

520 Barton

An unattended-retail feasibility study.

A corner property in Stoney Creek, Hamilton, and the venue question inside a 76-day program: can unattended, machine-served retail carry itself with no staff, in a small structure on a high-exposure lot.



Fig. 0.1 The study site, from the north-east. The corner of Barton Street East and Dewitt Road, April 2025.

Site photography, the study's own archive.



Fig. 0.2 And the machine built to test it. The bench unit for the unattended fresh-drink format: a single-board computer running the storefront, paired with an NVIDIA edge module running language and speech models on-device, against the live platform. Chapter 06. Bench photography, July 2026.

Abstract

This study examines 520 Barton Street East as a site for unattended, machine-served retail. It covers the site's exposure and zoning, the concepts considered, the unattended fresh-drink category's public evidence base, the regulatory classification question in two jurisdictions, a buy-or-build assessment of drink automation, the software platform built alongside, and the unit economics at total capital. The method was kill criteria set before spend. The verdict is kill: unattended fresh-drink retail fails on demand per machine in every measured case, and the cost of proving otherwise exceeds the return available, as better-funded operators established before this program began. The corner remains a strong asset. Venue capital spent was approximately zero.

Disclosure: the study site is held by an entity related to the studio's founder. The work was self-funded research, not a client engagement.

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The site

The asset is the corner; everything else in this study tests what it can carry.

520 Barton Street East sits at the signalized junction of Barton Street East and Dewitt Road in Stoney Creek, Hamilton. The lot is 90 by 160 feet, with frontage on both streets. The building is 5,364 square feet over two storeys, built 1947, steel and masonry, with three service bays and five hoists.¹ The current tenant is Mr. Lube + Tires, active and in good standing.¹

Zoning is C2, Neighbourhood Commercial. Permitted uses include motor vehicle service, restaurant, medical clinic, financial establishment, and veterinary practice.¹ The zoning is part of why the parcel matters: the permitted-use list is wide enough to leave the site's use genuinely open.

One corner, two frontages: the exposure geometry.

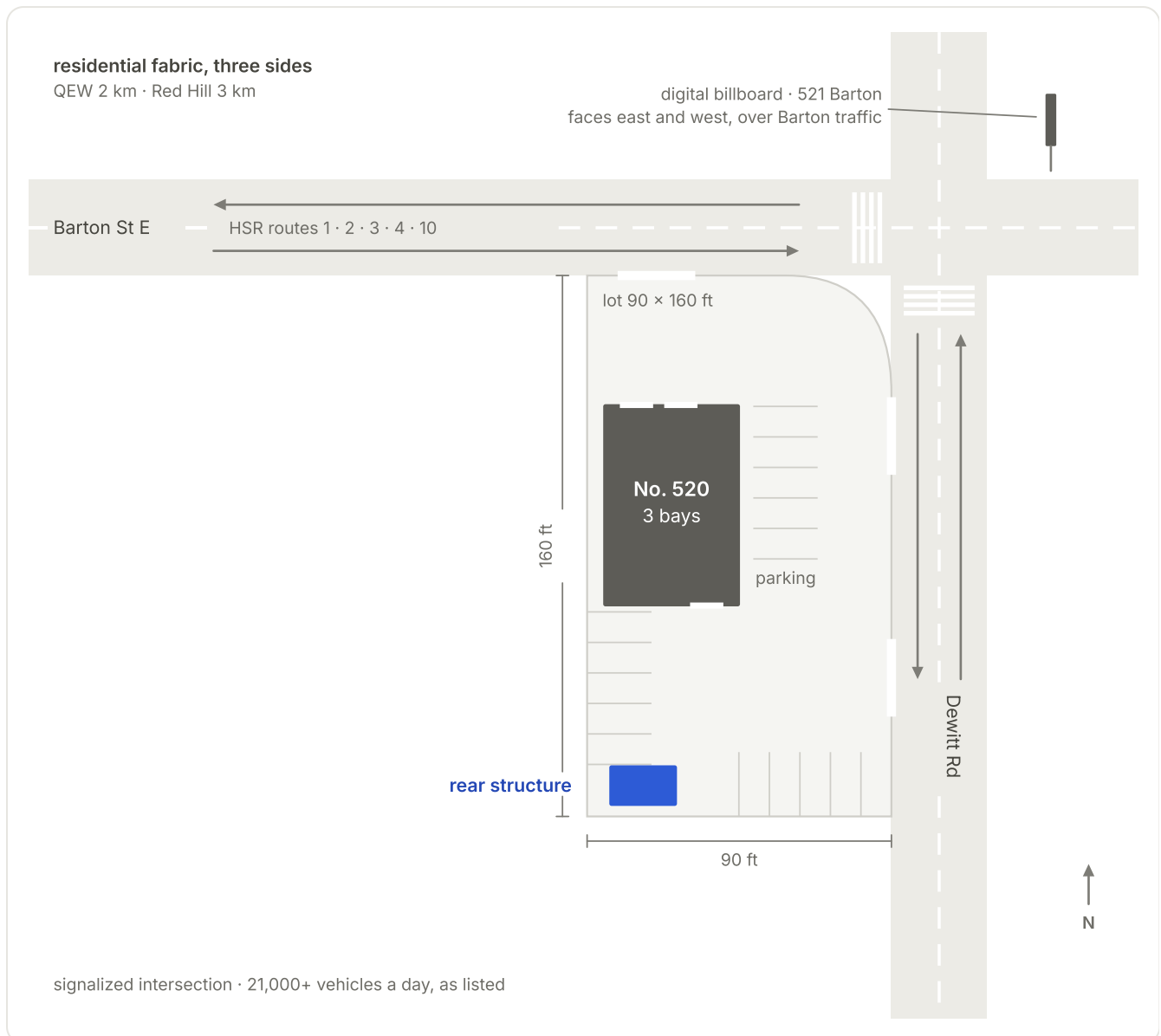


Fig. 1.1 Dual frontage on a signalized junction, with the through-traffic and transit routes that produce it. The building sits against the lot's west line, long axis north–south, with the parking on the Dewitt side: twin bays on the Barton face, a third door on the south face. The billboard across the intersection faces east and west over Barton's traffic. Schematic, approximate scale.

Geometry: 2007 Ontario Land Surveyor site plan of the parcel (on file); property facts as published at 520barton.com; aerial photography, April 2025 (orientation from the source files' camera-heading EXIF). Traffic figure as listed; see note 2.

Exposure

The junction carries 21,000 or more vehicles per day, as listed by the property's commercial listing and its management site.² Five HSR bus routes run the corridor: 1, 2, 3, 4, and 10.¹ The QEW is two kilometres away via Fruitland Road; the Red Hill Valley Parkway is three.¹

Third parties price this exposure. The digital billboard across the intersection, at 521 Barton, is marketed at 21,034 daily impressions.³ Its two faces point east and west, down the Barton corridor, at exactly the traffic the counts describe.



Fig. 1.2 Barton eastbound toward the Dewitt junction, April 2025. The 521 Barton digital board stands over the eastbound lanes at left; the subject corner is at right. The board's faces point down the corridor, at the same traffic the counts describe.

Site photography, the study's own archive.



Fig. 1.3 The corner from the north-east, April 2025. Queue on Barton at the signal; townhouse and detached residential fabric on three sides. Signage in the photograph is the prior tenant's.

Site photography, the study's own archive.

Context

The surrounding fabric is residential on three sides: detached houses along Dewitt and the side streets, townhouse blocks to the north, an industrial strip east along Barton. Two schools sit within walking distance, a

secondary school and an elementary school, which matters later in this study when demand is counted by channel rather than assumed.

The property's working life is automotive service, and its street presence reflects that: twin bays on the Barton face, a third door on the south face, a parking apron wrapping the building's east and south sides, and three curb cuts, one on Barton and two on Dewitt. The subject of this study is the small structure at the rear of the lot, 12 by 20 feet. The main building is leased; the rear structure and a slice of the lot are not part of the tenant's premises, which left them free to study.



Fig. 1.4 The Barton corridor from above the junction, April 2025. Residential west, industrial east, the escarpment behind.

Site photography, the study's own archive.

NOTES

- 1 Property facts (lot, building, zoning and permitted uses, transit routes, highway distances, tenancy) as published by the property's management site, 520barton.com, accessed 2026-07-14 and 2026-07-15.
- 2 21,000+ daily vehicles: as listed on the property's LoopNet listing (loopnet.ca, listing 35028900) and repeated at 520barton.com. The LoopNet page was not directly fetchable at the 2026-07-15 access attempt (HTTP 403 to automated access); the figure is reported here as listed, not independently measured. A City of Hamilton open-data traffic count for this junction was searched for and not found; no estimate is substituted.
- 3 21,034 daily impressions: the billboard vendor's listed figure for the 521 Barton Street digital board (Vendo Media). The vendor's per-board listing page was not directly fetchable at the 2026-07-15 access attempt; the figure is reported as listed by the vendor.

The concept space

Eight concepts entered the funnel and none survived. Every one carried a kill criterion written before capital.

The program ran from late April to mid July 2026. It began as a neighbourhood-retail software platform, narrowed to the question of what the site itself could carry, and ended the day the last candidate use was falsified. Each concept below is listed with what killed it, because the kill reasons are the study's actual findings.

Eight concepts entered. What killed each one, and when.

CPG micro-retail	Parked. Payment processing takes ~15% of a \$2.50 basket; no volume fixes a ratio.	Apr 30 → Jul 13
Staffed bubble tea	Rejected the same day it was proposed. No staff in store operations, ever.	Jul 13
Unattended bubble tea	Pivoted. Tapioca needs a heated hold, the exact burden an unattended format cannot carry lightly.	Jul 13 → 14
Unattended smoothie	Killed. Measured category demand at 6.8 cups/day against a 12-cup floor, and ~\$26K of capital paying back in 2.2 to 3.3 years against a 24-month line. Better-funded operators ran it first and lost.	Jul 14
Prepackaged cold drinks	Survived every format test. Closed with the site, not falsified; the most revivable line.	Jul 13 → 14
Venue-placed units	Closed. Where these machines survive, venue service fees carry them, not cup margins.	Jul 14
Private training venue	Killed on paper. Change-of-use permit, assembly-occupancy obligations, and the same geometry.	Jul 14
Micro office	Considered; closed with the venue lines. The record holds no dated entry, and none is invented.	undated → Jul 14

Fig. 2.1 The concept record. Six of eight exits landed on July 13 and 14, when the evidence arrived together. One line, in blue, survived its own format tests and closed with the site.

Program ledger and tracker, close-out record, July 2026.

What each concept met

CPG micro-retail. The founding concept: shelf goods, transparent platform pricing, phone checkout. Payment processing on a \$2.50 convenience basket takes roughly 15 percent of revenue, at any volume, so the concept

was parked. The platform shipped and works; the format waits for a higher-ticket application.

Staffed bubble tea. Recommended to the program, rejected the same day, and the rejection became standing doctrine: no human staff in store operations, ever. A format that only works with a shift worker is a different business than the one under study.

Unattended bubble tea, then smoothie. The core candidates. Bubble tea fell first, on a food-safety mechanic: tapioca requires a heated hold, and a heated hold of a time-and-temperature-controlled food is exactly the obligation an unattended format is least able to meet. The pivot target, a smoothie format built on individually-quick-frozen fruit, deletes that burden. It died a day later anyway, on the two findings of chapters 03 and 07: measured category demand below the model's floor, and total capital that does not pay back inside the kill line. Appendix D is the third leg: better-funded operators had already run the experiment and lost.

Prepackaged premium cold drinks. The low-risk format survived every regulatory and machine test in this study. It was swept away with the site, not falsified. Of everything in the funnel it remains the most revivable, on a different parcel.

Venue-placed units, and selling the machines. Floated on the final day and closed by the category evidence: where unattended drink machines survive, venue service fees carry them, not cup margins. Operating placed units is a real business, but it is a services business with a sales motion, which the studio was not going to bolt on to rescue a site.

Private training venue. The last non-retail reuse. It failed on paper before it failed on geometry: a change-of-use permit applies even without construction, a fitness use classifies as assembly occupancy under the building code, and a 240 square foot unplumbed structure cannot meet the washroom and barrier-free obligations that classification brings without disproportionate spend.¹ Client access would still cross the vehicle plane hourly. The local market for hourly training space is also already served.

Micro office. Considered; closed with the venue line. The program's record holds no dated entry for it, and the chart shows the gap.



Fig. 2.2 The space the last two reuses were fitted to: the building's upper office as found. Someone ran a business here; the question was always what could run next, unstaffed. Interior photography, the study's own archive.

The kill criteria

The fresh-drink format carried seven numbered criteria, set while the machine was still a spreadsheet line. Three are worth reading in full, because they did the killing or would have.

The kill criteria, verbatim from the program record. Read each row as: if this happens, do that.

#	IF THIS HAPPENS	THEN
K1	Counted demand below 6 cups/day after the minimum sample; a go requires a counted base case of 12 or more	Re-site or re-product. Do not buy the machine.
K2	No doctrine-compliant machine at or under \$20K CAD landed, and no DIY build at or under \$15K in parts	Wait or descope. The rules are not negotiable to make a purchase happen.
K5	Machine availability under 95% in the first 60 days, any health-unit stop order, or more than two verified made-wrong incidents	Halt scale-out. Re-engineer before a second store.
K6	Winter net below zero and trailing payback projecting past 24 months	Format kill. The structure reverts to storage.
K7	The public-health unit classifies the operation as a food service premise requiring an on-site certified food handler, and no low-risk menu redesign escapes the classification	Format kill for fresh drinks at this site. Doctrine forbids staffing around it.

The record on how these resolved is itself instructive. K2 was falsified by research before any order was placed: no compliant machine lands under \$20K (chapter 05). K1 was never run; the site died before the September counting window. K7 was never answered; the classification question's public evidence is chapter 04. What closed the program was not on this list at all: the category's own published record and the total-capital arithmetic, both of them free and public the whole time. Walk-up circulation was not on

the list either; chapter 08 records it as a bound on one structure, and it moved none of the arithmetic. The method note in Appendix C carries the amendment that follows: read the category's record, and price what it costs to prove a model, before building the model.

NOTES

- 1 City of Hamilton Building Permit By-law 15-058 (change-of-use permit requirement); Ontario Building Code Group A-2 assembly classification and its washroom and barrier-free obligations, as assessed in the program's close-out record, July 2026.

Category analysis: unattended fresh-drink retail

The unattended fresh-drink category has exactly one measured throughput figure in its public record; this chapter is built around it.

The best-documented operator in the category is Zenblen, a Chicago company running robotic smoothie kiosks. It is presented here as the category's best evidence, not as a target: it is the operator that has survived, iterated, raised institutional money, and placed units. What its public record shows is therefore the most favourable data available about how this category performs.

Throughput: the one real number

In a 2024 interview, Zenblen's founder stated the company "served over 2,500 smoothies" from its field unit in 2023.¹ Over a full year that is roughly 6.8 drinks per day. The unit sits inside a members-only innovation hub, a captive and friendly population of habitual users. The hub's own blog places the kiosk on site by May 2022, a year before the counted period, so the 6.8 reads as a mature rate rather than a ramp-up undercount.² No later or better figure has been published by anyone in the category, in any climate, in any venue class.

The demand gap: the category's best measured unit serves 6.8 cups a day. This study's cheapest case needs 12.

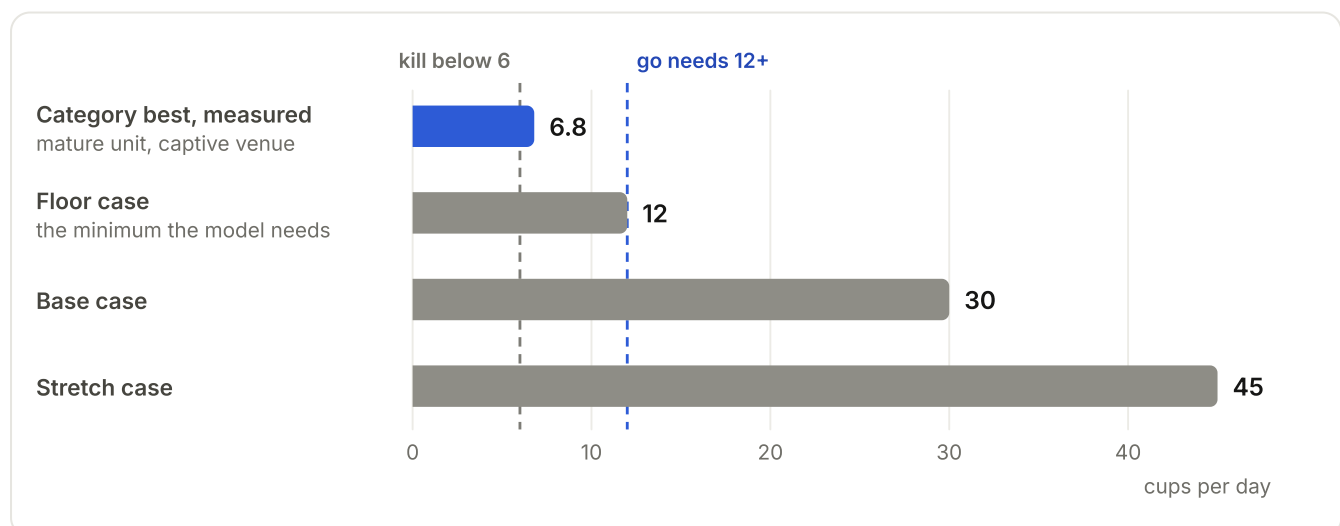


Fig. 3.1 The floor case, the minimum the smallest capital stack needs, sits 75 percent above the best measured mature rate anywhere in the category's public record.

6.8/day: 2,500 drinks in calendar 2023, operator interview (Ottomate News); scenarios: this study, ch. 07.

Where the units live

Zenblen lists eleven kiosks: university buildings, hospital towers, a members-only innovation hub, a residential building's gym, a pilates studio.³ Checking each venue's own published hours and access rules yields a clean structural finding: every unit sits inside an access-controlled or hours-limited building. None is street-facing; none can be reached by a member of the public walking up off a sidewalk, the use an unattended machine nominally exists for.³

Placement follows procurement, not retail siting. At two universities the kiosks arrived through the incumbent campus vending contractor, a division of Compass Group; the contractor's regional director, not the startup, speaks for the expansion decision in the campus paper.⁴ A third campus lists the kiosk as a line item in the vending contractor's procurement bid.⁵ The category leader's distribution, in other words, is the vending industry's existing rails.

The economics the record supports

On stage in 2026, the founder described two revenue lines: "we get revenue both from our location partners in terms of monthly service fee and we also get retail revenue from each smoothie we sold."⁶ No dollar figure has been disclosed for either line. The venue pays for the amenity. The same pitch claims over 550 percent contribution margin, a six-month payback per kiosk, and 99 percent reliability; all are the operator's own unaudited statements with no disclosed dollar basis, and are labelled here accordingly.⁶

The retail price point at one campus is US\$8 per smoothie, per the student paper.⁴ The capital side is better documented: two SEC Form D filings confirm US\$2,117,117 sold in the 2023 round and US\$2,480,647 in the 2025–26 round, a floor of US\$4.6 million across the two, against eleven placed units at the time of this audit.⁷ A US\$6 million Series A was described by the founder as "closing" in the same 2026 pitch; no filing or press confirmation existed at this study's access dates.⁶ Roughly US\$420,000 of confirmed capital per placed unit is the ratio the public record supports.

Two revenue lines. The disclosed one is small; the undisclosed one carries the business.

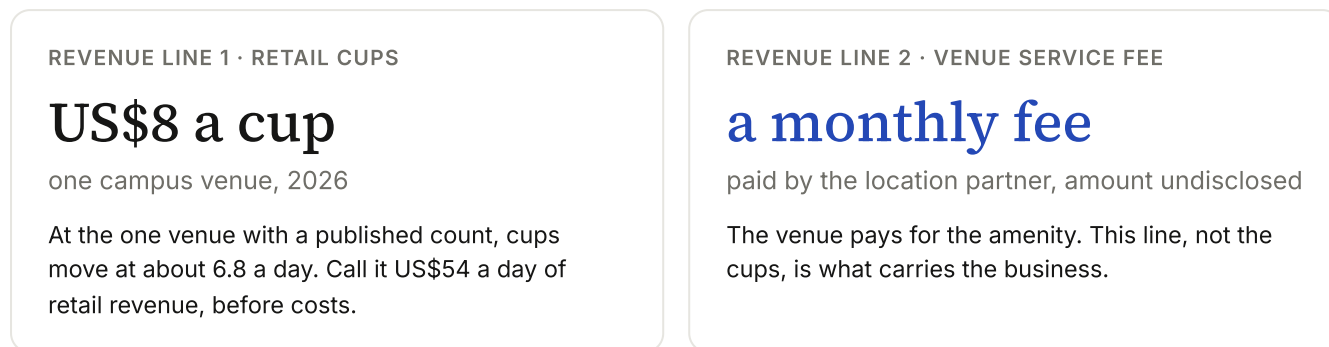


Fig. 3.2 The category's revenue structure, as its best-documented operator describes it. The measured operators are venue-amenity businesses with a retail line, not standalone stores. The operator's own unaudited pitch claims ("over 550% contribution margin," "six-month payback," "99%+ reliability") disclose no dollar basis and are labelled in the text. Operator's own statements (pitch, 2026; interview, 2024); SEC Form D filings, 2023 and 2026; campus press, 2026. Self-reported figures labelled.

The patent shadow

The blend mechanism itself is not open ground. F'real Foods holds two live United States patents on in-cup blending with an elevator assembly and removable spindle, expiring 2033 and 2037.⁸ A third patent often casually attributed to f'real, US10682942B2, in fact belongs to Tikiz Franchising and covers mobile-kiosk dispensing hardware; the correction matters because the misattribution circulates.⁸ Zenblen's own application was allowed but not yet granted at this study's access date.⁹ Whether any given built machine infringes the live claims is a freedom-to-operate question the public record cannot resolve; what the record does establish is that a new entrant's cheapest mechanical path runs near claims that are enforced assets until 2037.

The adjacent evidence

The two nearest comparators reinforce the read. teaBOT, the automated tea kiosk company, remains active after a decade; its chief executive simultaneously serves as Zenblen's CTO per his own public profile, and appears on Zenblen's first Form D but not its second.¹⁰ Blendid, the robotic smoothie company that raised venture capital for an eight-by-eight-foot robot-arm format, disclosed in its FY2025 annual report substantial doubt about continuing as a going concern, thirteen employees, a \$308,000 obsolete-inventory write-off, and the discontinuation of its original kiosk in favour of a smaller, cheaper unit sold outright rather than leased.¹¹ Those are the filing's own figures, reported without characterization. The direction of travel across the category is uniform: smaller and cheaper machines, venues rather than streets, fees rather than cups.

What the category's public record supports: unattended fresh-drink machines survive as venue amenities on service-fee economics, inside access-controlled buildings, placed through vending-industry procurement.

What no public record supports: a street-facing unattended fresh-drink store carrying itself on cup margins. Nobody has published a case, and the one measured throughput figure is below every capital stack's viability line in this study.

NOTES

- 1 Ottomate News, "Zenblen brings robo-crafted smoothies" (founder interview), ottomate.news/p/zenblen-brings-robo-crafted-smoothies, accessed 2026-07-14. The 2,500-smoothie figure is the operator's own; 6.8/day is the naive full-year division.
- 2 mHUB blog, "Hardtech startup Zenblen inspires healthy consumption," published 2022-05-23, mhub.org, accessed 2026-07-14; IIT Institute of Design article, published 2020-11-05, iit.edu, accessed 2026-07-14.
- 3 zenblen.com/find-a-kiosk, accessed 2026-07-14; each venue's access reality checked against the venue's own published hours pages (rush.edu, lib.uchicago.edu, mhubchicago.com, rentnemachicago.com, onyxpilates.com, and others), all accessed 2026-07-14.
- 4 The Daily Northwestern, "Second Zenblen smoothie machine installed in Main Library," 2026-05-26, accessed 2026-07-14. Canteen (Compass Group) senior regional director quoted on the expansion decision; US\$8 price point per a student quoted in the same article.
- 5 College of DuPage vending-services procurement solicitation, June 2025, cod.edu (PDF), indexed via search snippet, accessed 2026-07-14.
- 6 mHUB HardTech Summit pitch (video uploaded 2026-03-25), youtube.com/watch?v=wW6zQRT78pA at 41:28-44:18, auto-caption transcription, accessed 2026-07-14. All figures in that segment are the operator's own unaudited statements.
- 7 SEC EDGAR, Zenblen, Inc. (CIK 0001993331), Form D filed 2023-09-18 (US\$2,117,117 sold of a US\$2,840,275 offering, 34 investors) and Form D filed 2026-01-21 (US\$2,480,647 sold, offering indefinite, 12 investors), both accessed 2026-07-14. Commonly cited broker figures (US\$2.84M, US\$3.55M) understate the SEC-confirmed total.
- 8 US9579615B2 (expires 2033) and US10299628B2 (expires 2037), assignee F'real Foods LLC; US10682942B2, assignee Tikiz Franchising, LLC. patents.google.com, all accessed 2026-07-14.
- 9 US20220160162A1, Zenblen, Inc., legal-events table showing "allowed, notice of allowance not yet mailed," 2026-04-12 as the last indexed event. patents.google.com, accessed 2026-07-14.
- 10 LinkedIn public profile headline ("CEO @ teaBOT + CTO @ Zenblen"), ca.linkedin.com/in/rehmanmerali, accessed 2026-07-14; presence on the 2023 Form D and absence from the 2026 Form D per note 7.
- 11 6d bytes inc. (Blendid) FY2025 annual report (year ended 2025-10-31, filed 2026-03-02), SEC EDGAR CIK 1830909, accessed 2026-07-14. Going-concern language, headcount, write-offs, and the product transition are the filing's own disclosures.

Regulatory posture

On paper, an unattended fresh-drink kiosk in Ontario needs a trained human standing next to it. In practice, two cities' own open data show the paper is not how the category is policed.

Ontario, on paper

Ontario's Food Premises regulation, O. Reg. 493/17, defines a "food service premise" as any food premise where meals or meal portions are prepared for immediate consumption. The definition is agnostic to who, or what, does the preparing.¹ A "food handler," by contrast, is defined only as a person; the regulation contemplates no machine substitute.¹ Vending machines appear in the text as a species of *equipment*, not as an alternative premises class.¹

Two sections then pull in opposite directions. Section 17, an equipment-sanitization rule, plainly contemplates lawful unattended operation: a machine that auto-mixes water needs a piped potable supply, and the operator's name and phone number must be posted "if an employee of the operator is not in full-time attendance."¹ Section 32 requires that every operator of a food service premise keep at least one trained food handler or supervisor on the premise "during every hour in which the premise is operating."¹ A fresh drink blended from dairy and frozen fruit is a time-and-temperature-controlled food, which forecloses the regulation's low-risk exemption on its face.¹

So the classification question is exact: is the kiosk a food service premise, which section 32 staffs; or equipment inside a premise, which section 17 sanitizes? The regulation's text does not resolve it. The Ministry's own reference document acknowledges that many vending machines "operate automatically without employee assistance" while affirming that all other duties still apply, and leaves section 32 untouched.²

Toronto, in practice

Toronto's DineSafe open dataset holds 104,790 inspection records.³ RC Coffee has operated unattended robotic espresso kiosks, fresh dairy, cashless, since June 2021, at twelve or more listed locations including major hospitals. The dataset holds no record of it under any searchable name.³ Caffeo, a directly comparable unattended fresh-dairy espresso kiosk that opened in September 2025, is listed, and passed a Food Premises inspection on 2025-09-12.³ The same city treats the same class of operation both ways; Toronto's enforcement of the category is unsettled.

Four operators, two cities, one pattern: the unattended kiosks are missing from their own cities' food records.

TORONTO · DINESAFE OPEN DATA, 104,790 RECORDS

RC Coffee

0 records

unattended robotic espresso · fresh dairy · since June 2021 · 12+ locations

across ~5 years of operation

Caffeo

listed · passed

same class of operation · opened September 2025

Food Premises inspection, 2025-09-12

CHICAGO · FOOD INSPECTIONS + BUSINESS LICENSES, 26 LOGGED QUERIES

Zenblen

0 records

smoothie kiosks · fresh dairy · queried at all 9 venue addresses, 2021 to 2026

both datasets, every spelling variant

Co-located food vendors

licensed · inspected

cafés, a chain bakery, campus dining, the vending contractor, same addresses

individually listed in the same datasets

Fig. 4.1 Two jurisdictions' own open data, queried directly; methods in the notes. The datasets are not blind: the co-located, conventional food vendors at the same addresses appear normally. One downtown "shared kitchen user" license exists for the category leader, at an address unconnected to any venue, renewed through January 2027.

City of Toronto DineSafe open dataset; City of Chicago Food Inspections (4ijn-s7e5) and Business Licenses (r5kz-chrr) via the Socrata API, 26 logged queries, accessed 2026-07-14.

Chicago, in practice

Chicago's municipal code anticipates this exact business model. Section 4-8-032 defines an automatic-food-vending-machine operation and routes it through a retail-food-establishment license, with health-department approval of the machine type and inspection of the commissary and servicing facilities.⁴ On paper, an operator's dispensing locations carry licenses.

Queried directly through the city's open-data API, across both the food-inspections and business-licenses datasets, at all nine of Zenblen's Chicago venue addresses and over multiple spelling variants: zero records.⁵ The datasets are not blind at those addresses; the same queries return the co-located food operators, from campus dining and a chain bakery to the vending contractor's own micro-markets, individually licensed and inspected.⁵ One Zenblen license does exist: a shared-kitchen-user license at a downtown address unconnected to any venue, renewed through January 2027.⁵ After five years of operation there is no dispensing-location record, though the code requires one.

Illinois' statutory language is also softer than Ontario's. The state food-handling act requires food service establishments to be under a certified manager's "operational supervision," wording that plausibly permits one manager across several unattended sites; Ontario's section 32 says a

person on the premise, every operating hour.⁶ The federal model code's own working group put the strict reading plainly: an unattended operation selling anything beyond prepackaged, non-hazardous food "would be required to have a person-in-charge at all hours of operation."⁷

The finding is regulatory lag, not wrongdoing: enforcement practice in two large cities has not caught up to a category their own codes already describe.

Chicago's practice is not evidence that Ontario's stricter text will not be applied in Ontario. The study therefore assumes Ontario's text will be enforced as written.

NOTES

- 1 O. Reg. 493/17 (Food Premises), under the Health Protection and Promotion Act: s.1 definitions, s.3.1 exemption, s.17, s.32. ontario.ca/laws/regulation/170493 and canlii.org, accessed 2026-07-14. Statutory text cross-checked two ways (rendered e-Laws fetch; text extraction of the Ministry reference document, which reproduces the definitions verbatim).
- 2 Ontario Ministry of Health, Food Premises Reference Document (2019), p. 18, on s.17, accessed 2026-07-14.
- 3 City of Toronto DineSafe open dataset, 104,790 records at access, parsed directly, 2026-07-14. RC Coffee locations per rccoffee.com, accessed 2026-07-14. Caffeo (405 Richmond St W) inspection pass dated 2025-09-12 in the same dataset.
- 4 Chicago Municipal Code §4-8-032 (automatic food vending machine operations, licensed through retail food establishments), accessed via the code's indexed text, 2026-07-14.
- 5 City of Chicago open data via the Socrata API: Food Inspections dataset 4ijn-s7e5 and Business Licenses dataset r5kz-chrr; 26 queries with full raw responses archived, 2026-07-14. Co-located examples include license 2796844 (chain bakery at a hospital address) and licenses 2877822 and 2882530 (the vending contractor's café and micro-market at a hospital tower). The shared-kitchen-user license is 2762826, current renewal expiring 2027-01-15.
- 6 410 ILCS 625/3 (Food Handling Regulation Enforcement Act), ilga.gov, accessed 2026-07-14. Illinois adopts the FDA Food Code (2022) as the Illinois Food Code, dph.illinois.gov, accessed 2026-07-14.
- 7 Conference for Food Protection, "Unattended Food Establishments" issue paper (2014 packet), foodprotect.org, accessed 2026-07-14.

Automation assessment

The machine question entered the study as a prediction: a doctrine-compliant drink robot exists at or under \$20,000 CAD landed. The research falsified it.

The landed-cost arithmetic

Robot-arm bubble-tea machines list on overseas marketplaces at US\$12,800 to \$15,900, which converts to roughly \$18,000 to \$22,500 CAD and appears to clear the ceiling.¹ Landed, it does not. A worked mid-range example at US\$14,350 free-on-board becomes \$20,305 CAD before the boat: ocean freight adds \$600 to \$1,500, import duty adds zero to about \$1,700 depending on an unresolved tariff-heading question, tax and brokerage add about \$1,300, and none of the researched Chinese units carries a Canadian electrical approval, so an Electrical Safety Authority field evaluation adds an estimated \$2,000 to \$6,000 more.² The full landed range is roughly \$26,500 to \$28,400 CAD, a 30 to 40 percent understatement in the sticker, and four to six months from purchase order to legally operable is the realistic timeline.²

The machine cost ladder, cheapest to dearest. Only the component build lands under the \$20K ceiling.

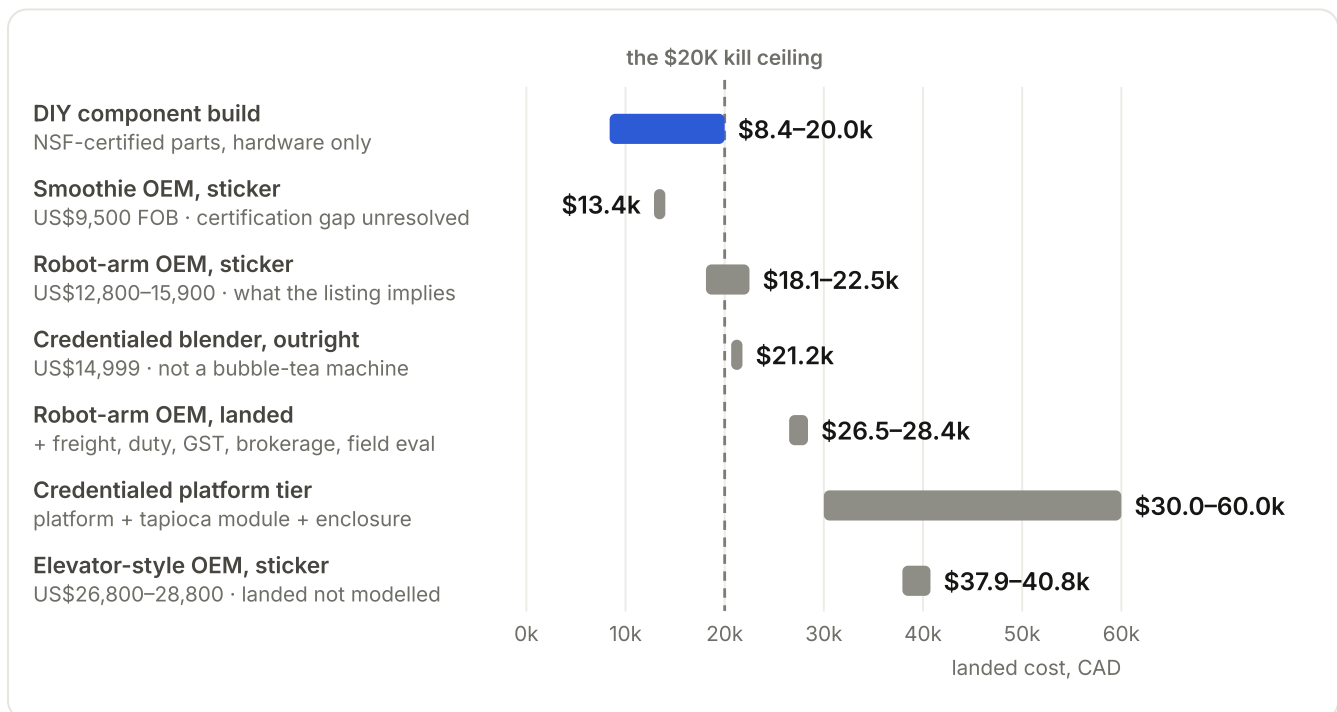


Fig. 5.1 Sticker rungs are what listings imply; the landed rung is what a unit costs in Ontario, legally operable. The dashed line is the study's \$20K kill threshold (criterion K2).

Vendor listings and worked landed-cost example, prices researched 2026-07-13/14, FX 1 USD = 1.415 CAD; full source list in Appendix B.

The payment filter

Before price, one binary filter: who is the merchant of record. The studio's standing rule is that the operator owns the payment flow. Most overseas vending hardware is built for sealed domestic payment rails and bakes the reader into the machine; there is no legitimate way to intercept a sealed proprietary payment path without the vendor's cooperation.³ The compliant integration shape is a documented bus or dispense-trigger interface, the way third-party vending processors integrate.³ Of everything researched, exactly one vendor claims third-party point-of-sale openness in its marketing, unverified; the rest are unconfirmed or lean toward sealed.¹ A component-level build passes the filter by construction: every interface in it is the operator's own.

The component build

The reference design prices a fresh-drink machine as a set of individually certified commercial food-service parts: merchandiser fridge, chest freezer, food-grade dosing pumps, a hot-hold unit, a cup sealer, stainless prep surfaces, an enclosure, and the actuation electronics an edge computer drives directly. Hardware totals roughly \$8,400 to \$20,000 CAD, midpoint near \$14,000.⁴ Beyond price, the build carries two structural advantages: its parts already hold recognized food-equipment certifications individually, a materially cleaner compliance story than a sealed imported box with none; and its integration surface is plain relays and drivers rather than a vendor protocol to reverse-engineer.⁴

The component build, priced line by line.

SUBSYSTEM	RANGE, CAD
Dairy/perishables fridge	\$1,500–3,000
IQF fruit chest freezer	\$1,610–2,500
Chassis / food-zone enclosure *	\$1,500–4,000
Peristaltic pumps × 4 *	\$600–1,800
Contingency (~10%)	\$700–1,700
Water line-in + drain fittings *	\$500–1,500
NSF stainless prep tables × 2	\$420–1,800
Diaphragm pump (purée) *	\$400–900
IQF dosing mechanism (custom) *	\$300–800
Actuation electronics *	\$300–800
Cup sealer	\$260–400
Cup dispenser *	\$150–400
Tapioca hot-hold unit *	\$150–350
Ice machine	\$0 · chilled, not iced, by design
Subtotal, hardware only	~\$8,400–20,000

* vendor capability confirmed, price quote-only; range estimated against the comparable market. Midpoint of the subtotal is roughly \$14,000.

Fig. 5.2 The component build's subsystem ranges. The least mature line is the frozen-fruit dosing mechanism, custom fabrication with no off-the-shelf part found.

Reference design bill of materials, sources accessed 2026-07-14; quote-only lines estimated against the comparable market and marked *.

Reliability is the bar

The category's corporate history says the hard part is not making the machine. Bobacino, a robotic boba bar, closed before shipping and said why in its own words: the environment "made it increasingly difficult to secure the resources required to continue development and achieve full regulatory compliance."⁵ Tea Industries, the first robot bubble-tea shop in British Columbia, opened in March 2024 and closed quietly in 2025.⁵ Cafe X closed its downtown San Francisco robot-coffee locations and retreated to airports, its chief executive summarizing the lesson as "less robot, more old-school coffee"; the airport units later closed too.⁵ Briggo, which raised US\$19 million across a decade, exited by acquisition into a coffee incumbent.⁵ Machines with no human backstop live or die on uptime, restock cadence, and a permit officer's classification. The failures cluster on compliance and operations, not robotics.

Verdict of the assessment: at the study's \$15–20K tier, build, do not buy. No researched machine lands compliant under \$20K; the component build is the only path that clears cost, payment ownership, and the certification story at once.

The machine, however, was never the binding constraint. Chapters 03, 07 and 08 are where the format actually failed.

NOTES

- 1 Overseas marketplace listings for robot-arm and elevator-style bubble-tea machines (alibaba.com showrooms), and vendor pages for the named platforms (Smoodi US\$14,999 outright; a smoothie-vending OEM at US\$9,500 FOB; a Taiwanese vendor claiming point-of-sale API openness), all accessed 2026-07-14. FX at 1 USD = 1.415 CAD, Bank of Canada-range market rate for the week of 2026-07-07.
- 2 Worked landed-cost example: LCL ocean freight \$80–200 per cubic metre; duty scenarios under tariff headings 8476.89 (free) versus 8476.21 (unconfirmed) with no Canada–China surtax applying to this equipment class; 5% GST on the duty-paid value; brokerage \$175–230; ESA SPE-1000 field evaluation, no published price, estimated \$2,000–6,000. Sources: tariffnumber.com, ghy.com, esasafe.com (fees revised 2026-04-01), all accessed 2026-07-14. The researched Chinese units carry CE/CB/ISO marks only, none a Canadian electrical approval.
- 3 Multi-drop bus (MDB) as the documented integration path for third-party vending payment (nayax.com glossary, accessed 2026-07-14); dominance of sealed domestic mobile-payment rails in the exporting market (oceanpayment.com, accessed 2026-07-14).
- 4 Component reference design and bill of materials: commercial merchandiser fridge, chest freezer (gofoodservice.com), NSF-certified peristaltic dosing pumps (dispensingcomponents.com), food-contact diaphragm pumps (graco.com, arozone.com), pearl warmer, semi-automatic cup sealer (lollicupstore.com), NSF prep tables (katom.com), all accessed 2026-07-14. NSF/ANSI 18 covers component-level dispensing equipment (webstore.ansi.org, accessed 2026-07-14).
- 5 Bobacino closure statement, bobacino.co, accessed 2026-07-14; Tea Industries closure, Daily Hive, accessed 2026-07-14; Cafe X retreat, The Spoon and Axios (January 2020) and Crunchbase News, accessed 2026-07-14; Briggo acquisition by Costa Coffee (Coca-Cola), Daily Coffee News (November 2020), accessed 2026-07-14.

The platform build

While the retail question was being researched, the software it would need was built by one founder over 76 days and tested to destruction.

The platform is a production-grade payments and inventory system: 173 commits from April 30 to July 14, 2026; 57 API route handlers; 20 database tables, every one carrying row-level security; 48 schema migrations; 44 automated regression suites.¹ It ships four ways to move money: a code-confirmed shopper checkout, a cash and external-card walk-in register, tap-to-pay through a card processor's terminal rails, and an unattended charge-on-exit loop for a store with nobody in it.

Seventy-six days of commits, one founder.

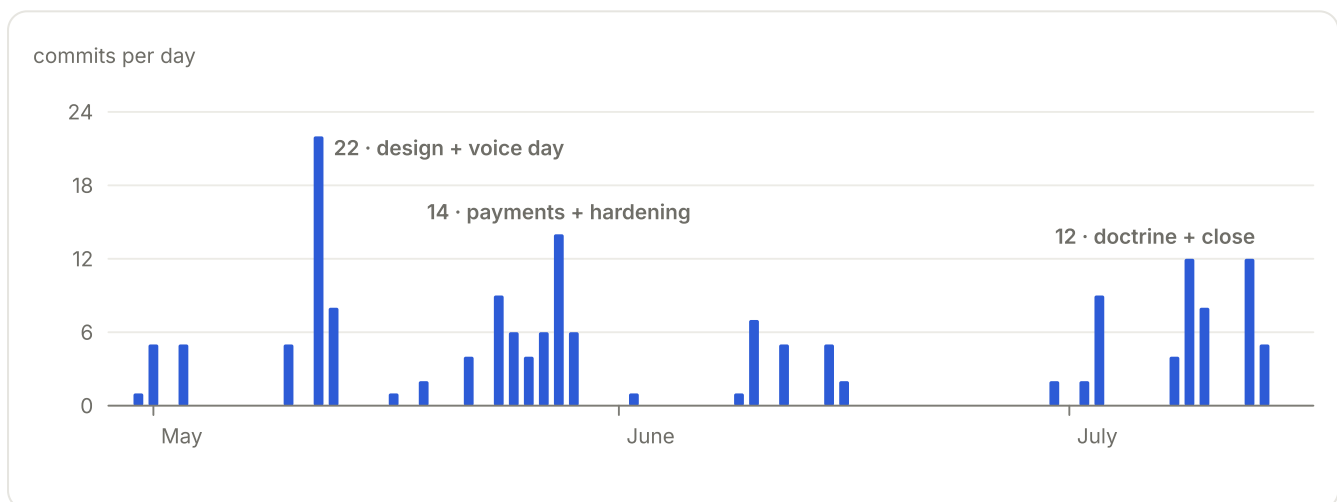


Fig. 6.1 Commit cadence across the program. The bursts are build days; the quiet weeks are when the strategy questions of chapters 02 to 05 were being worked instead.

git history of the platform repository, counted per author date through the close-out commit.

Money state machines, built for missing webhooks

The design assumption throughout: the network is unreliable and event delivery is optional. Every money mutation takes a mandatory idempotency key through a reserve-then-complete envelope; every webhook is deduplicated by event identity; and a reconciliation job converges any stuck payment or refund against the processor's truth through the same idempotent operations, so webhook delivery is a latency optimization rather than a correctness dependency. Refunds on the terminal path are two-phase and confirmed by event, with an atomic claim so two concurrent refund attempts cannot both fire.

That posture was then attacked on purpose. Nineteen adversarial scenarios, 71 checks: oversell races, idempotency storms, duplicate-webhook floods, cron-versus-webhook finalize races, decline storms with

inventory restore, out-of-order refund events, reconciliation cap saturation. All nineteen held. The destruction pass surfaced exactly one real defect, an idempotency key that leaked across two transactions; it was fixed and the pass re-run clean.²

Nineteen adversarial scenarios against the money loop; all held.

#	SCENARIO	SUITE	RESULT
A	Oversell race	local concurrency	held
B	Idempotency storm	local concurrency	held
C	Rate-limit burst	local concurrency	held
D	Concurrent refund	local concurrency	held
E	Checkout key storm	local concurrency	held
F	Refund-initiate storm	live payment rails	held
G	Cron webhook race	live payment rails	held
H	Duplicate webhooks	live payment rails	held
I	Persist-race adopt	live payment rails	held
J	Decline storm	live payment rails	held
K	Webhook-drop converge	live payment rails	held
L	Cron-only backstop	live payment rails	held
M	Rate-limit isolation	live payment rails	held
N	Reconcile cap	live payment rails	held
O	Cross-path collision	live payment rails	held
P	Pending refund arc	live payment rails	held
Q	Out-of-order events	live payment rails	held
R	Two-cron race	live payment rails	held
S	Key reuse across transactions	live payment rails	held · found the one real defect (fixed, re-run clean)

Fig. 6.2 The chaos record. Scenario S found the run's one real defect.

The platform's chaos suites: 23 local concurrency checks; 48 checks against live test-mode payment rails, June 2026.

The live transaction

The loop was proven with money. A physical bench unit, a single-board computer driving a real lock behind a small touchscreen, rang up a live \$1.99 purchase by phone wallet against production infrastructure on July 9, 2026: charged on the studio's own merchant account and receipted with no personal data, then refunded by hand from the processor's dashboard. The refund exposed a gap the program recorded rather than closed: nothing ingests a dashboard-initiated refund, so the platform's own ledger still reads the sale as succeeded.³

The bench unit, from a few angles.

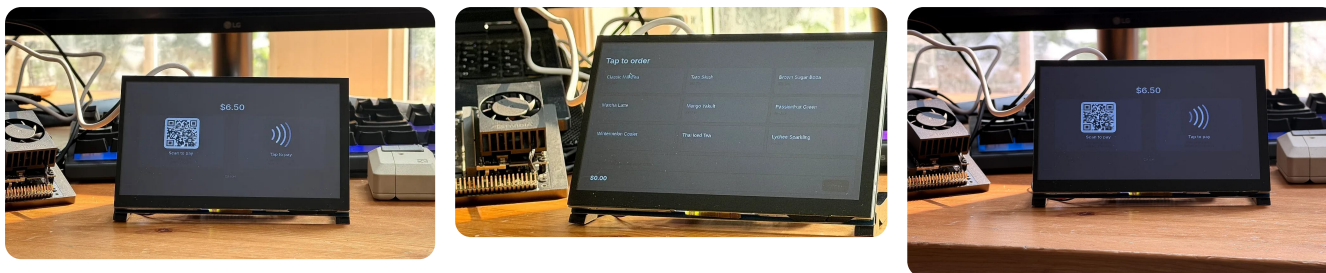


Fig. 6.3 The physical bench unit on the workbench: a single-board computer behind an 800 by 480 touchscreen, driving a real lock. Left to right: checkout, with a contactless “tap to pay” beside the phone-handoff QR; the shelf grid; and the same screen from the side. On the fresh-drink catalogue chapters 05 and 07 model.

Photographed on the bench, July 2026; demo configuration. The kiosk software’s wordmark is retouched out of the screens. The on-screen QR was staged for the shoot and now leads to this study.

The shopper’s side of the same dollar.

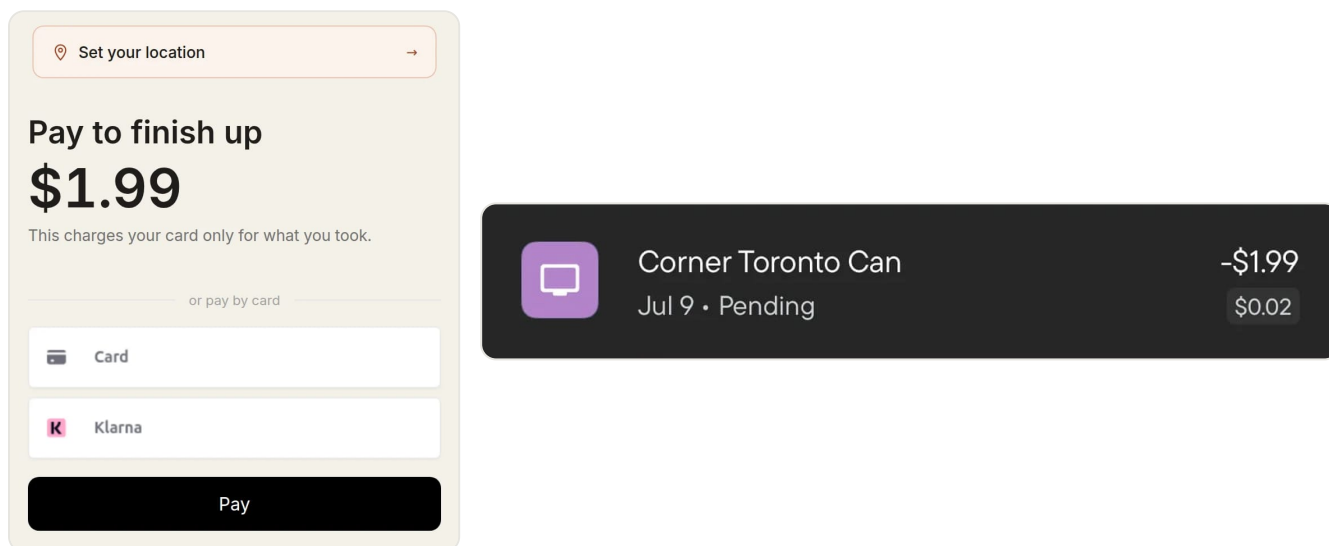


Fig. 6.4 Left: the phone checkout the kiosk’s QR opens, backed by the payment processor’s own elements; on a real phone the wallet sheet sits above the card form. Right: the actual July 9 live purchase, \$1.99, as it appeared in the cardholder’s banking app.

Phone checkout: capture of the live surface, test rails, July 15, 2026. Bank app capture: July 9, 2026, cropped to the one charge.

The edge experiment

A parallel spike asked whether store intelligence could live in the store. On a \$250-class edge computer with 8 GB of memory, a 3-billion-parameter language model and a speech-to-text model run co-resident; voice commands in the common case complete end to end in about 2.6 seconds, under the program’s 4-second bar.⁴ Two software levers did the work: a deterministic fast path that skips the model entirely for unambiguous commands, and grammar-constrained decoding against an indexed stock list, which cut the model’s proposal latency from 8.8 to 2.9 seconds.⁴ The edge device never holds payment authority; the cloud stays the ledger of record.

The \$250 box: an NVIDIA edge module, on the bench.

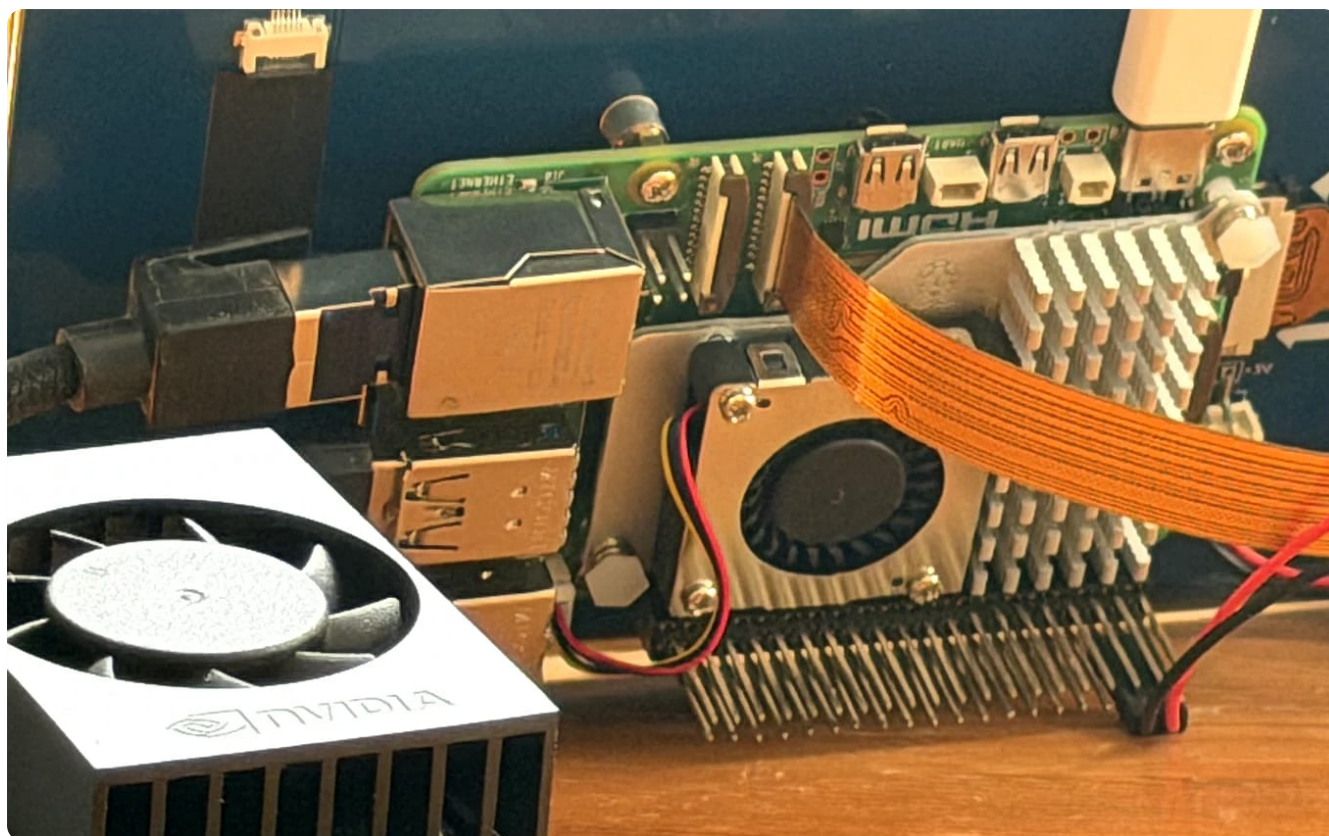


Fig. 6.5 The edge computer the voice spike ran on: an NVIDIA Jetson-class module, the language and speech models co-resident under the heatsink, beside the single-board computer driving the slab. On-device intelligence; the cloud keeps payment authority.

Edge hardware spike, photographed July 2026.

Voice on a \$250 box: 8.8 seconds cut to 2.6, under the 4-second bar, with software alone.

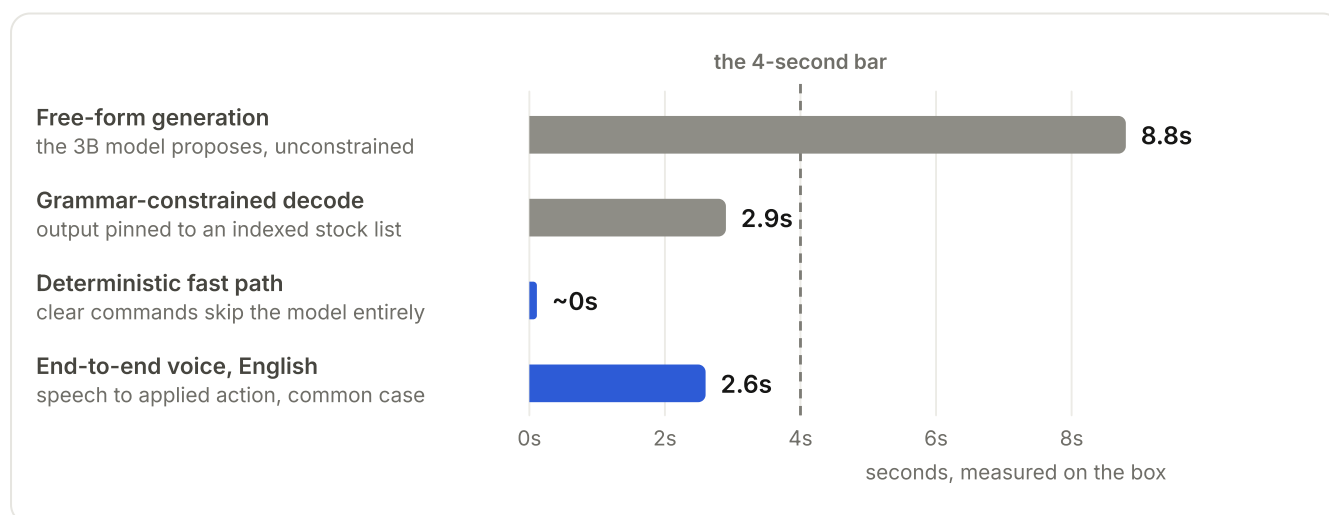


Fig. 6.6 The latency levers. Mandarin lands around 3.7 seconds; Tamil, at roughly 5.9, is the documented miss.

Edge hardware spike, June 2026, measured on-device; per-language results as recorded, including the documented Tamil miss.

The platform, the money state machines, the chaos suites, and the edge pattern are assets of the studio, independent of any particular corner.

NOTES

- 1 Counts audited at the program's close-out commit, 2026-07-14: commits, route handlers, tables with row-level security, migrations, and regression suites counted directly from the repository tree and git history.
- 2 Chaos suites: 23 checks across five local concurrency scenarios; 48 checks across fourteen adversarial scenarios against live test-mode payment rails, all fourteen held, one defect found (cross-transaction idempotency-key leak), fixed and re-verified, June 2026.
- 3 Live-mode verification, 2026-07-09: \$1.99 wallet purchase on the bench unit against production, charged and subsequently refunded on the studio's own merchant account.
- 4 Edge spike, June 3–9, 2026, on an 8 GB Jetson-class single-board computer: 3B-parameter instruct model plus whisper-class speech-to-text co-resident; English end-to-end voice ~2.6 s, Mandarin ~3.7 s, Tamil ~5.9 s (the documented miss); grammar-constrained decode 8.8 s → 2.9 s.

Unit economics

The zero-labor drink store clears its running costs at four cups a day. The problem is paying back the capital, at demand anyone has actually measured.

The per-cup model

The modeled ticket is \$6.25 pre-tax, with a \$5.49 floor price, which sits at the low-middle of the local drink-price ladder rather than above it.¹ At 30 percent cost of goods, one cup contributes \$3.87 after processing fees. Processing takes 8.1 percent of revenue on a single-cup ticket, right at the studio's ceiling, and falls as baskets grow.²

Where a \$6.25 cup goes. CAD, single-cup ticket, 30% COGS.

LINE	\$
Cup price, pre-tax	6.250
Charged incl. 13% HST (remitted)	7.063
Processing (2.9% + \$0.30 on gross)	0.505
Cost of goods (30%)	1.875
Contribution per cup	3.870

Fixed costs run \$450 a month: power including refrigeration and climate, connectivity, insurance, consumable service. No rent is charged in the model, because the structure was already held; a third-party operator should add theirs. No labor is charged, because the format bans it, and the check cuts the other way: one loaded minimum-wage part-timer, at roughly \$2,800 a month, exceeds the entire floor-case revenue line.² Break-even is \$450 divided by \$3.87: 116 cups a month, 3.8 cups a day.

Volume scenarios

Monthly net by volume and COGS. CAD, 30.4 days/month.

CUPS/DAY	28% COGS	30% COGS	32% COGS
12 (floor)	1,007	962	916
30 (base)	3,193	3,079	2,965
45 (stretch)	5,015	4,844	4,673

Capital, fully totalled

The machine-only frame flatters the format. A \$15K machine at the 12-cup floor pays back in 15.6 months, inside the study's 18-month comfort line. But the machine needs a structure around it. The structure's buildout, priced to the fastener in the program's bill of materials, runs \$17,638 for the walk-in-vestibule configuration and up to \$23,720 for the serving-window configuration, permits and contingency included.³ Total capital for the smallest real configuration is about \$26,000; with the component build at the top of its range, \$37,600.

Months to pay back four capital stacks, across demand. The curves only flatten well right of anything ever measured.

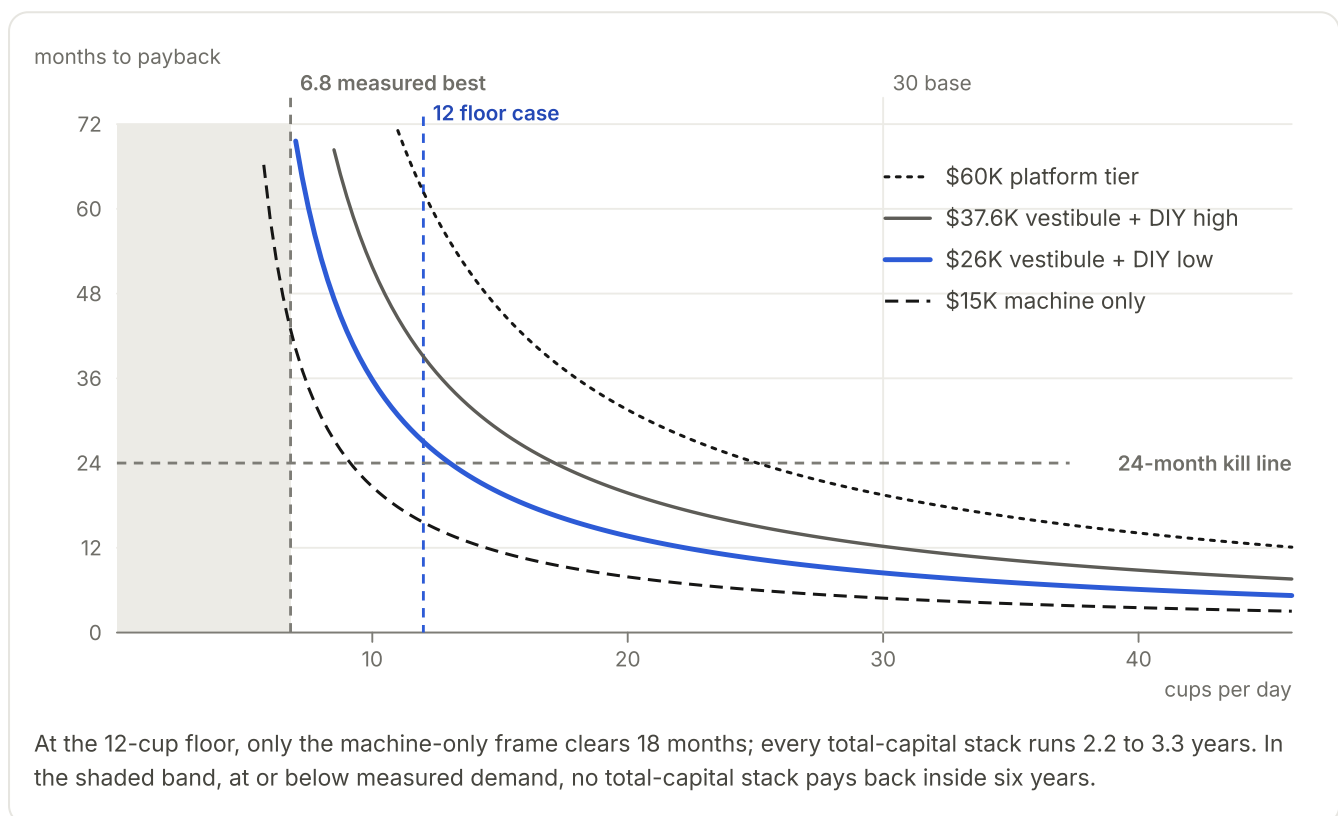


Fig. 7.1 The payback surface, with the category's measured best and the study's thresholds marked. The shaded band is demand at or below the measured line; curves are undefined where net margin approaches zero.

Model: this chapter's tables (contribution \$3.87/cup, fixed \$450/mo). Reference lines: ch. 03 (6.8 measured); the program's kill criteria (12 floor, 24-month line).

Payback in months, 30% COGS, total capital.

STACK	@ 12/DAY	@ 30/DAY	@ 45/DAY
\$15K machine only (the flattering frame)	15.6	4.9	3.1
\$26K vestibule + component build, low	27.0	8.4	5.4
\$37.6K vestibule + component build, high	39.1	12.2	7.8
\$60K platform tier	62.4	19.5	12.4

At the floor case, total-capital payback runs 2.2 to 3.3 years, not the 16 months the machine-only frame suggests. The program's own kill line was 24 months. Winter makes it worse: at 60 percent cold-month volume with no hot menu line, the floor case's annualized net falls by about a quarter.²

Then apply chapter 03

Every number above still assumed the floor case: 12 cups a day, every day, from a walk-up window. The category's best measured operator, mature, in a captive venue, with a decade of iteration behind the machine class, serves 6.8. The floor case is not conservative; it requires beating the category's best documented steady state by 75 percent from a cold start. The 30 and 45 cup columns, where the larger stacks become rational, have no measured comparable anywhere in the public record.

The model fails on demand, not margins: left of the measured line, no total-capital stack pays back inside six years, and the counted evidence that would move the model right of it does not exist.

NOTES

- 1 Local price ladder surveyed 2026-07-13/14 across chain menus in the trade area: the modeled \$5.49 floor undercuts every found comparable line; \$6.25 sits between mid-ladder chain prices. Ontario bubble-tea range roughly \$5–8, premium lines to \$8–12.
- 2 The program's unit-economics model, recomputed independently at close-out from first inputs (ticket, HST, processing 2.9% + \$0.30, COGS 28/30/32%, fixed \$450/mo, 30.4 days/mo), July 2026. Winter sensitivity modeled at 60% volume (no hot line) and 80% (hot line) for November through March.
- 3 Buildout bill of materials, July 2026: walk-in vestibule configuration \$17,638 all-in (60A panel variant); serving-window configuration to \$23,720 (100A variant); both include a 12% contingency on physical goods and \$2,040 of permits and fees.

Site circulation

A walking customer cannot reach the rear structure without crossing the lot's vehicle circulation. That caps what the building can hold. It is the narrowest finding in this study, a bound on one 240 square foot structure, and it is not the reason the program closed.

The lot's vehicle circulation is fixed by its geometry. Dewitt carries the entries: two curb cuts, the first just south of the corner, the second further down, with a third cut on Barton. The strip west of the building is a gully with no vehicle path, so everything on wheels wraps the building's north, east and south sides: the apron in front of the twin Barton-facing bays, the east corridor, and the rear lot. Vehicles queue on the apron in front of the bays at exactly the hours a walk-up store wants customers.

The rear structure stands at the south-west of the lot, on the far side of that vehicle plane from both sidewalks. Trace any pedestrian path from the Barton sidewalk or the Dewitt sidewalk to the rear structure and it crosses the vehicle circulation area; the gully rules out a third approach. The geometry offers no route that does not put a walking customer and a moving or queued vehicle in the same plane.

The circulation bound, drawn: the vehicle plane wraps the building on three sides, and every walking route to the rear structure crosses it.

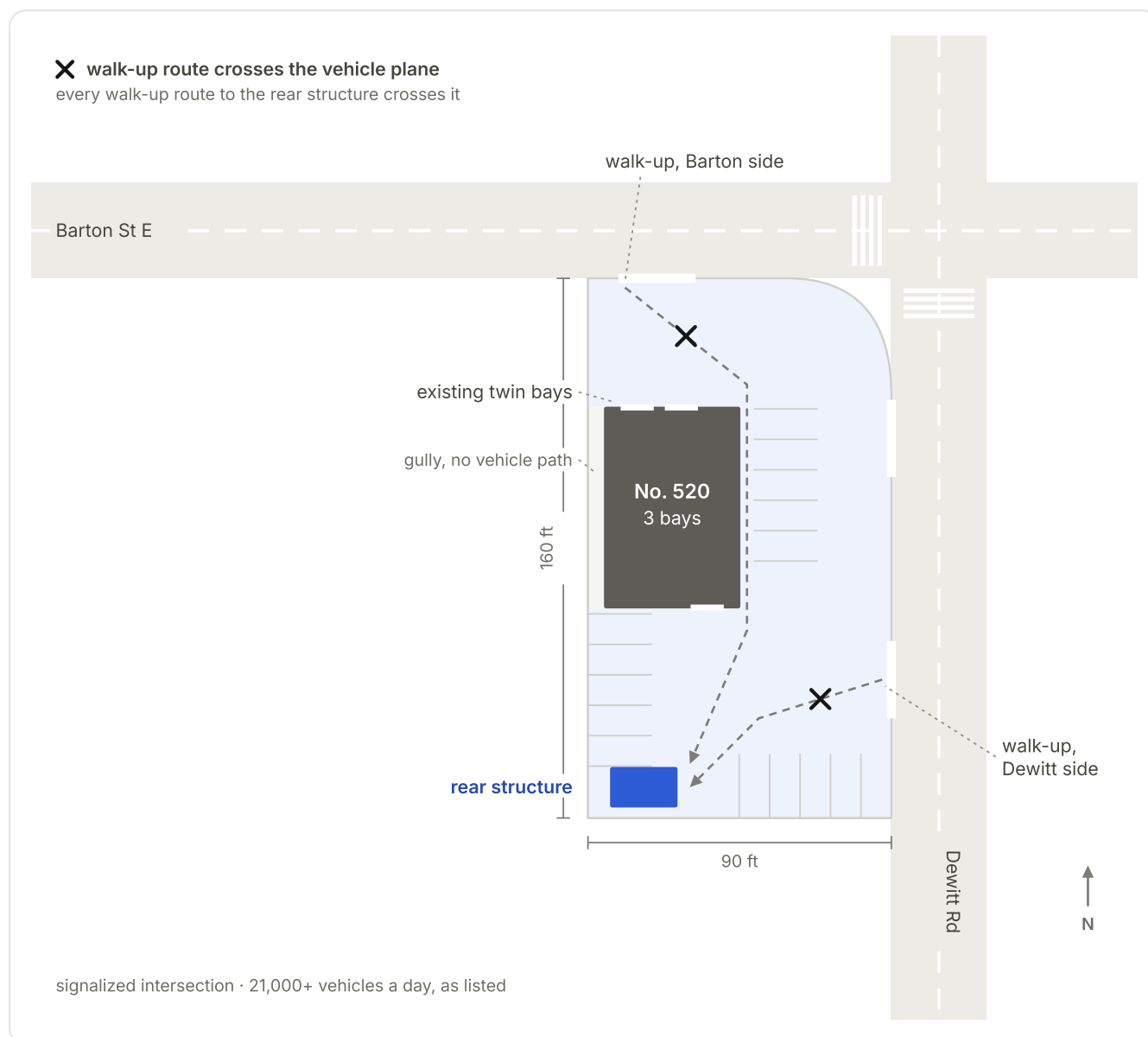


Fig. 8.1 The circulation finding. Vehicle plane shaded: the north apron in front of the bays, the east corridor and the rear lot, entered from the two Dewitt cuts and the Barton cut; the strip west of the building is a gully with no vehicle path; walk-up approaches dashed; conflict points marked.

Site-plan analysis from the 2007 Ontario Land Surveyor site plan of the parcel (on file), the study's aerial and ground photography (April 2025), and the owner-side account of the lot's circulation; schematic, approximate scale.



Fig. 8.2 The vehicle plane at ground level, from the rear lot looking north, April 2025. The courier truck is parked against the blank south wall. This is the plane a walking customer must cross.

Site photography, the study's own archive.



Fig. 8.3 The rear plane from above, April 2025. The rear structure and the lot area between it and both frontages.

Site photography, the study's own archive.



Fig. 8.4 Both faces of the building, December 2024. Left: the twin Barton-facing bays, straight-on from the north apron. Right: the blank south wall, vehicles parked against it on the plane a walking customer must cross. Signage in both frames is the prior tenant's.

Site photography, the study's own archive.



Fig. 8.5 The subject itself, December 2024: the 12 by 20 foot rear structure at the lot's south-west, with the parking row, the rear apron, and the building's south face behind it. Everything between the structure and either sidewalk is the vehicle plane of Fig. 8.1.

Site photography, the study's own archive.

What the geometry caps

The consequence is a cap, not a demolition: in the lot's current configuration, rear-structure uses that require the public to walk in are out. Uses that do not, such as storage, service functions, or equipment, are unaffected. A customer-facing use sited in that structure would have to move the vehicle plane, the walking route, or the store.

All three are engineerable, and the standing to attempt them was already in hand: the property is held by an entity related to the studio's founder, as disclosed on the cover, and the rear structure and the lot area in front of it

sit outside the leased premises. Re-routing circulation was a question of cost and sequencing.

It was also not the question that decided anything. The platform of chapter 06 is venue-independent by construction: the store could have been a non-producing store, on this lot or another or none, and the outcome would not have changed. What closed the program is in chapters 03 and 07 and Appendix D, where measured category demand sits below the model's floor, total capital does not pay back inside the kill line, and better-funded operators have already run the experiment and lost. This chapter records a site bound. It is not the verdict.

NOTES

- 1 Analysis of the study site's own plan geometry: lot and frontage dimensions from a 2007 Ontario Land Surveyor site plan of the parcel (on file) and as published at 520barton.com; bay positions and rear-structure position from the study's aerial and ground photography, April 2025, orientation fixed by the source files' camera-heading EXIF. The two Dewitt entrances and the gully are the owner side's account of the property. The walk-up finding is the studio's own site-plan analysis.
- 2 The standing noted above: the rear structure and the lot area directly in front of it are outside the leased premises and under the owner side's control. The lease is on file; its terms are not reproduced here. The studio's founder is on the owner side, as disclosed on the cover.

Verdict, and what transfers

Unattended fresh-drink retail fails on demand per machine everywhere it has been measured, and the cost of proving otherwise exceeds the return available. Several far better-funded operators established that before this program began.

Verdict, in full: kill. The cost to prove this model, across prototyping, development, marketing and selling it, exceeds what it returns at any demand anyone has measured. The smallest real capital stack is about \$26,000 and pays back in 2.2 to 3.3 years against a 24-month kill line, and it needs 12 cups a day to do it. The category's one measured throughput figure is 6.8, from a mature unit in a captive indoor venue, at an operator whose disclosed economics are a venue service fee alongside the retail line rather than cup margin alone.

The category is contested and its distribution is owned: the leader's placement runs on the vending industry's existing procurement rails, the region already carries operators, and the better-funded entrants ran this experiment first and lost. The site is not the reason. Its exposure is real and independently priced, its zoning is permissive, and the rear structure's walk-up cap is a bound on one 240 square foot building that the owner side had the standing to engineer around. The viable expressions of the work are venue-placed units, on the service-fee economics the category actually runs on, and the platform itself.

How it closed

Each concept in chapter 02 died against a named criterion or a falsified premise, and the evidence that closed the remainder was public and free the whole time. The category's own record had already been written by operators with more money: [Appendix D](#) holds the roster. An entrant that raised US\$19 million, an order of magnitude more than this program would ever commit, was acquired by a beverage incumbent and had its format wound down. A US\$3.5 million crowdfunded entrant closed without ever advancing past prototypes and trade-show demos; its closure statement

blamed the difficulty of securing resources for development and regulatory compliance. A robot bubble-tea shop opened in March 2024 and closed quietly in 2025. The demand ceiling of chapter 03 and the capital arithmetic of chapter 07 then said the same thing in this program's own numbers, and the program's founder closed all venue exploration the same day the last reuse was falsified. The circulation finding of chapter 08 landed the same week; it caps one structure, and it moved none of the arithmetic.

Venue capital consumed by the 76-day program: approximately zero. Nothing physical was bought for the structure, no permit was filed, no machine was ordered. The spend was bench hardware and domain renewals.

What transfers

The platform. A production payments and inventory system with four money paths, idempotent state machines, reconciliation convergence, receipts, and a 71-check adversarial test record; it charged and refunded a live purchase on production rails. It is venue-independent by construction.

The edge pattern. A validated recipe for on-device store intelligence: a small language model and speech-to-text co-resident on a \$250-class computer, sub-4-second voice in the common case, with the cloud as ledger of record. The same architecture serves any deployment where compute must live on site.

The method. Kill criteria before capital, primary-source verification of load-bearing claims, and the one amendment this program earned: read the category's own record, and price what it costs to prove the model, before building the model. Appendix C states it in three paragraphs; it is the studio's standing operating procedure.

What was never proved

The market. No store ever ran on the platform, for the whole life of the program. No shopper used it in the wild; the pre-launch lockdown never lifted. No cup was ever counted; the counting protocol was written and the venue closed before it ran. The close-out state is launch-ready engineering with no market evidence. The platform was never falsified as a business. The venues for testing it were.

What would reopen the question

Three conditions were recorded at close. An inbound placement request from a venue relationship formed during the program; no outbound motion reopens the file. Or counted demand, measured somewhere real, clearing the floor case with the total-capital arithmetic closing inside the 24-month line: that is the first gate now, and no parcel reopens the file on its shape, because the shape of a parcel was never what failed. Or a successor project needing the unattended-retail stack as a hardware testbed, in which case the store becomes the harness rather than the business. Absent one of these, the park is permanent.



Fig. 9.1 The corner, April 2025.
Site photography, the study's own archive.

NOTES

- 1 Close-out record of the program, July 14, 2026: verdict, capital accounting, transferring assets, and revival conditions as filed in the program ledger. The same record carries what was never proved: zero stores onboarded across the program's life, the public lockdown never lifted, and the cup-count protocol written but never run. Category figures in this chapter are sourced in chapters 03 and 07 and Appendix D.

Timeline

Every dated entry below is anchored to the program's ledger, its git history, or a filed record. The pre-repository months are narrated without invented specifics.

DATE	EVENT
Nov 2025	Lease executed on the property; the main building is let to the operating tenant. The rear structure and a slice of the lot are outside the leased premises.
Jan 2026	Possession and fixturing begin under the new tenancy.
Spring 2026	Concept work begins on what the site's unleased remainder could carry. The pre-repository months are concept phase; no artifacts survive from them, and none are invented here.
2026-04-30	Founding commit of the software platform.
2026-05-13	The walk-in register ships: cash and card ring-up, end-of-day closeout.
2026-05-25	Strategy pivots register-first; two days later the posture hardens to no partial rollout, test to destruction before any real user.
2026-05-28	The payments spine lands in one long day: processor onboarding, terminal simulator, admin authentication with an append-only audit log, and the first chaos harness.
2026-06-03 to 06-09	Edge hardware spike: a 3B language model and speech-to-text co-resident on an 8 GB edge computer; voice under the 4-second bar for the common case. Validated, then deliberately parked.
2026-06-10	The bulletproofing capstone: two-phase terminal refunds, the reconciliation backstop, and the 48-check destruction pass. All scenarios held.
2026-06-12	All money paths verified live on deployed infrastructure, test mode, end to end.
2026-06-30	The unattended loop ships: session, charge-on-exit, inventory decrement, receipt.
2026-07-06	First full bench proof on physical hardware: a real session rung up and closed by a single-board computer driving a real lock, still test mode.
2026-07-09	First live dollar: a \$1.99 phone-wallet purchase charged on production rails and refunded through the same system.
2026-07-13	The studio's doctrine is written down. The drink program is specified to the fastener: hypothesis, seven kill criteria, market calendar, machine assessment, buildout bill of materials. The staffed variant is rejected the same day.
2026-07-14	The evidence closes the question: the category autopsy and its measured demand ceiling (chapter 03), the landed-cost falsification (chapter 05), the total-capital arithmetic against the 24-month kill line (chapter 07), and the category's own record of better-funded operators who lost (appendix D). All venue lines are closed. The record is filed the same day. The circulation finding (chapter 08) lands the same week: a bound on one structure, not a cause.

Sources

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- 10 FX: 1 USD = 1.415 CAD, market range for the week of 2026-07-07, exchangerates.org.uk. Accessed 2026-07-14.

Platform, economics, circulation (chapters 06 to 08)

- 1 The program's own records: repository git history and close-out audit (2026-07-14), chaos-suite results, the unit-economics model, the buildout bill of materials, and the close-out ledger. Internal records; figures reproduced in the chapters are the audited counts.
- 2 Local drink-price ladder: chain menu prices surveyed in the trade area, 2026-07-13/14.
- 3 Site photography: the study's own archive, February to June 2025; aerials April 2025. All images resized and stripped of metadata for publication.

- 4 Bench photography and screen captures (chapter 06): the studio's own hardware and surfaces, documented July 2026, after the production deployment was parked by disposition. On-screen QR codes in these frames resolve, deliberately, to this study rather than to a live checkout session, and capture-tool overlays were removed in processing. The kiosk software's wordmark was retouched out of the screens. No production endpoint, payment session, or chargeable code appears in the published record. The July 9 live dollar is documented at Figure 6.4.

Method note

The studio keeps three standing commitments.

Kill criteria before capital. Every format under study carries numbered, numeric, dated criteria with the exit action written in advance. This study's K2 was falsified by research before a purchase order existed.

Falsifiable gates, amended by their misses. The amendment this study earned: read the category's own record, and price what it costs to prove a model, before building the model. The evidence that closed this program was public and free the whole time, and it was written by operators carrying more capital than this studio will commit. A model that cannot pay back at any demand anyone has measured is not rescued by a better site, a better machine, or a better menu, so the category record and the total-capital arithmetic now run first: before format work, before machines, before any site. Site constraints, circulation among them, are checked inside the site assessment where they belong.

The operating model. The studio runs as two AI surfaces around one founder: one authors strategy and task specifications, the other executes against the real system and writes back evidence. Every task ends in a written report; the reports are the record. Load-bearing claims are verified against primary sources before they are trusted, and the confirmed, refuted, and excluded counts are kept.

The category record

Every company this study leaned on, in one place: what each built, what it raised, and how it ended. The machines were real and the failures were not mechanical.

Facts below are held to the study's sourcing rule: capital figures are documented amounts from securities filings or dated press, never estimates; fates carry dates. This edition reproduces no third-party photographs.

Closed

Bobacino

CLOSED

Los Angeles · founded 2020 · ~US\$3.5M crowdfunded (SEC Reg A+, 2021 + 2022)

Incorporated inside a venture studio in March 2020, it unveiled a robotic boba bar prototype that November and raised about US\$3.5 million from crowd investors. It never advanced past prototypes and trade-show demos. The founder resigned in November 2023, development stopped, and the closure statement blamed the difficulty of securing resources for development and regulatory compliance.

Tea Industries

CLOSED

Richmond, BC · opened March 2024 · capital not disclosed

British Columbia's first robot bubble-tea shop: a caged robotic arm brewed, shook, and sealed each order in about two minutes, with staff still on hand to prep ingredients and clear faults. It opened in March 2024 and closed quietly in 2025; local press reported the closure without a post-mortem, and no public account of why has been found. The Canadian precedent closest to this study's format, and it failed.

Exited, absorbed, or out of retail

Briggo

ACQUIRED 2020

Austin · founded 2008 · US\$19M raised pre-acquisition (Daily Coffee News)

An entrant carrying an order of magnitude more capital than this program would ever commit. Founded by a semiconductor engineer, Briggo placed its Coffee Haus kiosks with employers, grocers, and airports across a decade of raises. Costa Coffee, a Coca-Cola subsidiary, acquired it in late 2020 on undisclosed terms, rebranded the fleet, and has since wound the format down. Five active kiosks at the most recent figure found. The machine survived; the company did not remain independent.

f'real Foods

ACQUIRED 2012

Emeryville, CA · founded 1995 · privately held to acquisition

The category's one durable success, and it is not a robot: a self-serve in-cup blender for real-milk shakes, first installed in a Tulsa convenience store in 2003 and in roughly 9,000 locations by December 2012, when Rich Products acquired it. The patents it holds on in-cup blending run to 2037 (chapter 03); a 2019 jury verdict against two imitators showed they are enforced.

Cafe X

LEFT RETAIL

San Francisco · founded 2014/15 · capital not disclosed

Put an industrial robot arm behind glass in downtown San Francisco in January 2017. It closed all three city locations in January 2020, its founder summarizing the lesson as less robot and more old-school coffee, then lost its airport outposts to the pandemic within months. The company survived by selling machines to other operators instead of running stores.

Under going-concern doubt

Blendid (6d bytes)

GOING-CONCERN DOUBT

Sunnyvale, CA · founded 2015 · capital not disclosed; Regulation A+ crowdfunding history (SEC, CIK 1830909)

An eight-by-eight-foot robot-arm smoothie kiosk, launched 2019, piloted at Walmart and on campuses, with a claimed pipeline of hundreds of kiosks that did not materialize. Its FY2025 annual report discloses substantial doubt about continuing as a going concern, thirteen employees, a \$308,000 obsolete-inventory write-off, and the original kiosk discontinued in favour of a smaller, cheaper unit sold outright rather than leased.

Operating

Zenblen

ACTIVE

Chicago · founded 2018 · US\$4.6M documented (SEC Form D, 2023 + 2026)

The category's best-documented operator, and this study's chapter 03 subject. Eleven kiosks at audit, every one inside an access-controlled venue, placed through foodservice procurement, on venue-fee-plus-retail economics. One unit's 2,500 smoothies in calendar 2023 is the only measured throughput figure the category has published.

teaBOT

ACTIVE

Toronto · founded 2013 · Y Combinator S15; venture amounts undisclosed

A robotic kiosk blending custom loose-leaf tea in under thirty seconds, placed in cafes, libraries, and campuses by 2016. It survived its decade by pivoting from running retail kiosks to selling the machine as equipment. Its chief executive also serves as Zenblen's CTO, which is how small this category's talent pool is.

RC Coffee

ACTIVE

Toronto · first kiosk 2020 · internally funded by its payments-company parent

Toronto's unattended espresso network: first kiosk in fall 2020 with a local roaster, its own Robo Cafe brand from June 2021, and about a dozen sites today, including hospital towers. Fresh dairy, cashless, unattended, and absent from DineSafe across five years of operation, which is half of chapter 04's enforcement finding.

Caffeo

ACTIVE

Toronto · founded 2023 · capital not disclosed

A robot arm working espresso equipment behind glass on Richmond Street West, opened September 2025, and the other half of chapter 04's finding: it passed a DineSafe Food Premises inspection twelve days in. A planned Series A and a five-location footprint have not appeared on schedule; the flagship keeps operating.

Smoodi

ACTIVE

Boston · founded 2018 · US\$4.97M Series A (SEC Form D, 2022)

The cheaper thesis: no robot at all, just a self-cleaning countertop blender sold outright to operators, with pre-portioned frozen fruit cups behind it. A Series A in December 2022, national foodservice distribution, and a claimed 300-plus locations by 2026. Its machine is the US\$14,999 rung in figure 5.1.

The operators that survive sell machines, sell venue amenities on service fees, or sell something simpler than a robot. None runs a street-facing unattended store on cup margins (chapters 03 and 07).

Craftpine Inc. · Toronto, Ontario · hello@craftpine.com · craftpine.com

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