

Traffic Intelligence

The science of
shopper conversion

Introduction

**Store Intelligence.
Retail Excellence.**

Traditional “brick-and-mortar” retailers may envy the performance of their colleagues on the e-commerce side. In a decade punctuated by the failures of iconic retail chains and a depressing parade of store closings, e-commerce growth and market share have outpaced traditional stores in every single quarter. The future holds more of the same: e-commerce in the U.S. and Western Europe is set to grow by 10% or more every year through at least 2014—a pace traditional retailers are unlikely to match.¹

How have e-commerce sites outpaced physical stores when stores offer a far superior environmental, social, and product experience? Convenience and price are major factors, of course. But a third, overlooked advantage of e-commerce sites is their relentless application of metrics to improve the productivity of every interaction with shoppers. Figure 1 suggests that in-store and online actually represent two distinct types of retail experiences—one rich in experience but metrics-challenged, the other experience-challenged but metrics-rich.

	Success Factor	In-Store	Online
Experience	Environment	Deep —Surroundings and displays encourage trial, consideration, impulse buys	Shallow —shopper’s home, office, mobile device and computer—compensate with web design
	Social	Engaging —trained associates interact with shoppers and attend to their needs	Lonely —compensate with online chat, buyer reviews and social media integration
	Merchandise	Rich —shoppers experience look, fit, feel in full context; take merchandise home immediately	Flat —product photos; compensate with 360° view, video
Metrics	Advertising performance	Limited direct measurement —compensate with indirect statistics, studies and surveys	Direct measurement of ad views, traffic sources, SEO performance, clickthrough rate
	Traffic	Limited direct measurement —compensate with intermittent counts and informal estimates	Direct measurement of page views, bounce rate, clickthrough rate, abandoned carts, etc.
	Sales	POS data	Checkout data

Figure 1: Comparison of experiential and measurement factors for in-store and online shopping.

Store Traffic The Missing Fundamentals



Both e-commerce sites and brick-and-mortar stores work hard to maximize their advantages. Online stores use their built-in metrics to adapt their sites continuously to seasonal and competitive trends. Traditional retailers are constantly reviewing store layouts and operations, retraining staff, and fine-tuning merchandise displays to improve their shoppers' experience.

Both groups are less effective in minimizing their disadvantages. Online retailers can't offer a full, immersive in-store experience using today's technologies, but go as far as they can within the limits of website design, social integration, multi-media, and in-store pickup. Brick-and-mortar retailers do far worse at deploying and—more importantly—use metrics beyond traditional “comp” (year-over-year same-store) sales.

Store traffic—the missing fundamental

Retailers' heavy reliance on comp sales is easy to explain: virtually every other important metric requires direct, continuous measurement of store traffic, and few retailers actually measure how many people are in their stores.

Without direct knowledge of store traffic, advertising and promotion performance, weather and seasonality effects, and conversion of shoppers to buyers are guesswork at best. Retailers rely instead on informal or intermittent measures—associate or manager impressions, after-the-fact studies and surveys, occasional clicker-counts when they can spare the staff (i.e., when traffic is low). Attempts at analysis end in argument: the promotion failed, the weather was bad, shoppers came but didn't buy, and endlessly on and on.

The good news is that physical stores can adopt the practices and metrics of online retailers much more easily than online stores can mimic an immersive in-store experience. And as they do, stores can refine their advertising, merchandising, and operations to compete more effectively with both physical and online competitors—based on facts, not opinions.

Traffic, conversion, and sales

Point of Sale (POS) data measures only the endpoint of a long, complex process. And while end results are an important metric—the most important metric—they

show only the “what” of retail success and failure, with no indication of the “why.” Just as important is their blindness to lost opportunities—store visitors who came but didn't buy. Store traffic, corrected for recurring time, day, weather, and seasonal effects, reveals the objective performance of advertising and promotions, freed from the self-interested opinion that drives advertising discussions today. More importantly, store traffic and currently-measured POS results are the essential factors in calculating conversion, the “missing metric”² that unlocks adaptive strategies to build retail success.

At the store level, conversion is defined as total transactions per store visit—how many shoppers became buyers? But with appropriately fine-grain traffic measurements, conversion can be measured within a store as well—how many of the shoppers who walked by or stopped at an end-cap display purchased the item? With information like this in hand, traditional retailers can begin to manage their stores as rigorously as e-commerce experts manage their websites, without compromising the quality shopping experience that is their most compelling advantage.

Every percentage point of conversion means millions of dollars for a major retailer, but with no trustworthy conversion data, they can't tell where the problem resides. Is store traffic too low? Is it poorly directed, for example to low-margin or understaffed departments? Or is it wasted through poor conversion? Without reliable information on store traffic, retailers just can't tell.

Traffic Intelligence—the capture and analysis of traffic in and around the store—delivers three kinds of value. First, it builds revenue. By analyzing the impact of promotions on both traffic and conversion, traffic intelligence helps retailers allocate their resources by answering questions like these:

- // Did a promotion bring in more shoppers than last year?
- // Did it raise conversion of shoppers into buyers?
- // Did it raise average order size/market basket?

In the longer term, certain knowledge of store traffic patterns eliminates guesswork about expensive strategic marketing and merchandising initiatives:

- // Did the store remodel attract more shoppers?
- // Which endcaps, bulks, and center-aisle fixtures increase shopper dwell times?
- // How are shoppers navigating the store, and how can you position impulse items to maximize purchase?

Second, traffic intelligence maximizes profit by optimizing resources for maximum effectiveness. Optimizing staffing—the largest expense for many retailers—sets staff levels, breaks, shift lengths, and shift changes according to traffic, to maintain ideal associate-to-shopper ratios throughout the store. Using transactions as a proxy for traffic results in sub-optimal staffing as shown in Figure 2: staffing constraints during periods of high traffic may reduce

sales below their potential, so transaction-based staffing becomes a self-fulfilling, self-limiting process. Optimizing staff according to traffic, on the other hand, simultaneously improves coverage and customer service even as it cuts expenses.

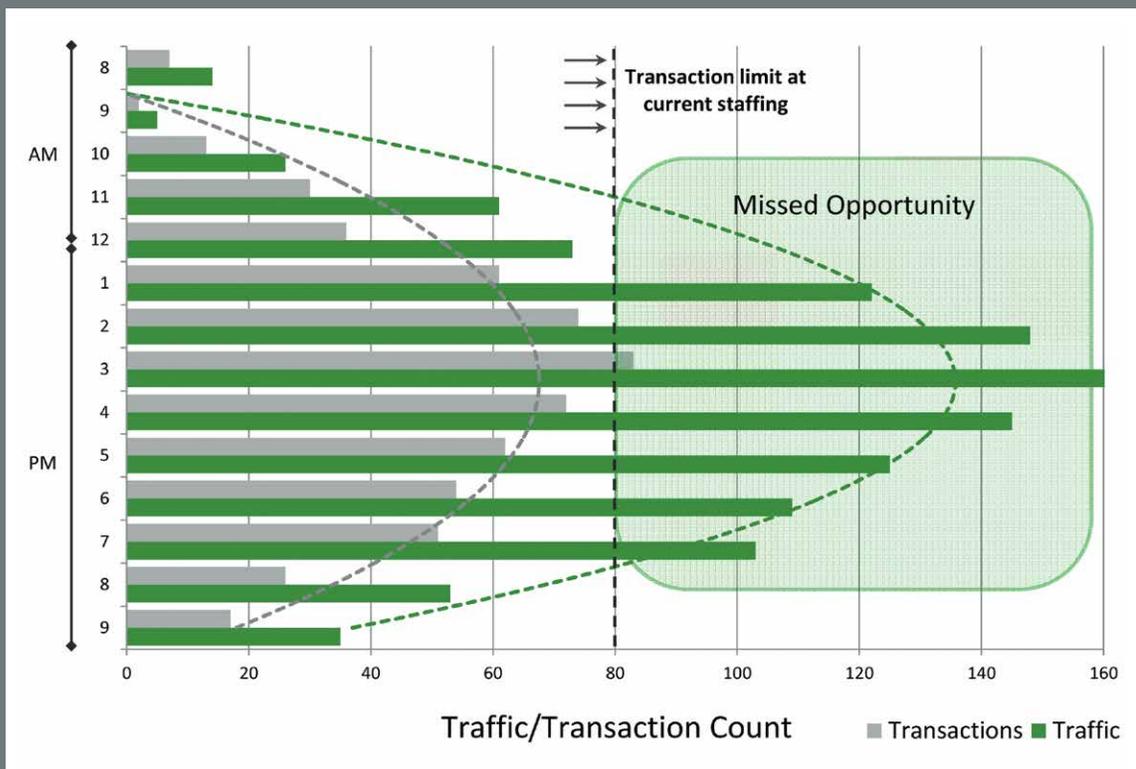


Figure 2: The vertical line represents the maximum possible conversion rate at current staffing levels. Staffing constraints during periods of high traffic may reduce sales below their potential, so transaction-based staffing becomes a self-fulfilling, self-limiting process. Optimizing staff according to traffic, on the other hand, simultaneously improves coverage and customer service even as it cuts expenses.



The same logic applies to staff allocation within the store: traffic-based assignments optimize staff distribution; sales-based assignments tend to “lock in” missed opportunities in understaffed locations or “choke points.”

A third set of benefits comes from integration within multi-purpose devices, or with other store solutions—analogue to the integration by online retailers of data from banner ads, search engines, landing and product pages, shopping carts, buyer reviews, and the other elements of a comprehensive online program. A clear, objective understanding of store traffic can help a store improve inventory management, merchandising, facilities management and energy consumption—virtually any aspect of store operations where resources can be allocated according to the number of shoppers in the store:

// Traffic solutions can cut nuisance alarms from Electronic Article Surveillance (EAS) systems by distinguishing entrance and exit traffic from non-directional traffic of nearby shoppers, store greeters, etc.

// Traffic solutions can help manage associate staffing to assure adequate coverage during peak traffic hours, at POS terminals, and in departments when and where shopper traffic justifies redeployment.

// Traffic tools can help manage power and cooling costs by adjusting or powering down lighting, heating and cooling, and detection systems when shoppers are not present.

Once Traffic Intelligence solutions are deployed at a store, store managers’ performance at driving or converting traffic becomes a matter of fact, not guesswork. The improved performance that comes with this increase in management accountability more than compensates for the cost of a modern Traffic Intelligence solution.

Traffic Intelligence—solution components and decision map

Stand-alone “people counters” and other Traffic Intelligence solutions aren’t new, but advanced detection technologies and systems for managing the information they produce have increased their value significantly over just the last few years.

The next section includes a quick overview of available alternatives, and a “decision map” to help stores of any number and size, whether or not they currently use Traffic Intelligence, Video Surveillance, or Electronic Article Surveillance.

Solution overview

Detection technologies

Sensors used in Traffic Intelligence solutions are more than simple cameras. Their internal electronics, or external Video Analytics appliances, convert optical inputs into data streams that reflect the presence of shoppers. Some systems transmit additional information about shopper location, direction of travel, and other details.

Beam-break detection solutions use horizontal infrared beams, either stand-alone or built into EAS pedestals. Their main advantage is low cost, with some having the capability for directionality, reducing errors by counting entrances and exits separately. Beam-break devices count beam interruptions and not images, so they may deliver extra counts from carts, strollers, and children, and miss counts from shoppers passing at the same time, especially during periods of high traffic. Overall, the technology is about 85% accurate, but the 15% error tends to be concentrated at the times of heaviest traffic. Beam-break solutions are a cost-effective solution for specialty boutiques and low-traffic entrances of larger stores.

Thermal detection technologies use ceiling-mounted sensors to detect shoppers' body heat. Their overhead orientation reduces occlusion issues, and permits them to count effectively when multiple shoppers pass through a doorway simultaneously. Widely available, they are sensitive to sources of environmental interference—surfaces warmed by sunlight or cooled by air conditioning, moving masses of warm or cold air near entrances, and so on.

Overhead video detection uses ceiling-mounted cameras, in either monocular (single-lens) or stereo (dual-lens) configuration. Both are more accurate than beam-break detection, less susceptible to interference, and both offer a holistic view of traffic, better analysis of activity, and video validation capabilities for their higher price. Monocular systems can often be built onto installed video surveillance systems (see next paragraph), but can be impacted by variations in light and shadow. Stereo systems, while more costly, are much better at directionality and discrimination (of shoppers from carts, strollers, and children), and their accuracy is higher than beam-break, thermal, or monocular video systems.

Overhead video sensors may be stand-alone, with image processing (recognition, counting, directionality and discrimination) built into their electronics, or appliance based, in which multiple monocular or stereo cameras feed “raw” video to a Video Analytics appliance, a specialized server that accomplishes the image processing.

Stand-alone systems are a good choice for new solutions at smaller stores, up to about four sensors. Video Analytics appliances offer much greater expansion potential—they are the economical choice for larger stores, and the data-quality leader for installations at flagship and high-value stores. In many cases, current Video Surveillance systems can be upgraded to add Traffic Intelligence by adding Video Analytics devices to convert image data into usable information about store traffic.



The critical role of directionality;

The ability to distinguish inbound and outbound traffic—directionality—is essential to the traffic metrics retailers care most about. Movement past sensors at the entrance is useful, but directionality allows calculation of the number of shoppers in the store, and the average time they spend there—for a more objective, finer-grained picture of traffic and conversion.

When Traffic Intelligence is linked to Loss-Prevention data, directionality adds even more valuable information. Inbound thieves carrying EAS jammers or booster bags can be identified and intercepted before they steal, and selective alarming of exits only prevents nuisance alarms that compromise the credibility of EAS alerts.

Tyco Traffic Technology	Accuracy*	Range*	Functional Features				Environmental Scenarios					Special Characteristics	
			In/out counts	Directional	IP remote	Height	Heat, cold	Light, shadow	Blocking	Children, carts	Greeters		High traffic
Beam Break integrated or wall-mount	Average 85%	Up to 14' (4.2m)	✓	✓			✓	✓			✓		Effective low cost option is visually hidden when integrated within EAS system
Thermal	Average 90%	Up to 40' (12m)	✓	✓	✓			✓	✓			✓	Solution addresses privacy concerns by using detection of body heat for low/high traffic variable conditions
OVERHEAD VIDEO	Camera + Appliance	Average 90%	Up to 20' (6.1m)	✓	✓	✓		✓		✓		✓	Cost-effective solution for stores having many monitoring points and using video cameras
	Mono Sensor	Average 90%	Up to 20' (6.1m)	✓	✓	✓		✓		✓			Ceiling mounted option helps eliminate tampering and provides image processing of the entire scene
	Stereo Sensor	Average 95%	Up to 14' (4.2m)	✓	✓	✓	✓	✓	✓	✓	✓	✓	Advanced solution handles depth perception making it ideal for high traffic stores with variable conditions

Figure 3: Tyco Traffic Technology Comparison Chart

*Data is estimated based on Tyco Retail Solutions traffic products at time of this publication. Accuracy and range figures can vary based on hardware manufacturer, environmental scenarios and mounting heights.

Analysis alternatives

As described above, image recognition takes place before traffic information is streamed out for analysis, either in the sensor electronics or a Video Analytics appliance that converts images into traffic data. The next stage of processing is analysis, which consists of:

1. consolidation of information arriving from multiple areas, at different times of day/week/year, about shoppers entering or exiting, and so on, and
2. integration of traffic data with information from Point-of-Sale terminals, Loss-Prevention systems, Inventory Management software, and other elements of a store's operations and IT infrastructure, for the purpose of
3. reporting of integrated information for rapid response or adaptation of store infrastructure and processes

Analysis is accomplished by a standard server running Traffic Intelligence software, which should be evaluated according to its capabilities, ease of use, and scalability.

As far as where the analysis should be done, major alternatives are:

- // In-store, which supports tight integration with other systems and immediate response to traffic events, but requires store personnel to perform system maintenance and interpret reports. This alternative is best suited for larger stores with trained associates, and local autonomy over staff, inventory, and operations management.
- // Corporate, which maintains company control over sensitive information, for example from POS terminals. This approach typically allows next-day expert analysis without the need for in-store staff, although same-day

response is probably achievable for special events, promotions, and so on.

// Hosted, by a third-party firm that typically offers both Traffic Intelligence solutions and expert analysis without requirements that retailers maintain in-store or corporate analysts. Hosted approaches minimize staffing costs and startup time, and may be considered as a first step to establish best reporting practices, even when analysis will eventually be taken over in-store or at the corporate center. Responsiveness is roughly comparable to the corporate alternative, and despite the concerns of store managers, real data security risks are minimal, and manageable under an appropriate confidentiality agreement that permits review and auditing.

Implementation of any Traffic Intelligence solution should be preceded by a planning phase incorporating careful review of unique store requirements: Issues to consider during the planning phase include maximizing the value of legacy infrastructure investments, including multiple use of legacy Video Surveillance and EAS systems; the utility of fully integrated systems vs. traffic-only point solutions; requirements for real-time response; and the need for an open-standards approach that accommodates future technologies offered by multiple suppliers.

The Tyco Retail Solutions advantage

Tyco Retail Solutions (TRS) offers a broad range of compatible sensor technologies, a highly refined and scalable Store Performance Platform, and comprehensive support ranging from technical installation and maintenance through professional planning, design, and workflow development, to highly secure hosted services, as reviewed below.

But the most compelling advantage claimed by TRS is its broad and exclusive

Tyco Traffic Intelligence Reports

Standard Reports

- Traffic summary by:
 - Store
 - Hour
 - Day
 - Week
 - Zone
 - Zone per hour
- Traffic distribution by:
 - Store
 - Division
- Standard Reports

Sales Conversion Reports

- By Store
- By Store per hour
- By Division
- By Division per hour

Traffic Exception Reports

- Traffic count exception
- Shopper-to-associate exception
- Sales conversion exception

Device and Diagnostic Reports

- Device list
- Diagnostic summary
- Diagnostic summary by device
- Diagnostic summary by device by day
- Traffic accuracy by store

Figure 4: Tyco Retail Solutions Traffic Intelligence Reports, from integrated quick-response dashboards to in-depth analyses for long-range planning.

focus on solutions for the retail store. TRS solutions and services are comprehensive and designed for the retail environment. Tyco Retail Solutions' clients can count on representatives who understand retail in depth, speak their language, and offer solutions tailored to their exact requirements.

Technologies

The TRS portfolio of Traffic Intelligence solutions ranges from cost-effective embedded sensors sold as upgrades to our Sensormatic branded EAS systems to the most advanced stereo sensors. Regardless of sensor selection, every option includes not only basic traffic counting but capabilities for directionality, selective alarming for inbound "booster bags" and EAS jammers, and EAS alarm suppression when traffic sensors report no one leaving the store.

TRS monocular and stereo overhead video systems include options that are appropriate from small initial installations at single stores, to integrated Surveillance and Traffic Intelligence systems for large and flagship stores or reference stores. A unified approach to a retail information management platform consolidates information across sensor technologies, provides data validation and editing options, and integrates reporting of EAS and Traffic Intelligence data to provide clients with a predictable, affordable route to the sophisticated integrated store management solutions that lie ahead.

Platform and Reporting

The TRS exclusive Store Performance Platform links Traffic, EAS, and Inventory Visibility solutions to deliver reports as detailed in Figure 4. They include real-time, quick-response dashboards, operational reports, and specialized exception reports for tracking down and ameliorating specific issues.

The Store Performance Platform is highly configurable, scalable from the store to the corporate level, and based on open standards. This facilitates integration with other store point and legacy solutions, including home-grown counting, as well as with third party solutions from the retail industry and beyond.

For clients who prefer a hosted solution, TRS also offers the Store Performance Platform as the core of a hosted solution. This provides rapid benefits, keeps costs low and flexibility high, requires only minimal staff training, and is an ideal solution when expert staff is not available. It can also be a first step toward an in-store or corporate solution.

Services

Tyco Retail Solutions backs its Traffic Intelligence solutions with comprehensive support, including:

- // Device-level installation and maintenance through experienced retail service professionals for quality service in the most demanding retail environments, featuring on-site and remote management and diagnostic services to help retailers manage thousands of devices chain-wide.
- // Solution-level professional services including business case and ROI analysis, solution design, use case development, and a range of support, implementation, and training services.

Conclusions

Tyco's full array of traffic sensors, comprehensive store performance platform, and open-standards approach to its solutions portfolio delivers end-to-end retail integration, breaking down operational silos and promoting the integrated, strategic decision-making that is essential



to retail stores' robust recovery and future success. Tyco promotes innovation and long-term growth as the best ways to optimize retail operations, helping to create competitive advantage for our retail clients across vertical markets and specialties.

Whether you are trying to minimize shrink, increase conversion rates, optimize inventory, drive employee productivity, or enhance overall store performance, Tyco Retail Solutions' goal is to integrate information across the store to drive retail excellence. Traffic Intelligence is now available from Tyco Retail Solutions in a broad array of configurations to meet the

infrastructure, information requirements, and performance goals of every retailer.



Footnotes:

¹ Erick Schonfeld. "Forrester forecast: Online Retail Sales Will Grow to \$250 Billion by 2014." TechCrunch.com. (New York: AOL, Inc. March 8, 2010). <http://techcrunch.com/2010/03/08/forrester-forecast-online-retail-sales-will-grow-to-250-billion-by-2014/>.

² Mark Ryski. Conversion: the Last Great Retail Metric. (Bloomington, IN: Authorhouse. 2011).



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Leverage our strength and experience

Tyco Retail Solutions is a leading global provider of integrated retail performance and security solutions, deployed today at more than 80 percent of the world's top 200 retailers. Customers range from single-store boutiques to global retail enterprises. Operating in more than 70 countries worldwide, Tyco Retail Solutions provides retailers with real-time visibility to their inventory and assets to improve operations, optimize profitability and create memorable shopper experiences.

The Tyco Retail Solutions portfolio for retailers is sold direct and through authorized business partners around the world.

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