

THE FRAGMENTATION TAX

What disconnected systems really cost a visitor attraction, and how to stop paying it.

Guest experience for theme parks, zoos, aquariums and visitor attractions



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ABSTRACT

Most visitor attractions run their guest-facing technology in pieces. Ride and queue times, wayfinding, digital menu boards, advertising and footfall data are bought separately, managed separately and updated separately. Each system works on its own. None of them knows what the others know.

This paper argues that the separation itself carries a cost, which we call **the fragmentation tax**. It is paid every operating day in staff time, guest trust, lost secondary spend, under-valued commercial inventory and slower responses when something goes wrong. Because it is spread across departments, it rarely appears on any one budget line.

We set out where the tax is paid, offer an illustrative model for estimating it, and describe what changes when an attraction's systems share the same live data. The paper ends with a ten-question self-audit and a practical sequence for operators who want to stop paying it.



1 THE DAY THE GUEST REMEMBERS

Ask a family what they remember about a day at an attraction and you rarely hear about the infrastructure. You hear about the ride that made someone scream, the lunch that came too late, the moment a child got tired, and how the day ended. Research into visitor experiences suggests that particularly positive and negative moments, including how an experience ends, can disproportionately influence how people remember and evaluate it. Every operator knows this in their bones. [1]

What is easy to miss is how much of that memory is shaped in the gaps between the attractions themselves. The walk to a ride that turned out to be closed. The twenty minutes spent looking for somewhere to eat that was not heaving. The wait time board that said fifteen minutes when it was really forty. None of these moments is designed. They happen in the space between systems, and they are where good days quietly turn into ordinary ones.

Forty years ago, David Maister set out a set of propositions about waiting that still hold in every queue line in the world. Two matter more than the rest here: uncertain waits feel longer than known, finite waits, and unexplained waits feel longer than explained ones. [2] A guest who knows exactly what is happening and what to do next will tolerate a great deal. A guest who has been given wrong or out-of-date information will tolerate very little. [2, 3]

“Uncertain waits are longer than known, finite waits. Unexplained waits are longer than explained waits.”

David H. Maister, *The Psychology of Waiting Lines* (1985) [2]

That is the heart of this paper. In most attractions, the information a guest relies on is spread across several systems that do not talk to each other. Each one is only as accurate as the last time somebody updated it. The result is a steady stream of small uncertainties and contradictions that guests feel, staff absorb, and operators pay for. We call that cost the fragmentation tax.



2 HOW ATTRACTIONS END UP FRAGMENTED

Nobody sets out to build a fragmented attraction. Fragmentation arrives one sensible decision at a time.

Operations needed wait time boards, so they bought a wait time system. Food and beverage wanted digital menu boards, so they chose a menu board supplier that worked with their tills. Marketing commissioned a park map and later an app. Commercial signed a sponsorship deal and put up screens for it. Someone in IT added footfall counters to answer a capacity question. Each purchase solved a real problem, and each was the right call for the team that made it.

The trouble is what happens between them. Industry analysis of theme park technology identifies siloed, inaccessible and incomplete data as a barrier to making better use of operational information. [4]

A typical mid-sized attraction can end up with:

Guest-facing need	Usually owned by	Usually runs on
Ride and queue times	Operations	Ride or queue system, plus manual updates
Wayfinding	Marketing / guest experience	Printed maps, static signs, an app
Digital menu boards	Food and beverage	A menu board tool linked to point of sale
Advertising and sponsorship	Commercial	Standalone screens or a media partner
Dynamic signage and queue content	Creative / entertainment	A separate content system
Footfall and dwell data	IT / insight	Sensors and a reporting dashboard
Emergency messaging	Health and safety	Public address, radios, manual screen overrides

Seven needs, often five or six systems, and several teams who each see one slice of the guest's day. Nothing in this arrangement is broken. It simply cannot act as one, because no single part of it knows what is happening everywhere else. [4]

That matters most at exactly the moments that shape a guest's memory: a ride closure, a weather change, a lunch rush, a show letting out. These are the moments



when information has to change in several places at once, and they are the moments a fragmented estate handle worst. Research into theme park crowding found that providing visitors with timely information and incentives could help redistribute them away from crowded areas, demonstrating the potential value of coordinating information with changing conditions. [\[5\]](#)



3 WHERE THE TAX IS PAID: THE FIVE COSTS

The fragmentation tax is hard to see because it never arrives as one bill. It is paid in five places, by different teams, in different currencies.

Cost 1: Staff time spent being the integration

When systems cannot share information, people do it for them. A ride host radios operations about a closure. Someone updates the wait time board. Someone else changes the app. Guest services fields the questions from guests who saw the old information. Front-line staff at entrances and junctions answer the same three questions all day: is it open, how long is the wait, and where is the nearest toilet.

None of this is anyone's job description, and all of it takes people away from the work guests actually value: welcoming, entertaining, keeping people safe. In effect, **the team becomes the integration layer the technology never provided.** [4] On a quiet Tuesday that is a nuisance. On a bank holiday it is the reason queues back up and tempers fray.

The wider operational cost of manual work is measurable. A 2026 study of 1,400 large organisations found that managers spent an average of more than six hours a week on administrative tasks that could potentially be automated or handled by better systems, while one-third of organisations reported weekly disruption to frontline staff from IT or system failures. [9] Although not specific to visitor attractions, the findings illustrate how fragmented workflows can absorb staff capacity that could otherwise be spent on higher-value work.

Cost 2: Guest trust, spent one wrong number at a time

Guests make dozens of small decisions in a day, and they make them based on what the screens tell them. Every time a screen is wrong, they learn to trust it a little less.

The most damaging example is the wait time that does not match reality. A posted fifteen minutes that becomes forty does more harm than an honest forty, because it breaks the one thing that makes waiting bearable: knowing what to expect. Maister's propositions explain why. An inaccurate wait is both uncertain and unexplained, the two conditions that make any wait feel longer. [2] Research into theme park visitors has also found that waiting information and perceived waiting time are significant factors in visitor satisfaction. [3]



Once trust goes, it goes everywhere. A guest who has been caught out by one screen discounts the next one, walks to check for themselves, or asks a member of staff. **The investment in screens stops paying back, because guests have stopped believing them.**

Cost 3: Secondary spend lost to friction

Secondary spend lives in the moments between attractions: the drink on the way, the snack while waiting, the shop on the way out. Those moments are exactly where fragmentation causes friction.

When every guest decides to eat at the same time and only one food outlet is promoted, that outlet backs up while others sit quiet. Some guests join the long queue. Some give up and wait until later. Some do not buy at all. Meanwhile the menu boards at the quieter outlets have no idea they should be working harder, because they cannot see the footfall data that would tell them.

The same applies after a disruption. **Guests whose plans have been upset are more likely to cut their day short.** Every early exit takes the rest of that group's spend with it.

Research into theme park visitor behaviour has found relationships between queuing arrangements, visitors' time allocation and food consumption. Industry-reported results from mobile food-ordering systems also suggest that reducing friction in the purchasing process can recover abandoned orders and increase transaction values. [8]

Cost 4: Commercial inventory sold below its value

Every queue line, walkway and food court in an attraction is an audience. Sponsors and advertisers will pay for that audience and pay more when they can see who they are reaching, where and for how long.

In a fragmented estate, advertising usually runs on its own screens with its own schedule. It cannot respond to where guests actually are, it cannot easily prove what played and when, and it has no link to dwell time or footfall. So the inventory is sold as a flat package at a flat price. Some of it **plays to empty paths while the busiest moments of the day go under-used.**

Industry guidance on digital out-of-home advertising highlights the importance of consistent measurement, reliable audience estimates and transparent reporting to help advertisers and media owners evaluate performance. [6]



Cost 5: Slower response when it matters most

The final cost is the one operators least want to think about. When the weather turns severe or an area needs to be cleared, every second spent updating separate systems is a second guests are not being told what to do.

Most attractions have robust procedures for these moments. The question is whether the technology supports them or gets in the way. If emergency messaging means overriding several systems by hand, with radios filling the gaps, **the response depends on people remembering every screen under pressure.**

UK government statutory guidance stresses that emergency communication should alert people to danger quickly, provide clear instructions and use appropriate channels such as signage, public address and staff communication. [7]

A connected estate could help coordinate digital messages, but the extent to which it can update every screen, kiosk and route in one action depends on the systems, integrations and emergency procedures in place.



4 PUTTING A NUMBER ON IT

In our illustrative attraction, the fragmentation tax comes to about £373,000 a year, and almost two-thirds of it is lost food and beverage spend rather than technology or labour.

£373,300 A YEAR

Illustrative fragmentation tax for a mid-sized attraction welcoming 1,000,000 guests across 150 operating days. Assumed figures, not a benchmark.

The model below is deliberately simple and illustrative. **None of these figures is a benchmark.** They show how the tax adds up, and each one should be replaced with your own data.

Cost line	How it is calculated	Assumptions	Annual cost
Lost F&B spend at peak	Guests × abandonment rate × average transaction	$1,000,000 \times 2\% \times £12$	£240,000
Staff answering information queries	Staff × hours a day × days × hourly cost	$20 \times 1.5 \times 150 \times £13$	£58,500
Early exits after disruption	Guests × early-exit rate × secondary spend lost	$1,000,000 \times 0.5\% \times £8$	£40,000
Sponsorship priced below its value	Sponsorship income × discount from no audience proof	$£150,000 \times 20\%$	£30,000
Manual screen updates	Hours a day × days × hourly cost	$2 \times 150 \times £16$	£4,800
Total			£373,300

Three things stand out.

The technology line is the smallest. The manual effort of keeping screens up to date is real but modest. The fragmentation tax is not mainly an IT cost, which is why IT budgets rarely surface it.

The biggest line is commercial. Small percentages of a large guest number add up fast. A 2% loss at the food court, which most operators would recognise on a busy day, outweighs every other line combined.



The model leaves out the hardest costs to measure. It puts no value on guest satisfaction, review scores, repeat visits or the reputational effect of a disruption handled badly. For many attractions these are the costs that matter most, and they all move in the same direction as the figures above.

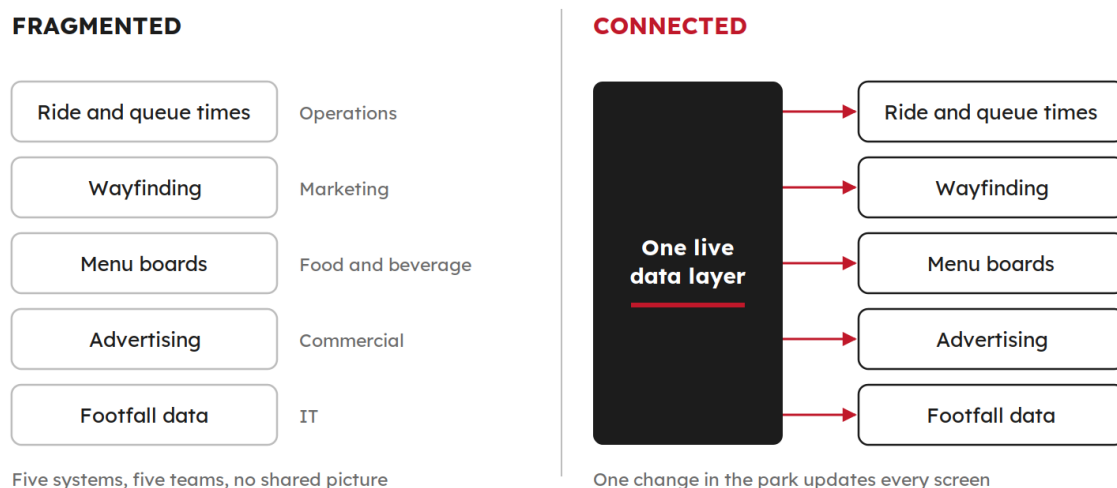
To use the model, start with the two lines you can measure most easily: staff time on information queries (a one-week tally at your busiest junctions will do) and food and beverage transaction counts by outlet and hour. Those two alone usually make the case for a closer look.



5 WHAT A CONNECTED ATTRACTION LOOKS LIKE

A connected attraction runs every guest-facing system on the same live data, so one change in the park updates every relevant screen, route and offer at once.

This is what we mean by Connected Space Infrastructure: the visual layer (every screen, from queue-line displays to large-format LED) and the spatial layer (wayfinding and guest movement) running as one system rather than six. The individual tools still exist. What changes is that they share one picture of what is happening in the park.



The same five systems, two ways.

Five principles

- 1 Live signals straight from where they happen.** Ride status, queue times, outlet capacity and weather come directly from the systems that know them, and every screen reads the same live feed. Nobody retypes a number.
- 2 Every screen knows what every other screen knows.** A wait time board, a menu board and a wayfinding kiosk are not separate products. They are different views of the same park.
- 3 Rules, not reactions.** The response to predictable events is agreed in advance: which alternative to promote when a ride closes, which outlets to push when one fills up, what changes when it rains. The platform carries out the plan, so the team does not have to improvise it at 2pm on a Saturday.
- 4 Operations before commerce, always.** Safety and operational messages override commercial content instantly and without exception. Advertising can



follow the crowd, but never at the expense of telling guests what they need to know.

- 5 The data shapes the day, not just the report.** Footfall and dwell data are used in real time to move content, routes and offers, and then over the season to inform staffing, outlet placement and investment.

The same moment, two ways

Moment	Fragmented response	Connected response
A ride closes	Radio calls, manual board update, guests keep walking to it	Every board updates, nearby screens promote an alternative, wayfinding reroutes
Lunch rush	One food court overwhelmed, others quiet	Menu boards at quieter outlets lead with offers, wayfinding spreads demand
Weather turns	Screens keep showing outdoor content	Indoor attractions, hot drinks and rainwear take over the screens
A show lets out	Thousands of guests head to the same few places	Exit routes promote short queues, dining and the next showtime
An area must be cleared	Several systems overridden by hand	One action changes every screen, kiosk and route

None of the connected responses needs a new member of staff. They need systems that can hear each other.



6 THE FRAGMENTATION SELF-AUDIT

Ten questions will tell you how much of the tax your attraction is paying. Score each one: **0** = no, **1** = partly or sometimes, **2** = yes, reliably.

This self-audit is an indicative diagnostic tool developed by Acquire Digital, not a validated industry benchmark.

	Question	Score
1	When a ride closes, does every wait time display update without anyone touching it?	
2	Do your wait time boards, app and website always show the same number?	
3	Can your wayfinding route guests around a closed ride or a full area?	
4	Do your menu boards change when one outlet is busier than another?	
5	Can a weather change alter content across the whole site from one place?	
6	Can you see where guests are right now, not just in last week's report?	
7	Can you show a sponsor what played, where and when, with reliable audience measurement where available?	
8	Does commercial content give way to operational messages automatically?	
9	Can one authorised action trigger emergency messages across all integrated screens and kiosks configured to receive them?	
10	Could a trained member of the operations team coordinate these functions from one place?	
	Total	

Score	What it means
0 to 7: Fragmented	Your systems operate largely in isolation. Staff may be bridging the gaps manually, creating costs that are difficult to measure.
8 to 14: Networked	Some systems are centrally managed or connected, but opportunities remain to share data and coordinate responses across the attraction.
15 to 20: Connected	Your systems appear well coordinated across the areas assessed. The next opportunity is to use operational data to improve decisions and investment.

If your lowest scores are on questions 3, 4 and 6, these are useful areas to investigate first. Wayfinding, food and beverage and footfall data can influence how guests move around the attraction and how operational decisions are made.



Start by identifying which systems hold the relevant information, whether that information can be shared, and where better coordination could make the greatest difference.



7 WHERE TO START

Stopping the fragmentation tax does not mean replacing everything at once. It means connecting things in the order that pays back soonest.

- 1 **Measure the tax.** Run the self-audit with operations, food and beverage, commercial and IT in the same room. Then gather the two easiest numbers from Section 4: staff time on information queries and outlet transactions by hour. Most attractions find the conversation itself is revealing, because each team has only ever seen its own slice.
- 2 **Connect ride status first.** Live ride and queue data are among the most important signals guests rely on, and changes can trigger knock-on effects across the attraction. Where the systems allow it, connect data at source to relevant screens, kiosks and digital channels, so ride closures can be communicated automatically rather than relying on manual updates.
- 3 **Bring wayfinding onto the same data.** Once ride status is available to the wayfinding system, routes can be adjusted around closures and, where reliable queue and capacity data are available, guests can be directed towards suitable alternatives. This is where guests can start to feel the difference.
- 4 **Link food and beverage to footfall.** Explore how footfall and outlet-capacity data can inform menu-board content and help guests discover alternatives when one outlet is busy. The potential commercial benefit should be measured against your own transaction data rather than assumed in advance.
- 5 **Write the rules for your ten biggest moments.** Agree in advance what happens during a ride closure, weather change, show finish or peak period. Define which information changes, which screens and channels respond, and who is responsible. Test the rules on a quiet day before relying on them on a busy one.
- 6 **Bring advertising and sponsorship in last.** Once the platform can access reliable information about guest movement and audience exposure, commercial inventory can be planned and measured more intelligently. Better audience evidence can support more informed sponsorship discussions, with operational and safety messages taking priority from the outset.



CONCLUSION: STOP PAYING FOR THE GAPS

An attraction can invest in the best rides, the most engaging experiences and the most impressive technology, yet still lose value in the spaces between them.

A ride closes, but the information does not travel. One outlet fills up while another sits quiet. A guest follows a sign that no longer reflects what is happening. Staff spend their time joining the dots between systems that were never designed to work together.

Individually, these look like small operational problems. Across a season, they can add up to wasted staff time, frustrated guests and missed commercial opportunities. That is the fragmentation tax.

The answer is not necessarily to replace the systems an attraction already owns. It is to make them work together. When operational data, digital signage, wayfinding, guest information and commercial content share a live picture of the attraction, teams can respond more consistently, guests can make better-informed decisions, and operators can make more of the infrastructure they have already invested in.

This is the thinking behind Connected Space Infrastructure: moving beyond a collection of separate technologies towards one coordinated guest environment.

The question for every attraction operator is no longer simply whether each individual system does its job. It is whether those systems work together when the day changes.

Because the real cost of fragmentation is not just what each system fails to do. It is what the attraction loses in the gaps between them.



ABOUT ACQUIRE **DIGITAL**

Acquire Digital builds Connected Space Infrastructure for complex physical environments, bringing the visual layer and the spatial layer together on one platform.

Founded in 1997 and headquartered in Leicester, UK, with offices in Boston and Macao, Acquire Digital has delivered more than 23,000 installations across 10+ countries.

TALK THROUGH YOUR SELF-AUDIT

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SOURCES

All cost figures in Section 4 are illustrative assumptions and do not represent industry benchmarks.

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Wayne Cross is a Fellow of the Chartered Institute of Marketing, a Chartered Marketer and a marketing strategist whose work explores the intersection of behavioural psychology, intent-based marketing and human decision-making.

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As Head of Sales & Marketing at Acquire Digital, Wayne applies this thinking to the relationship between people, information and technology. His work examines how digital environments, wayfinding and the delivery of information influence behaviour in physical spaces, shaping how people navigate, interact with their surroundings and make decisions.

Bringing together behavioural insight, marketing strategy and commercial thinking, Wayne is particularly interested in the gap between what technology makes possible and what people actually need. His perspective is rooted in a simple premise: to influence behaviour effectively, you first need to understand it.

Wayne writes about behavioural psychology, intent-based marketing and the often-overlooked human factors that shape how people engage with brands, technology and the world around them.

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