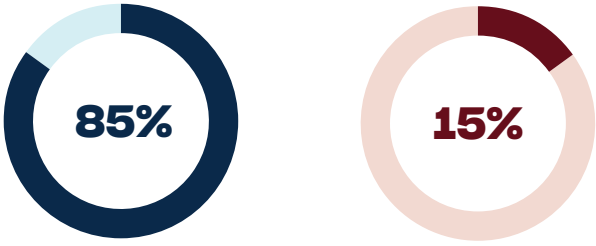
Given the higher demand for digital ordering channels, combined with the importance of in-store revenue streams, **brands can no longer view in-store technology separately from digital technology.**

Qu's 2022 State of Digital report revealed that restaurant brands overwhelmingly feel it is time to upgrade and consolidate their systems to cope with changing guest demands—plus an overly-complex and disjointed tech stack.

The Big 2021 Mandate: Consolidate Systems

Digital Ordering Sales will Continue to Increase, said 85% of participants

In 2022, do you expect your digital ordering sales to:



Expect it to increase

Expect it to remain the same

Source: Qu Digital Survey 2022

The Complex Restaurant Technology Ecosystem

The restaurant technology ecosystem will continue to grow and evolve at a rapid pace. Meanwhile, quick service and fast casual operators need to constantly find better strategies to **improve speed of service, incremental revenue, and efficiencies while managing an unwieldy tech stack.**

New tech solutions are introduced every day, with restaurant tech investments at an all time high. To simplify the complex landscape, we've organized it into three main areas:

- Take Orders — includes all guest-facing ordering channels (on- and off-prem) and payment management
- Make Orders — kitchen, production and fulfillment services
- Serve — Loyalty, back of house functions, revenue and cost management

1. Take Orders

- In-Store POS, Drive-Thru, Handheld/Tablets, Kiosks, Order Confirmation Boards
- Web Ordering, Mobile Ordering App, Catering, Third-Party Delivery & Marketplaces

2. Make Orders

- Kitchen Display Systems
- POS — via Multi-Channel Order Management (Third Party Marketplaces)
- Order Management System
- Order Fulfillment System

3. Serve Orders & Revenue Management

- Technologies for serving orders include order pickup (curbside, drones, guest communications, etc.) and third- or first-party delivery.
- Revenue-enhancing technologies include: Loyalty Programs, Gift Cards, Email Marketing, SMS/Text, Search, Social Media Management, Digital Menu Boards, and Customer Relationship Management (CRM).
- Cost management technologies include: Inventory Management, Purchasing, Labor Management, Scheduling, Analytics, Accounting, Payroll, and Fraud Prevention.

Part Two

The Business Case for a Unified Commerce Platform

Transitioning to a unified platform is a **total mindset shift** and paradigm change for most restaurateurs who've acquired lots of legacy and modern tech over the years. As the mandate to consolidate and unify systems continues — and if guest data is ever to be truly captured and unified — a more holistic platform approach will be necessary for the larger brands.

Large, multi-unit restaurant brands will be best served by building a business case for a unified commerce platform for these three reasons:

A unified commerce platform brings together all the disjointed elements that multi-unit brands have been managing separately into one connected system.

1. Full tech stack modernization

- Moving from dated legacy systems (including client-server and first-gen cloud platforms) to a new system enables restaurants to build and customize for many years to come.

2. Faster, more scalable digital transformation

- As digital ordering becomes more pervasive and new order channels continue to arise, digital transformation is now the norm and a platform approach provides the foundation to transition more efficiently and confidently.

3. Owning the guest experience

- The platform approach gives your internal IT team the solid foundation to build on, with all the core functionalities provided right out of the box. The data is unified and getting to one view of the guest along their ordering journey is within reach.

A connected ordering experience must not only permeate self-service order channels like web, mobile app, and third-party sites but also encompass in-store order channels like drive-thru, curbside, kiosk, and phone orders that are driven through the POS.

The Big Benefits of a Unified Commerce Platform

Additional benefits of a platform approach include:

Scalability — Built for massive scale and growth so that with proven support for millions of transactions you can grow with ease.

Future-Proofing — Platform providers keep up with the latest trends freeing restaurant teams to focus on improving the menu and guest experience.

Flexibility — The ability to integrate with other platforms, data, and software is built into the platform.

Reliability & Stability — A next-gen cloud platform ensures continuous operations and minimizes downtime.

Security — Flexible permission model with PCI compliance and end-to-end encryption/CC info.

Extensibility — The ability to add fields, data, and UI changes as new use cases develop.

Faster Development Timeline — An API-first micro-services architecture enables rapid development and integration of new technologies, reducing time to market.

Maintainability — With less code to maintain, developers can focus more on the user and guest experience.

Speed — Unified menu management and cross-brand management allow for accurate and timely updates to all business impacting functions.

Now is the time to invest in a solution that will allow you to adapt and thrive as new technologies emerge and guest behaviors continue to evolve.

Part Three

Core Capabilities of Qu's Unified Commerce Platform

Qu was founded by veterans in the technology and restaurant space with a clear vision about how the cloud and digital ordering would disrupt the industry as a whole.

Even before the pandemic, Qu's enterprise platform was developed with changing market dynamics and constant evolution in mind. Qu's technologists were focused on the future and foresaw inevitable digital transformation and how that would impact in-store operations.

To build out a compelling long-term offering, we developed a set of key Business and Technology Capabilities needed for modern restaurant operations.

Qu's unified commerce platform provides not only the building blocks for applications that are guest or employee facing (Ordering, Payments, Production, Fulfillment), but also the APIs and reference integrations to traditional revenue and cost management products (Loyalty, Martech, Inventory, Labor, etc.). These APIs ensure that applications can easily leverage those data sources to cover the entire spectrum of restaurant operations.

Business & Operating Capabilities

Qu's platform delivers business value immediately, enabling you to better manage your operations across several key functional and operational areas:

Unified Omnichannel Ordering — Accept orders in-store, online, and from third parties to provide a unified guest experience regardless of channel. Leverage Qu's single menu approach and open architecture to quickly scale and extend reach to new channels and new customers. Give your customers more choice, in terms of order placement and fulfillment, as well as the ability to modify and customize items.

Unified Menu Management & Setup — Configure different types of menu items, pricing options, discounts, taxes, and payment options to eliminate complexity inherent in managing multiple menus at multiple locations.

Infinite Menu Depth - Maximum flexibility in configuring your menu items with no limit on the number of layers of modification.

Unified Menu Items - Use a data model with contextual capabilities to manage product and channel uniqueness while maintaining one single source of truth.

Unified Pricing Engine - Calculate pricing for in-store and digital menu items in one place - sales/check totals, pricing, discounts, taxes, service charges, and donations from a common core to ensure all calculations are consistent across channels. Benefit: Produces consistent numbers across your system; no need to worry about reconciliation and discrepancies between in-store POS, digital, third-party delivery pricing.

Payments - Ability to accept multiple forms of payments including credit cards, gift vouchers, cash, contactless, and crypto-currencies, increasing payment speeds. Flexibility to work with any payment processor of your choice.

Customer Management & Unified CRM - Track customer information, offers, and loyalty information to improve marketing during order flow and monitor guest transaction behavior with one consistent CRM - one customer record across all systems to provide a consistent view of your customers.

Labor Management - Track employee information, time punches, and labor rates to closely monitor and manage labor costs. Enforce labor schedules, allow or disallow early/late clock-ins and breaks. Generate payroll and improve payroll processes by auditing time entries, correcting missing time punches, reviewing weekly shift entries, and exporting data to third-party systems. Control fraud and minimize risk/business losses by reviewing no sales, open checks, open tills, $1 transactions; and receive predictive fraud alerts.

Unified Kitchen Management - Ease of use for kitchen station worker; clean interface, dynamic cells removes scrolling; reduce number of errors for kitchen worker through improvements in kitchen display and user experience. Manage kitchen configuration and track/increase speed of service. Optimize kitchen operations and support multiple brands (including virtual brands, ghost, host, and cloud kitchens) from one kitchen, driving stronger connections between front and back of house. Move from old-fashioned paper tickets to an all-digital solution (operational cost savings, paper savings).

Unified Brand Management - Easily launch and administer multi-brand, co-branded, and virtual brand offerings from a single store with brand support from one consistent user interface and back-end.

Dynamic Stores - Manage stores and locations by adding a store to multiple hierarchies so it can be in different configuration groups. This allows each store to inherit menu, discount, tax, service charge, and employee data based on configuration needs rather than ownership.

Permissions - Assign granular policy-based control across different parts of the platform to easily provide and restrict access to employees based on role.

Unified Data Management - Integrate with third-party inventory, labor, and accounting systems or build your own in-house data warehouse. Get real-time access to all data elements including menu items, checks, employees, customers, cash, payments, discounts, donations, service charges.

Architecture & Technology Capabilities

Qu's Unified Commerce Platform is built on a modern technology stack and is performance tested with more than 100 million transactions per day and more than 300,000 terminals at peak times with peak loads. It forms the backbone of large restaurant operations and scales for growth.

The key technology capabilities underlying our modern stack include:

Micro-Service Architecture — Uses independent networked components provides improved scalability, better fault isolation, and optimized scaling decisions.

Containerized Software — With each package abstracted away from the host operating system, they are able to run across any platform or cloud, free of issues.

NoSQL Database — Provides support for elastic scaling and flexible data models, with efficient, scale-out architecture instead of expensive monolithic architecture.

Commerce Cloud — While the platform is built to be used in the cloud, it also supports zero downtime, offline order-taking and payment processing. Qu's architecture offers three layers of redundancy, through: i) peer-to-peer/terminal-to-terminal mirroring, ii) terminal to in-store cloud, and iii) in-store to above-store cloud communication.

In-store Cloud — An in-store cloud device uses Edge Computing; computing is done close to the actual source of the data, reducing dependency on remote databases.

Global Load Balancing — Allows intelligent distribution of network traffic across server resources located in multiple geographies.

Peer-to-Peer Architecture — Replicates checks, clock-ins, and tills across all in-store terminals to ensure no data is lost in the event a terminal goes down.

Global Load Balancing — Allows intelligent distribution of network traffic across server resources located in multiple geographies.

Global Fail-Over — The platform can be quickly moved to a standby server to eliminate unplanned downtime.

Architectural Extensibility — Interfaces and clients are built to be extended internally and by third parties, and are not dependent on specific platforms.

Workflow Fluidity — APIs support multiple user flows.

Flexible Permission Model — Gain fine-grained access control based on policies and user role.

Credentialed API Access — Limit access to all data based on API.

Monitoring — Built-in infrastructure monitoring and intrusion detection for maximum reliability.

Part Four

A Look Under the Hood: Next-Gen Architecture & APIs

Open APIs form the foundation of the Qu platform and all its capabilities — the core APIs are used to deliver additional applications and support the deployment of clients (such as POS and kiosks). Our bi-directional APIs can also be used to build your own clients from scratch and develop a unique brand experience for your guests.

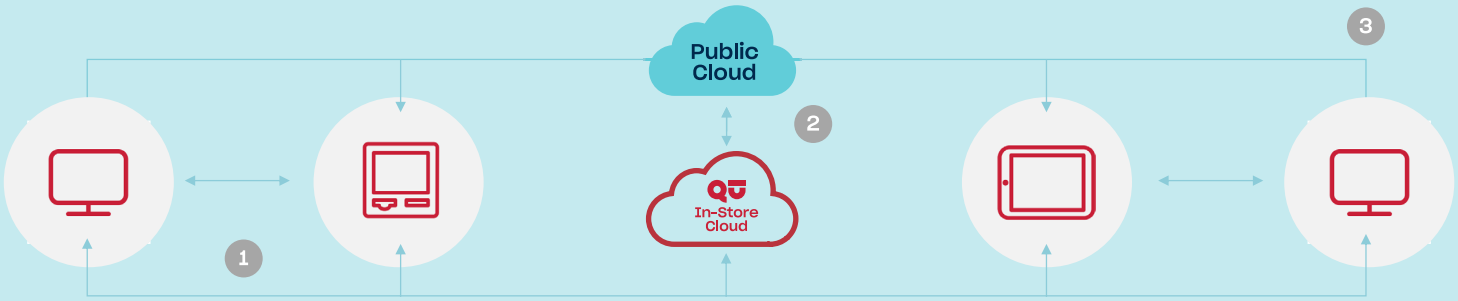
The platform was architected using a micro-services, containerized approach (in contrast to the monolithic manner by which most POS systems can be characterized). Though these domain-based APIs are independent, they communicate with each other and are responsible for their own functionality. This provides brands with tangible benefits from a development and deployment perspective.

A crucial element of Qu's platform and API model is a departure from traditional POS platforms — that is, **our platform architecture didn't start with the POS client in mind.** With POS now simply one of many touch points that comprise a restaurant's technology ecosystem, the deliberate choice to create our platform from a decoupled "omni-channel commerce perspective" sets restaurants up for a scalable and maintainable future.

Qu's Innovative Commerce Cloud

While APIs have led to advancements in software development, the availability of high-speed connectivity and distributed computing have in turn led to different deployment models, many of which take advantage of cloud and edge computing. Although a (public) cloud-first approach has long been espoused as a preferred method to reduce demands on POS terminals, the benefits derived from this model can often be diminished during times of high stress or lack of network connectivity.

Qu's cloud-enabled — not cloud-dependent — model was designed specifically to provide high levels of uptime, faster transaction processing, and enhanced reliability. The Commerce Cloud's first-of-its-kind three-layer protective redundancy takes Qu's leading edge, API-first approach and microservices architecture to a new level of speed and stability for enterprise restaurants.



Multiple layers of redundancy = Better business continuity

1. Each terminal* talks to the in-store cloud
2. The in-store cloud communicates with the above-store (public) cloud
3. Every terminal automatically switches to above-store cloud if necessary

Qu's in-store cloud architecture uses **Edge Computing** to bring the services close to the actual source of the data—reducing dependency on remote databases and providing sky-high levels of business continuity.

Our architecture contains all the APIs necessary for a restaurant to operate without access to the cloud above-store — that is, core functions like authentication, configurations, and operations specific to each restaurant are available locally. Additionally, every proxy for each client in the store also allows for failover, so if connectivity is lost (or something else goes wrong outside the restaurant), no change in regular operations occurs, as the clients will simply switch over to the locally replicated platform.

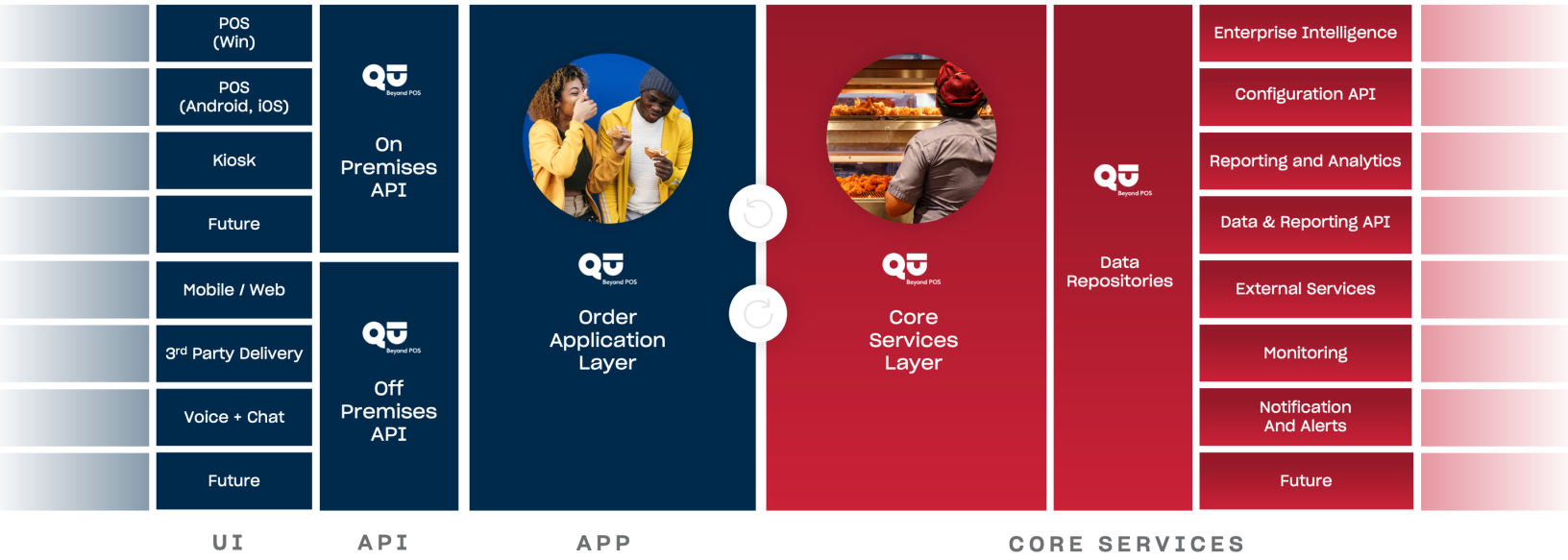
This unique combination of an API-led approach with a highly reliable cloud model doesn't simply provide technical or operational benefits. Qu's platform — in contrast to many legacy architectures — allows restaurants to realize many business benefits, from day-to-day operational continuity, flexibility, and future-proofing. This is reflected in how our platform can be extended, so that enterprise brands can create and deploy truly customized brand experiences.

Qu's API-Forward Approach

Qu provides the APIs, applications, and documentation for technology teams at enterprises, resellers, and system integrators to extend and build a customized experience for their guests both online and in-store.

Qu's platform was designed to be extensible in two key areas:

1. **Core APIs —** Qu's core APIs can be used to develop a completely new flow, look, and feel for client applications.
2. **Customized End-User Experiences —** Qu's application functionality can be extended by harnessing our open APIs and flexible codebase.



Core APIs

Qu's native applications and end-user touchpoints engage with our own purpose-built, bi-directional APIs to create appealing, customized user experiences. This means that we consume our own APIs.

- **Configuration -** The main API used to read and write menus, discounts, service charges, stores, meal periods, hardware configuration, and other items. This is used by Qu to generate menus based on order channel, order type, meal period, and store. The menu is used by POS, online ordering, and kiosk. Third-party applications such as digital menu boards use it to read menu data. It can also be used by third-party menu management systems to inject menus into Qu client applications.
- **Authentication -** The main API for all authentication for both users and systems. This is used to create, edit, or delete users in the system.
- **Order -** Includes Qu's pricing engine, discount engine, tax engine, and service charge engine. This has all the capabilities needed to price menu items and calculate the final order amount – both online and in-store.

Core APIs (continued)

- **Payments -** Integration interfaces to payment processors such as Worldpay, Firstdata, Chase Paymentech for credit card processing, credit card refunds, gift card activation, gift card reload, and balance inquiry – both online and in-store.
- **In-store -** Built on top of Qu's menu, order, and payments API, including additional capabilities for in-store operations such as employee functions, cash and till management functions, hardware, offline processing, and check-sharing between terminals.
- **Kitchen -** Built on top of Qu's in-store API, including additional capabilities for running kitchen operations, bump management, production management, and speed of service.
- **Loyalty -** Includes the ability to create and edit guest records, guest transaction tracking, and integrations with loyalty providers such as LevelUp, Punchh.
- **Labor -** Includes the ability to create, edit, or delete employees, and create and manage employee schedules for schedule enforcement.
- **Data -** Includes real-time data generated by Qu such as check, product, cash, payment, and labor information.
- **Analytics -** Includes detailed access to summarized analytics on various enterprise metrics including sales, payment, labor, and stores.
- **Alerting -** Configure and receive alerts about enterprise-level rules on sales, labor, and other key metrics. Also includes smart and predictive rules based on interesting and unusual patterns and exceptional trends.
- **Marketplace -** Bi-directional integration to third parties for menu synchronization and order integrations including Uber Eats, Doordash, GrubHub and Postmates.
- **Delivery -** Integration with delivery services such as DoorDash Drive, Uber Eats, Postmates for delivery only, without needing to use their ordering marketplaces.

Building Rich, Customized End-User Experiences

POS, online ordering, Enterprise Intelligence, and Reporting are examples of applications that can be made available out-of-the-box to third parties to provide enterprise brands with additional — and more consistent and unified — capabilities.

Rather than building new applications completely from scratch, Qu's open architecture and codebase enable restaurants to enhance the functionality of their tech stacks with minimal development effort while ensuring their unique business needs are met. For example, cashiers can clock in and clock out on Qu's POS, and with our microservices-led approach any third-party employee management software can use our APIs to get insight in real time about employee activity.

Qu's platform approach harnesses containerization and microservices to empower restaurants with flexibility and scalability. Examples include:

Point of Sale (POS)

Leverage Qu's robust and intuitive POS to provide service behind the counter, in the drive-thru, and via curbside. Extend order-taking to handheld mobile and payments devices for your employees and guests, powered by our open APIs.

Our capabilities allow restaurants to quickly create new ordering channels and ensure consistent guest experiences, through our bi-directional APIs, unified menu management, and robust data engine.

Online Ordering

Deploy our white-label online ordering solution to take your brand digital quickly or plug into our APIs to create a fully customizable online ordering or mobile app experience on top of your platform.

No matter which route you take, you'll be able to leverage menu data by location, order channel, or order type, and build an order based on guest interaction, while ensuring consistency across your different ordering channels. All your pricing, discounts, taxes and service charge calculations are handled by Qu's powerful menu engine.

Kitchen Solutions & KDS

Fully-integrated kitchen production and fulfillment systems reduce prep time and drive efficiency. Bi-directional APIs integrate all order channels with your POS and KDS into one simplified workflow. Automated order injection; bucket digital orders and set lead times to optimize production workflows.

Kiosk

Select from stand-alone kiosk display or repurpose your POS into a guest-facing kiosk with Qu's kiosk solutions. Leverage our white-label kiosk solution, or build your custom guest experience into the system using components that are already proven to work. Match the functionality and branding of your kiosk interface to your mobile apps, online ordering, and in-store collateral.

Ghost Kitchens & Virtual Brands (KitchenUP)

A dedicated, single-tablet solution for cloud kitchens and virtual brands. Single menu management with one consistent workflow and bi-directional integrations with third-party delivery providers. Unified cross-brand, cross-channel reporting and one dashboard for management and reporting.

Third-Party Delivery Management

A purpose-built conduit that reduces tablet chaos, by injecting third-party delivery orders automatically into the POS and to the kitchen without manual order entry and acceptance. All digital menus are managed from the same interface as POS and online ordering, with deep customization capabilities for pricing, availability, display attributes, nutrition, and modifiers for individual delivery providers or in groups.

Reporting

Qu's API reporting capabilities make it easy for brands to quickly build their own custom analytics. It exposes all of the check, labor, product, and cash data in detail, and the same data is used by Qu's reporting tools.

Developers can use the real-time data feed from Qu to easily create their own custom dashboards and analytics with additional visualizations and data cuts to support their unique business needs.

Disruption Will Continue

The shift to digital shouldn't be a scapegoat for the lack of innovation in the industry — it should serve as an indicator of the kind of disruption that's long overdue in the space.

What exactly does that mean for restaurants? The changes on the frontier will be fueled by new technologies and more flexible ordering modes like:

Voice-Enabled Ordering — Voice ordering through phones, virtual assistants, and cars are already at play for some brands, and will only become more prevalent as voice recognition technology improves and becomes even more common.

Chatbots and Text Ordering — Similar to voice ordering, you can expect to see more usage of chatbots, particularly as brands capitalize on their usage to not only automate elements of the guest experience, but to suggest items and drive higher ticket averages. Text-enabled ordering will also appeal to brands and guests that value speed and efficiency.

Data-driven Marketing and Loyalty — Greater focus on data and analytics to drive deeper guest engagement — along with the use of restaurant-specific customer relationship management — will help brands make the most of their marketing spend. This means aggregating and normalizing data from many sources, including social, digital ordering, and restaurant point of sale systems.

Dynamic Pricing and Menus — Leveraging both real-time and historical transactions combined with contextual information like weather, demography or events, machine learning algorithms are able to dynamically control menus and price dynamically optimizing individual locations offering increasing at turn operation efficiency and margins.

Drone Delivery — Drone technology is already in play, particularly as guests demand faster delivery times, and as restaurant brands seek to control costs. Combined with last-mile delivery by automobile, delivery times could be cut dramatically by this multi-modal system.

AI/Machine Learning-Powered Experiences — With recent advancements in artificial intelligence, fully automated order-taking technology is already a reality for certain brands. The technology can be used to not only alleviate challenges with labor and costs, but to drive higher ticket averages through recommendations and upselling based on prior purchase activity.

Robotics and Automated Food Preparation — Order-taking isn't the only element of the restaurant experience that will be increasingly automated — concepts the world over have implemented robotics to prepare everything from stir-fries to iced mochas.

Computer Vision — Knowing guests before they arrive, for example, when a car enters the drive-thru. Computer vision can read license plates. Another example: Cameras for the prep line (expo items) to make sure all the right food items are in the right bag.

The deployment and enablement of these technologies will be made easier with a **secure, customizable, and highly extensible platform** that invites and encourages innovation.

Conclusion

The unified commerce platform approach has arrived for the restaurant industry.

Brands that fail to adapt to the changing world will fall behind.

Qu's platform was built to meet digital-first guest demands and handle inevitable future disruptions. It provides the solid foundation and the building blocks for your team to create custom solutions to power every area of your business.

A forward-looking platform solution will help you **reliably engage guests better, increase check size, and scale sustainably into the future.**

Go forth and be deliciously agile!

NOTE: While in this white paper we focus primarily on restaurant operators, resellers, and system integrators working in the restaurant space, the platform can be easily extended and used by enterprises and developers in adjacent industries such as groceries, c-store, hotels, casinos, and others.