

ЕКОНОМІКО-МАТЕМАТИЧНЕ МОДЕЛЮВАННЯ БІЗНЕСОВИХ ПРОЦЕСІВ

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DOI: <https://doi.org/10.20535/2307-5651.36.2026.360563>**Belanovskyi Anton**

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PLATFORM ORCHESTRATION OF AN ESTABLISHED BUSINESS ECOSYSTEM

The article conceptualizes a digital platform as a governance and orchestration tool for an established business ecosystem in the low- and non-alcoholic beverage segment of the FMCG industry. The study addresses the problem of fragmented interactions, data silos, and inefficient coordination among ecosystem participants. Using a qualitative, ecosystem-oriented case study and industry-mapping approach, the author identifies 12 key participant groups and maps 32 typical interaction cases. The platform is proposed as a mechanism for integrating operational, logistical, service, telemetry, marketing, and analytical processes through data accumulation and redistribution. The findings demonstrate that platform-based orchestration can reduce transaction costs, eliminate process duplication, improve transparency, enable predictive maintenance and demand forecasting, and enhance overall ecosystem efficiency beyond the IT sector.

Keywords: business ecosystem, platform ecosystem, digital platform, FMCG, orchestration, data, process automation.

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ПЛАТФОРМНА ОРКЕСТРАЦІЯ УСТАЛЕНОЇ БІЗНЕС-ЕКОСИСТЕМИ

У статті обґрунтовано доцільність розгляду цифрової платформи як інструменту оркестрації вже сформованої бізнес-екосистеми на прикладі сегменту безалкогольних та слабоалкогольних напоїв FMCG. Актуальність дослідження зумовлена фрагментарністю взаємодії між виробниками, дистриб'юторами, логістичними та сервісними компаніями, роздрібними мережами, HoReCa, виробниками холодильного обладнання та телеметрії, що призводить до розрізненості даних, дублювання процесів і підвищення транзакційних та операційних витрат. Метою статті є концептуалізація цифрової платформи як механізму узгодження інтересів учасників, акумулювання, обробки та перерозподілу даних, а також автоматизації ключових операційних процесів для підвищення ефективності функціонування як окремих учасників, так і екосистеми загалом. Методологічну основу становить якісний екосистемно-орієнтований аналіз галузевого кейсу із застосуванням підходу industry mapping. У дослідженні ідентифіковано 12 груп типових учасників екосистеми та проаналізовано 32 ключові кейси їх взаємодії, що дозволило систематизувати основні операційні процеси та типи даних, які генеруються в межах екосистеми (дані про споживання, продажі, запаси, рух продукції та обладнання, показники роботи холодильного обладнання, сервісне обслуговування, фінансові та ESG-показники). Доведено, що інтеграція цих даних на єдиній платформі створює передумови для автоматизації замовлень і логістики, впровадження предиктивного технічного обслуговування, підвищення контролю дотримання стандартів викладки та температурного режиму, оптимізації запасів і маршрутизації. Наукова новизна полягає в обґрунтуванні платформи як інструменту управління усталеною галузевою бізнес-екосистемою поза межами IT-сектору. Практичне значення результатів полягає у формуванні концептуальних засад проєктування платформеної екосистеми для діючих промислових бізнес-екосистем з метою підвищення їх прозорості, керованості та економічної ефективності.

Ключові слова: бізнес-екосистема, платформена екосистема, цифрова платформа, FMCG, оркестрація, дані, автоматизація процесів.

Problem statement. In modern scientific literature, the platform ecosystem is generally considered a type of business ecosystem, where the platform leader develops a specific software platform, or "core," as well as software capabilities that enable third parties to connect to the platform. Various complementors develop software applications for this platform that extend its functionality, creating addi-

tional value for users. This creates network effects: the more applications based on the platform, the more valuable it is to users. As more users join the platform, an increasing number of complementors become interested in joining the ecosystem and creating their own complementary offerings based on it. Thus, the platform leader, application developers, system integrators, and users form the platform ecosystem.



However, researchers have not sufficiently addressed the use of a platform as a tool for orchestrating existing business ecosystems in industries unrelated to software. This study focuses on the principles for creating a platform ecosystem for a functioning business ecosystem. It uses the low- and non-alcoholic beverage segment of the fast-moving consumer goods (FMCG) industry as an example. The problem lies in the fragmented interactions among participants in the beverage business ecosystem, which creates “data islands” and operational gaps. The lack of a consolidated source of data on sales, inventory, product placement, and refrigeration equipment conditions leads to a decline in sales due to merchandising errors, downtime associated with untimely replenishment of product inventory, and refrigeration equipment breakdowns, as well as increased service and logistics costs. Existing processes are largely manual or unevenly automated using disparate tools from individual participants in the business ecosystem and do not provide timely, transparent coordination of decisions, especially during peak periods. These issues reduce the efficiency of the entire business ecosystem and require a systematic solution through coordinated orchestration of data and processes.

This study does not aim to determine which player would be best suited to take on the role of business ecosystem leader and invest in creating an ecosystem platform. Since the study only considers the main cases of interaction between participants in the beverage business ecosystem, the lists of typical interactions and data types possessed by participants are not comprehensive.

Analysis of recent research and publications. Platform ecosystems are considered in contemporary scientific literature as technological solutions with modular architecture based on a technological platform created by an ecosystem orchestrator and a periphery that unites complementors who develop and implement innovative technological additions and individual offers based on the platform, thus creating additional value and enhancing network effects, i.e., encouraging new platform users through their offerings, as defined by Gawer and Cusumano in various works [1; 2; 3; 4], as well as Tiwana [5], and Thomas, et al [6].

Hein et al. propose viewing the digital platform ecosystem as an interaction between the platform leader, autonomous complementors, and consumers based on value creation and distribution mechanisms [7]. The authors identify two key value mechanisms: transactional, which involves mediation between supply and demand and scaling through two-sided network effects; and innovative, which involves generating new solutions based on open interfaces, APIs, and SDKs. These mechanisms ensure both operational efficiency and the ecosystem's ability to evolve.

Summarizing the typology of platforms, Thomas et al. distinguish organizational platforms (integration of internal resources for rapid business reorientation), product platforms (shared technical architecture for creating product variations), market intermediary platforms (multilateral markets without asset ownership), and ecosystem platforms, in which the platform is a combination of key technologies and technological standards that facilitate the interaction among ecosystem participants aiming to jointly create value and “complementary offerings” [6]. Notably, these platforms can also serve as a coordinating structure for a broad network of businesses [1; 8].

Another area of research focuses on platform formation strategies. Gawer and Cusumano (2008) describe two strategies: coring, which involves creating a new industry “core”

around which the market is built, and tipping, which involves capturing an existing market by consolidating network effects and partner coalitions. These strategies illustrate how a platform can become the de facto standard around which other firms cluster [8].

In addition to the advantages, recent studies also identify systemic risks of platform ecosystems. Jacobides, Cennamo, and Gawer (2024) demonstrate that platforms emerge as a response to “market failures” – problems of matching supply and demand, innovation, and cooperation – but simultaneously generate their own structural imbalances, particularly the uneven distribution of value created between the leader and the complementors [9]. This raises the question of the platform ecosystem as a tool for governing an established business ecosystem.

Despite significant progress in researching platforms as drivers of innovation in technology industries (software, mobile ecosystems), there is still insufficient research on how platforms can serve as orchestration tools in established business ecosystems of particular industrial sectors. The present article addresses this pertinent gap.

Formulating the purposes of the article. The purpose of this article is to conceptualize a digital platform as a tool for orchestrating the existing business ecosystem in the FMCG beverage sector and to demonstrate how the platform can align interests, accumulate and distribute data, and automate operational processes to increase the efficiency of each participant and the ecosystem as a whole.

To achieve this goal, the article addresses the following tasks: (1) describe the structure of the beverage distribution business ecosystem in FMCG, including the roles of typical participants and the relationships between them; (2) map the main cases of interaction between participants, define the essence of operational processes as a basis for automation; (3) identify the types of data held by individual participants that can be accumulated, processed, and redistributed using a digital platform.

The research methodology is based on a qualitative, ecosystem-oriented analysis of an applied industry case study. An industry mapping approach was used to reconstruct the current configuration of the beverage supply ecosystem in FMCG. Based on the analysis employed for individual cases of interaction between participants, the article proposes a platform orchestration model that redistributes operational data and automates interaction processes between participants.

Presentation of the main research material. The low- and non-alcoholic beverage segment of the FMCG industry exhibits all the main characteristics of a business ecosystem [10]. This segment includes beverage manufacturers, refrigeration and specialized equipment manufacturers, retail chains, hotels and restaurants, distributors, and service and logistics companies. These players interact, compete, complement each other, and are interdependent. Together, they create value within the ecosystem and for the end user – the beverage consumer.

Participants in the business ecosystem, their roles and characteristics.

Beverage manufacturers (PepsiCo, Coca-Cola, Carlsberg, AB InBev, Efes, Obolon, etc.) produce finished products and bottle them in various retail containers (aluminium cans, glass bottles, PET), as well as wholesale containers for further dispensing (kegs, packs with syrups), and primarily sell their products wholesale through three sales channels:

– Traditional Trade channel encompasses sales through various non-chain, independent retail outlets which are not

affiliated with large national or international retail chains and do not have centralized purchasing. Such outlets include, but are not limited to, small grocery stores near the home, kiosks, stalls, gas station stores, small regional mini-chains, market outlets, and seasonal outlets.

- Modern Trade channel is constituted by sales through key customers, i.e. large national and international retail chains (ATB, Silpo, Auchan, Carrefour, etc.).

- HoReCa (Hotels, Restaurants, Cafes/Catering) is used to denote sales through restaurants, bars, cafes, hotels, and fast-food establishments.

International beverage manufacturing corporations operate through operating companies (OpCo) in each country or region. OpCo's typically operate their own production facilities, with their own or subcontracted logistics infrastructure.

The sales structure has two main stages: Primary Sales, which are sales from the manufacturer (or OpCo) to the distributor or retail chain, and Secondary Sales, which are sales from the distributor to the end point of sale (hereafter PoS). Manufacturers seek to control not only the volume of wholesale shipments (i.e. sell-in) but also retail sales to the end customer (i.e. sell-out), which enables them to determine real demand. To achieve this objective, a variety of methodologies, including GPS tracking of sales representatives, photographic audits conducted via mobile applications, and the telemetric monitoring of refrigeration equipment may be utilized. Refrigeration equipment (hereafter RE) is considered a strategic asset by beverage manufacturers and is procured centrally. Retailers are typically provided with RE by the beverage manufacturer on a complimentary lease basis, with the obligation to display products in accordance with a specified facing layout. The efficiency of the RE fleet is critical for beverage manufacturers, as chilled products account for a major part of immediate consumption.

Beverage distributors are typically multi-brand trading companies that function as intermediaries between beverage manufacturers and traditional retailers and HoReCa, thereby performing the function of the “last mile” to PoS. Distributors obtain products from the manufacturer at wholesale prices based on committed sales volumes, utilize credit lines or deferred payments, store products in their own or subcontracted warehouses or cross-docking centers, arrange delivery to PoS or HoReCa venues according to sales representatives' routes, monitor availability and assortment of products at retail outlets, often work with cash payments, and accumulate data from PoS (e.g. sales volumes, balances, temperature conditions, compliance with facing standards, etc.).

Logistics companies can be involved by other participants in the ecosystem at various levels. Manufacturers and OpCos frequently utilize contractors to deliver products to retail chains and distributors, or employ a hybrid model, e.g. delivery by their own vehicle fleet to regional warehouses and contractors for delivery to distributors' and retail chains' warehouses. Logistics contractors are similarly engaged by RE manufacturers to deliver RE to warehouses of beverage manufacturers or to the warehouses of their local logistics contractors. These logistics contractors then use the warehouses to import, store, and deliver RE to retail outlets on demand. For instance, in Germany, OpCos of Asahi and PepsiCo collaborate with the logistics company KTO to import, store, and deliver RE to PoS upon request. In France, the OpCo of Heineken similarly engages IGL. Logistics companies are involved in transportation, storage, route optimization, delivery monitoring, and reverse logistics (return of containers, such as kegs).

Retail chains (also referred hereafter as Modern Trade or MT), both international (e.g., Schwarz Group [Lidl], Auchan, Carrefour, Metro) and national (e.g., ATB-Market, Fozzy Group [Silpo, Fora, Fozzy], VolWest Group [Nash Kray, SPAR] in Ukraine, or Biedronka, Dino Polska in Poland) are responsible for the major part of beverage sales in metropolitan areas, and due to their control over shelf space and FE placement, wield significant influence within the beverage ecosystem. MT typically engage in direct procurement of goods and services from manufacturers through Key Account Management, often operating on deferred payment terms (typically 90–180 days). They primarily manage centralized logistics through their own distribution centers to chain stores. Additionally, retail chains often exercise control over pricing through promotional strategies and establish requirements for RE, such as placement, safety standards, energy efficiency, size and branding.

The *Traditional Trade* channel is the most numerous and the least digitized element of the beverage ecosystem. It accounts for a considerable share of sales, particularly outside of metropolitan centers. This category encompasses independent or small local retail outlets, including neighborhood grocery stores, kiosks, stalls, mini-markets, gas station stores, and small regional or private mini-chains comprising up to 10 outlets, as well as retail outlets in food markets and seasonal retail outlets such as beach outlets and pavilions. The Traditional Trade channel is the primary conduit through which spontaneous (impulse) purchases are made. It represents the final link in the chain of sales through distributors (the last mile). This channel contains a substantial amount of data on end-consumer behavior and the effectiveness of promotional campaigns. However, this data is largely inaccessible due to the limited digitization of most of the PoS of this channel. The wide geographical coverage complicates the control of the traditional channel by sales representatives and makes retail outlets more dependent on the functioning RE.

HoReCa (Hotels, Restaurants, Cafés/Catering) is a significant yet distinct segment within the beverage sales ecosystem. It is characterized by specific on-site consumption, unique distributor interaction logic, the use of premium and non-standard size RE, and flow-through RE for dispensing, distinct RE service requirements and business models. The channel encompasses restaurants, bars, pubs, cafes, hotels, catering companies, fast food venues, nightclubs, food courts, as well as stadiums and festivals. The HoReCa sector is not merely a sales channel, but also a means of shaping the image of a beverage brand. Manufacturers use it to create a “premium consumption” experience through requirements for temperature and serving method, saturation of the point of sale with branded marketing materials (glasses, umbrellas, sticks, light signs, and others). Disruptions in RE operations have a critical impact on sales; therefore, the channel is characterized by high KPIs for RE service companies.

Manufacturers of refrigeration equipment (i.e. refrigerated display cases – UBC Group, Frigoglass, Ugur, Liebherr, Epta; and flow coolers – UBC Group, Celli, Oprema) are a pivotal component within the beverage ecosystem, as they enable beverage manufacturers to maintain product consumption quality and brand visibility at the PoS. Refrigerated display cases and flow coolers constitute the sales infrastructure for beverage manufacturers and represent the physical point of contact between the brand and the consumer. The life cycle of an RE unit is typically 6–7 years, which is why beverage manufacturers make centralized yearly purchases of RE to renew part of their fleet with deliveries to OpCos according

to a schedule and market-specific specifications (dimensions, performance and energy efficiency requirements, customization, branding). In certain markets, RE is also supplied to RE distributors, RE installers, and service companies.

Manufacturers of telemetry devices (Danfoss/Prosa, Sollatek, Elstat) form the technological core of the digital transformation of the beverage ecosystem, as they create the basis for data-driven RE fleet management. Their smart thermostats collect real-time data on refrigerator temperature, the number of door openings, geolocation (via GPS, Wi-Fi, or triangulation), energy consumption, compressor operation (load, operating time), network connection status, and device identification data (serial number). In some cases, photo recording and AI facial recognition analytics are feasible. Beverage manufacturers determine the specifications for telemetry devices to RE manufacturer. All data is then accumulated on the designated software provided by the telemetry manufacturers to the beverage manufacturer. Telemetry devices remain costly, and as a result, only a small proportion of the RE fleet is currently equipped with such devices. However, some beverage manufacturers have plans to replace the outdated fleet with new RE models that are equipped with telemetry devices (e.g., PepsiCo with Prosa, Coca-Cola with Sollatek). The complexity arises from the need to unify data transmission systems (GPRS or Wi-Fi) in areas with weak signals (e.g., basements) or without Wi-Fi access. In such cases, physical contact between the sales representative and the RE may still be necessary to upload data to the smartphone application.

Refrigeration equipment distributors ensure the availability of RE in local markets, especially in markets where RE manufacturers lack their own production facilities (e.g. ISA is the distributor of RE by Ugur in Italy), or in markets constituted by numerous local beverage manufacturers who do not conduct annual purchases, instead purchasing on demand from RE distributor (e.g. Rick&Jülich represent Oprema in Germany). Distributors can supply RE to local beverage manufacturers and distributors for Traditional Trade channels, as well as small independent outlets and HoReCa. In certain instances, beverage manufacturers employ RE distributors as an intermediary in the supply chain due to restrictions imposed by local legislation that preclude the importation of equipment. For instance, in Italy, Heineken utilizes ISA for the import and logistics of RE from Ugur and UBC Group, or in complex leasing schemes. For instance, in Germany, PepsiCo utilizes KTO as an importer and logistics partner for contracted RE, the procurement of which is financed by a partner bank, and PepsiCo acquires the equipment on a leasing basis.

Refrigeration equipment installers fulfil an essential function within HoReCa, as the installation, connection, and configuration of flow-through RE for dispensing require additional effort and specialized skills. In many cases, installers also perform technical service functions (diagnostics, repair, dismantling and relocation). In certain markets, beverage distributors function as RE distributors and installers. E.g., in France, regional beer distributors supply, install, and service flow-through RE to HoReCa venues in exchange for sales volume commitments. During high season, the number of installations and service calls significantly increases. Flow RE requires a fast service response time (6 to 24 hours), since the failure of the cooler results in interruption of sales. The customers of installers are RE manufacturers, RE distributors, beverage manufacturers, as well as individual PoS and HoReCa.

Service companies are the hidden backbone of the beverage ecosystem, ensuring the operability of the RE fleet. Timely

maintenance and prevention, as well as rapid repairs in the event of a breakdown, are critical for ensuring the seamless operation of the RE fleet at the PoS. This guarantees uninterrupted beverage sales and prevents reputational damage to the brand. Due to the specific nature of the business, typically, no RE service companies are capable of ensuring uniform SLA performance across the country. Individual service companies tend to have regional coverage, which complicates centralized interaction and ensuring the same level of service for the entire RE fleet. In some markets, solutions exist that centrally collect service requests from PoS via designated service platforms or a single support line, and distribute them to the local service contractors who can fulfil SLAs, e.g. Unior in Italy and EgeCarbon in Turkey. RE manufacturers may have a service division that provides nationwide coverage in countries where they have production facilities, e.g. Ugur and Klimasan in Turkey and UBC Service in Ukraine and Kazakhstan. Beverage manufacturers' OpCos may also provide their own RE service in certain countries (e.g. PepsiCo in Turkey or Coca-Cola in Kazakhstan). However, such often engage other service companies as contractors in the regions, especially during high season and when there is a high inflow of requests. Service companies' customers include beverage manufacturers (Ugur and Klimasan provide warranty service to RE of Coca-Cola in Turkey), RE manufacturers in regions without their own service (for warranty and post-warranty service, as well as refurbishment services), retail chains for servicing unbranded RE, and traditional PoS and HoReCa.

End consumers are the focus of the beverage ecosystem, creating demand and determining the cyclicity and vitality of the entire business ecosystem. Understanding consumers' behavior, habits, and response to brands enables more effective management of distribution infrastructure, logistics and promotions. Different consumer types shape different marketing, logistics and refrigeration strategies, providing an important source of data for optimizing the entire beverage ecosystem. Figure 1 shows a diagram of the current beverage business ecosystem, based on the main cases of interaction between participants.

Interaction between participants in the beverage business ecosystem as the automation potential of the platform. In the process of digitizing the beverage business ecosystem, it is feasible to create a single platform ecosystem for organizing and orchestrating all types of interactions within the business ecosystem. The establishment of such a platform will facilitate the accumulation and redistribution of data and analytics from selected participants within the business ecosystem to other relevant parties. This will include the automation of pertinent business processes and the aggregation of data relating to the efficiency of interactions. Furthermore, the distribution of relevant data among participants will enable additional analytics and the continuous optimization of their activities. The implementation of automation on the platform can be achieved through the deployment of specialized functional modules of the platform itself, as well as the integration of third-party digital tools via API, which are already adopted by individual participants.

Automation of business processes involving interaction between individual participants in the business ecosystem is possible, for example, in the following areas:

– Operational, which allows to automate order placement and delivery planning through the integration of ERP and CRM systems of individual participants;

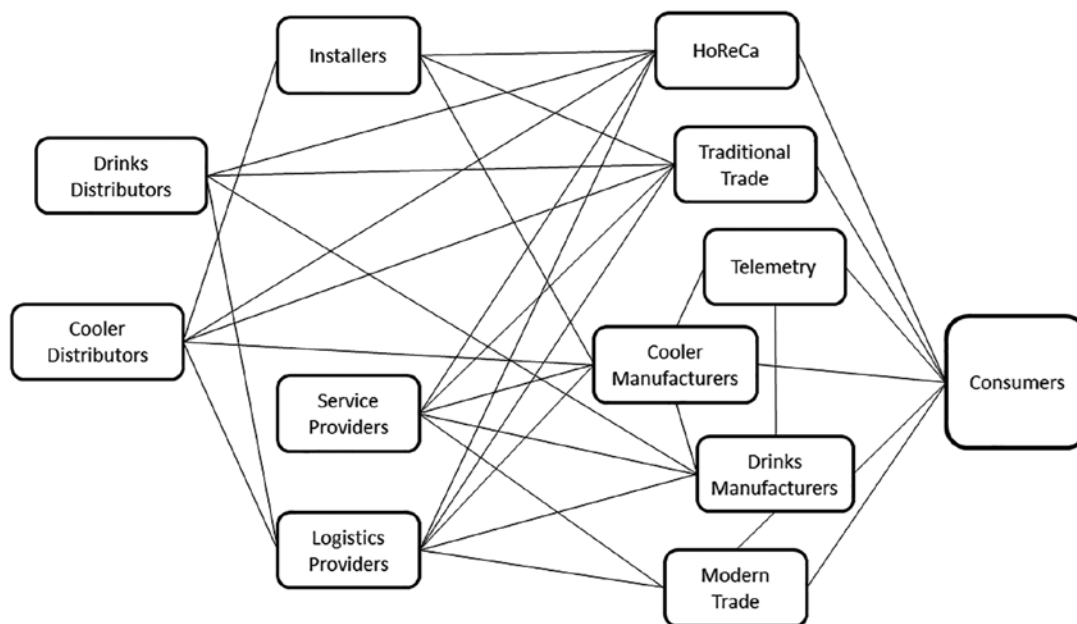


Fig. 1. Diagram of the primary cases of interaction between participants in the beverage business ecosystem

Source: author's conception

- Logistics, which optimizes distribution routes, makes ETA transparent, and enables cold chain tracking;
- Service, which improves predictive maintenance, raises the level of SLA, and provides warranty service and control;
- IoT/Telemetry, which enables real-time management of RE;
- Marketing, which involves obtaining feedback on promotional campaigns and loyalty programs;
- Analytical, which involves forecasting demand, monitoring the effectiveness of sales channels and the profitability of individual points of modern and traditional channels and HoReCa.

Based on the mapping of the beverage business ecosystem, 32 key cases of interaction between 12 distinct types of participants were analyzed. Table 1 presents the main cases and examples of typical areas of interaction.

Data as the foundation for the platform ecosystem. Each participant in the ecosystem possesses unique data generated during their operational activities, which is inaccessible to other participants. The level of digital maturity in the ecosystem is not consistent, meaning that some data is not collected due to a deficiency of digital tools. Additionally, some data is lost due to the variety of tools used by different participants. There is also insufficient or no integration between the individual tools of participants, and between the tools of smaller and larger players. Lastly, there is a lack of data exchange practices between players, and participants do not make sufficient efforts to collect, accumulate, and analyze data. This study aims to analyze the types of data generated by particular participants in terms of their potential value to other participants and to the business ecosystem as a whole. Table 2 presents the types of data generated in the business ecosystem.

Table 1

Key cases of interaction between players in the beverage business ecosystem

Pair of participants		Areas of interaction
1		2
Beverage manufacturers &	Beverage distributors	• Sell-in: quotas, prices, orders; • Joint demand forecast (S&OP), inventory replenishment; • Promotion and merchandising execution; • Exchange of secondary sales and leftovers; • Coordination of bonuses/retro bonuses; • FE fleet management: allocation/relocation.
	Logistics companies	• Transport requests; • Planning of shipping slots; • Cold chain control; • Track&Trace/ETA; • Reverse logistics of packaging, FE.
	Modern Trade	• Joint Business Planning; • EDI: orders/invoices/ASN; • Price and promotion mechanism coordination; • Access to POS sales and DC balances; • Management of planograms and facings (photo audit); • Joint OSA/OSD KPIs and penalties/bonuses.
	FE Manufacturers	• FE fleet renewal; • Specification/branding coordination; • Serialization and asset “passport”; • Delivery schedules by country/OpCo; • Warranty and spare parts.
	Telemetry manufacturers	• Defining KPI indicators (temperature, uptime); • Connecting the FE fleet to the data hub (API); • Setting up alerts (movement/offline); • Analytics (FE activity – sales).
	Service providers	• Service requests; • SLA management (response/repair time); • Scheduled maintenance; • Spare parts and warranty tracking; • Photo reports, quality control, coverage geography.
	Consumers	• Marketing communications and loyalty programs; • QR/mobile promotions; • Feedback collection/NPD testing; • ESG initiatives/brand reputation.

Continuation of table 1

1		2
Beverage Distributors &	Logistics companies	<ul style="list-style-type: none"> • Planning last mile routes; • Consolidating orders; • Track&Trace/ETA; • Electronic waybills/POD; • Temperature control (cold chain); • Reverse logistics for kegs and FE; • Coordinating shipment/delivery slots.
	Traditional Trade	<ul style="list-style-type: none"> • Order acceptance (B2B app/telemarketing); • Auto-replenishment for min/max; • Pricing/price lists, promotional mechanics; • Credit/ prepayment terms; • SR visits and photo audit of facings; • FE installation/accounting; • Service requests from the point.
	HoReCa	<ul style="list-style-type: none"> • Supply contracts (bottle/keg), standing orders; • Planning for events/seasons; • Provision of dispensers/keg circulation; • Service and sanitary standards of delivery; • Joint brand activations in establishments; • Rapid replenishment during peak slots.
Logistics &	Modern Trade	<ul style="list-style-type: none"> • Booking delivery slots; • Acceptance by ASN/SSCC; • Palletization and labeling requirements; • Compliance with delivery windows and penalties; • Track&Trace/ETA; • Temperature monitoring (cold chain) for sensitive SKUs; • ePOD/electronic claims; • Reverse logistics of containers/equipment.
	Traditional Trade	<ul style="list-style-type: none"> • Last mile routes; • Geofencing and arrival notifications; • Coordination of PoS operating hours; • Small batch deliveries and cross-docks; • ePOD; container returns; • FE delivery.
	HoReCa	<ul style="list-style-type: none"> • Deliveries outside peak hours; • Fast "urgent" replenishment for events; • Accounting and reverse logistics for kegs/dispensers; • Temperature control en route; • Labeling/specification for kitchen/bar areas; • ePOD and container deposits.
	FE Manufacturers	<ul style="list-style-type: none"> • Linear transportation from the factory (factory – hub); • Customs clearance, insurance; • Oversized/fragile cargo (shock/tilt sensors); • Storage and staging; white-glove delivery to the point of destination with agreed access/lifts; • Coordination with installers; • Return/disposal.
	FE Distributors	<ul style="list-style-type: none"> • Import/customs/cross-dock; • Last-mile planning to installers/ PoS/HoReCa; • Consolidation of shipments from different manufacturers; • ETA and ePOD; temporary storage and kitting; • Returns for repair.
Modern Trade &	Service providers	<ul style="list-style-type: none"> • Requests for repair and maintenance of FE at network locations (SLA, access windows, passes); • Scheduled work outside peak hours; • Coordination with security of shopping centers; • Unified FE register (SNs, warranties, work history) and energy efficiency/ temperature control; • Reports, billing, warranty cases, QA.
	Consumers	<ul style="list-style-type: none"> • Promotions, loyalty programs, push notifications; • Real-time availability and prices (web/app), pick-up/click&collect/delivery options; • Feedback collection on the shelf (QR), product ratings; • Packaging recycling initiatives.
Traditional Trade &	FE Distributors	<ul style="list-style-type: none"> • Purchase/rental/leasing of FE; • Agreeing on models/ dimensions/energy efficiency, delivery terms, financing/deposit conditions; • Tracking FE deliveries, acceptance certificates, FE warranty registration, exchanging/returning.
	FE Installers	<ul style="list-style-type: none"> • Coordination of access dates, technical conditions; • Installation/ commissioning, photo checklist, completion certificate; • Staff training, FE warranty registration.
	Service providers	<ul style="list-style-type: none"> • Repair requests, SLA timer, completion status; • Equipment replacement during repairs; tracking spare parts and warranty cases, photo reports of work performed; • Recommendations for operation/cleaning to reduce breakdowns, scheduled maintenance.
	Consumers	<ul style="list-style-type: none"> • Local promotions/discounts, loyalty programs, communications "close to home"; • Collecting reviews (QR), availability/prices; • Supporting "buy local" initiatives, personal SKU recommendations, reputation management.
HoReCa &	FE Distributors	<ul style="list-style-type: none"> • Selection of FE/dispensers for the venue, branding; • Financing models: purchase/rental/leasing, deposit terms, service packages; • Fleet supply/renewal plan for the season and events; availability of swap units for replacement; • FE warranty registration.
	FE Installers	<ul style="list-style-type: none"> • Venue inspection (electrical/ventilation/space), work planning; • Installation, commissioning, calibration, telemetry connection; • Photo checklist, e-act, warranty registration, marking of location/serial numbers; • Staff training on sanitary standards/ cleaning of dispensing systems, safe operation.
	Service providers	<ul style="list-style-type: none"> • Routine maintenance (cleaning/sanitation of filling lines, filters, defrost), scheduled prevention maintenance; • Emergency calls based on telemetry alerts (temperature/pressure/offline), SLA timer, request status; • Equipment replacement (swap) during repairs; spare parts management, warranty cases, photo reports of work performed; • Audits of compliance with delivery standards.
	Consumers	<ul style="list-style-type: none"> • Menu with availability display, information about new items/food pairings; • Set/drink reservations for events, happy hour, and personalized offers based on occupancy data; • Collecting reviews/ ratings, loyalty programs.

Continuation of table 1

1		2
FE Manufacturers &	Telemetry manufacturers	<ul style="list-style-type: none"> • Joint design of telemetry-ready models (sensors, power/ communication interfaces); • SN mapping – IoT-ID, API integration, security and access protocols; • Testing/calibration, anomaly threshold determination, firmware updates; • Exchange of telemetry metrics for R&D (temperature, power consumption, runtime).
	FE Distributors	<ul style="list-style-type: none"> • S&OP: by country/channel; price & portfolio management; • Spare parts, warranty terms, RMA; batch and SN tracking; • Branding/ customization, marketing kits, documentation.
	FE Installers	<ul style="list-style-type: none"> • Installation checklists, video guides, technician certification; electrical/ventilation requirements; • Photo verification of installation, geotagging, warranty registration; telemetry provisioning; • Field feedback, updating of instructions/design.
	Service providers	<ul style="list-style-type: none"> • Service manuals, parts catalogs, time standards; • Partner authorization, QA audits; • Support for diagnostics/remote inspections, access to device history; • Feedback on failures, cause analysis, design/material updates.
	Consumers	<ul style="list-style-type: none"> • Interaction via premium FE models with touch screens
	Telemetry manufacturers & Consumers	<ul style="list-style-type: none"> • Collecting data on consumer behavior (door openings, FE location effectiveness for sales, FE model effectiveness; • Photo recording and AI analytics of facings).
	FE Distributors & FE Installers	<ul style="list-style-type: none"> • Assigning tasks with reference to batches/SNs, transferring technical documentation; • Coordinating delivery and installation (co-scheduling), confirming ETA, minimizing repeat trips (one-trip); • Photo acceptance of components, installation checklists, e-acts with geotags at the location; • Warranty registration, SLA service launch; • Feedback from the field: typical installation errors, location restrictions, recommendations for FE manufacturer R&D.

Source: compiled by the author

Table 2

Types of data in the beverage business ecosystem

Type of Data	Examples of indicators	Primary data owners
Consumer and behavior	<ul style="list-style-type: none"> • Demographic and geolocation data of buyers; • Frequency of purchases and average check; • Response to promotions, discounts, new products; • Reviews, ratings, social mentions; • Data from loyalty programs; 	Modern and Traditional Trade channels, HoReCa, beverage manufacturers (via loyalty platforms), telemetry manufacturers; consumers (e.g. via mobile applications)
Sales dynamics, volumes, and geography	<ul style="list-style-type: none"> • Sales by individual products, channels, regions; • Seasonality, trends, promotions; • Number of active PoS; • Distribution of sales between channels (TT / MT / HoReCa); • Sell-in / sell-out analytics; 	Beverage manufacturers, beverage distributors, MT, HoReCa, telemetry manufacturers
Movement and stocks of products and equipment	<ul style="list-style-type: none"> • ETA, routes, GPS tracking; • Stock levels in warehouses and at PoS; • Shipments, returns, product rotation; 	Logistics companies, beverage distributors, beverage manufacturers, MT, TT, HoReCa
Compliance with brand standards	<ul style="list-style-type: none"> • Facing, product availability and visibility; • Compliance with PoS material standards; • Storage and consumption temperature 	Sales representatives of beverage manufacturers, telemetry manufacturers, beverage distributors, MT, TT, HoReCa
FE – Inventory	<ul style="list-style-type: none"> • SNs, models, year of manufacture; • Installation location, owner, user type; • Warranty status, technical specifications, energy efficiency; • Telemetry type, connection; 	FE manufacturers, FE distributors, installers, service providers telemetry manufacturers
FE – Performance and Operation	<ul style="list-style-type: none"> • Temperature, energy consumption, pressure, compressor runtime; • Door openings, operating cycles, uptime/downtime; • Movement; • Telemetry signals (anomalies, accidents); 	Telemetry manufacturers, FE manufacturers, service providers, installers, HoReCa, TT, MT
FE Maintenance and Life Cycle	<ul style="list-style-type: none"> • Installation date, service visits, preventive maintenance; • Frequency and cause of breakdowns, repair duration; • Spare parts used, SLA, warranty cases; • Replacement or disposal; 	Service providers, installers, FE manufacturers, FE distributors, beverage manufacturers
Financial and Commercial	<ul style="list-style-type: none"> • Prices, discounts, commercial terms, accounts receivable; • Service costs, cash flow, asset insurance; • Logistics costs; • ROI of promotions. 	FE manufacturers and distributors, Installers and service providers, beverage manufacturers and distributors, MT, TT, HoReCa,
Sustainability (ESG)	<ul style="list-style-type: none"> • Electricity consumption, carbon footprint, FE disposal; • Secondary processing, recycling. 	FE manufacturers, beverage manufacturers, telemetry companies, service providers

Source: compiled by the author

Automating operational processes between participants in the beverage business ecosystem performs an orchestration function. Key routine operations, such as recording PoS displays, confirming the availability and operability of FE at PoS, creating restocking orders, calling a service engineer, and monitoring distributor accounts receivable, may be transferred from manual mode to standardized scenarios within the platform. This may reduce human error and eliminate delays between events and responses. Automated triggers, such as refrigeration equipment exceeding the temperature range, may automatically generate a service request. A decrease in stock to a specified minimum level at a PoS may trigger the automatic creation of an order. Deviations from facing standards trigger an automatic task for the sales representative, shifting management from post hoc correction to preventive intervention. These changes directly affect the efficiency of the entire ecosystem. Beverage manufacturers can maintain a consistent brand presence “on the shelf” without constant manual auditing. Distributors can reduce losses from out-of-stock situations and accelerate turnover. Logistics can operate based on actual demand rather than forecasts based on intuition. Service companies can switch to scheduled maintenance instead of responding to emergency calls. Retail outlets experience less equipment downtime and a lack of refrigerated products during peak demand.

Providing access to unique data held by other participants in the business ecosystem can improve the effectiveness of each participant. If appropriate data collection and management practices are implemented, including integrating relevant tools into the ecosystem's business platform and a data distribution algorithm according to access protocols, then data can be accumulated in real time on the platform and reflected in relevant analytical reports for ecosystem participants. Currently, beverage manufacturers cannot access field data on secondary sales at retail outlets and HoReCa. However, combining this data with telemetry data from PoS systems that reflect consumer traffic, as well as logistics and consumer data from loyalty apps, allows beverage manufacturers to transition from manag-

ing wholesale sales to managing retail demand at the PoS of all sales channels. This data will empower distributors to enhance coverage, gain a more profound understanding of end demand, and optimize the balance between inventory and logistics. Logistics companies will be able to optimize routes, reduce costs, and create a predictive logistics model in line with seasonal spikes. Optimal inventory replenishment and predictive maintenance have the potential to reduce downtime, benefiting participants in modern, traditional trade, and HoReCa channels. Manufacturers of refrigeration and telemetry equipment will receive real data on the performance of various models and technological solutions. This will allow them to obtain transparent feedback for R&D, improve the quality of equipment, reduce losses from warranty cases, and gain additional competitive advantages. FE distributors may benefit from improved inventory planning, timely imports, and streamlined scheduling. Similarly, installers and service companies stand to gain from the exchange of technical parameters, spare parts inventory planning, and reduced costs through predictive versus reactive maintenance.

Consequently, the distribution of data, automation, and process optimization through the platform result in a reduction of operating costs for participants and the transformation of a distributed group of companies into a managed production and distribution system with coordinated standards for response speed, service quality, and product availability for the end consumer. This, in turn, benefits the entire business ecosystem. The interaction scheme in the beverage business ecosystem, organized using the platform ecosystem, is shown in Figure 2.

Conclusions. The article suggests considering the digital platform as a tool for orchestrating the existing beverage distribution business ecosystem in the FMCG industry. It describes twelve typical participants in this ecosystem, their roles, and the nature of their relationships. Thirty-two cases of cooperation between different types of participants were mapped and analyzed to identify the essence of key operational processes that are currently performed separately and have the potential to be automated using

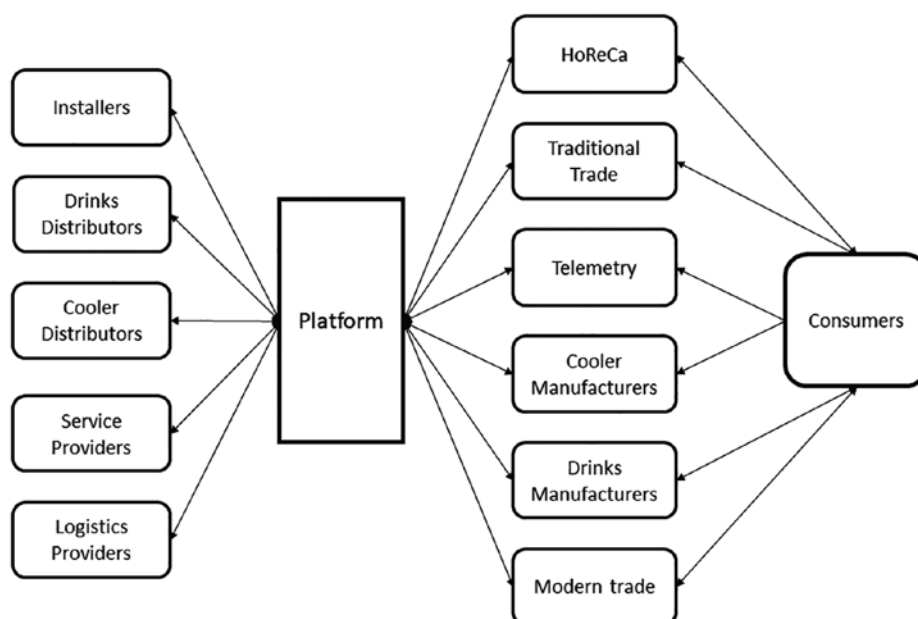


Figure 2. The beverage business ecosystem organized using the ecosystem platform

the platform. The types of data collected or possessed by the groups were analyzed. This includes data on consumer behavior, dynamics, sales volumes and geography, product and equipment movement and balances, compliance with standards, inventory, refrigeration equipment operation and maintenance, and financial data. The platform's ability to accumulate, process, and redistribute this data, as well as automate typical interaction scenarios, has been demonstrated. This may contribute to increased efficiency for each participant through more accurate analytics, process transparency, asset control, and reduced losses. It may also increase the manageability of the ecosystem as

a whole by replacing non-standardized agreements with common rules and reproducible procedures.

Further research should detail the mechanisms for implementing such a platform. Specifically, it should address which ecosystem participants should invest in developing and implementing the platform, the changes in structure and management approach that the platform leader should implement when transitioning to a platform model, the minimum functional modules required for successfully launching the platform, and the possible mechanisms for encouraging existing business ecosystem participants to join the platform ecosystem.

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