

A Forrester Total Economic
Impact™ Study
Commissioned By
Samsung

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The Total Economic Impact™ Of Samsung Outdoor Digital Menu Boards

Cost Savings And Business Benefits
Enabled By Outdoor Digital Drive-Thru
Menu Displays In The Quick-Service
Restaurant Industry

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Executive Summary

Samsung commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study to examine the potential return on investment (ROI) quick-service restaurants (QSRs) may realize by deploying outdoor digital menu-board displays in their drive-thru locations. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of outdoor digital menu boards on their restaurant's business outcomes.

To better understand the benefits, costs, and risks associated with deploying outdoor digital menu boards, Forrester interviewed several existing Samsung customers with multiple years of experience using outdoor digital menu boards. Forrester also conducted an online survey of 150 restaurant professionals involved in selecting outdoor menu signage solutions for their organization, to gain a better understanding of the current market impact, attitudes, and behaviors with regards to menu signage solutions.

With Samsung's ruggedized outdoor digital menu boards, restaurants are able to dynamically change outdoor menu-board content based on sales, customer, and contextual data, without the cost and resource constraints imposed by traditional printed menus. For more details on Samsung outdoor digital menu boards, see the section titled "Samsung Outdoor Digital Menu Boards: Overview."

Prior to adopting Samsung outdoor digital menu boards, QSRs typically used static, printed menu signage in their drive-thrus, inhibiting each restaurant's flexibility to change menu items, prices, or promotions based on market conditions, and forcing the organizations to incur costly printing expenses each month. Using Samsung outdoor digital menu boards to digitally transform their drive-thrus, organizations were able to reduce their operating costs, improve their operational performance, and deliver a better customer experience through more relevant and targeted digital content, increasing sales and profitability.

SAMSUNG OUTDOOR DIGITAL MENU BOARDS EMPOWER ORGANIZATIONS TO INCREASE PROFITABILITY THROUGH NEW REVENUE GROWTH AND COST SAVINGS

Our interviews with two existing customers, online survey of 150 outdoor digital- and print-menu stakeholders, and subsequent financial analysis, found that a representative, composite organization based on these interviewed and surveyed organizations experienced the risk-adjusted ROI benefits shown in Figure 1.¹

FIGURE 1

Financial Summary Showing Five-Year Risk-Adjusted Results



Source: Forrester Research, Inc.

Samsung outdoor digital menu boards help restaurants digitally transform their drive-thrus with relevant and timely dynamic digital content, without the cost and resource constraints of print menus.

Over a five-year period, a quick-service restaurant with a 10-store pilot can expect to:

- **Increase profit by \$1,432,940 from increased average order values, higher conversion rates on promotions, and increased drive-thru customer traffic.**
- **Reduce store labor, admin, printing, and food waste costs by \$1,059,798.**

- › **Benefits.** The composite organization experienced \$2,492,738 risk- and present value-adjusted quantified benefits over the five-year forecast period, comprising the following benefit categories:
- **Increased restaurant profit by \$693,201 by increasing the volume of drive-thru customers served weekly.** Use of Samsung's outdoor digital menu boards in its pilot drive-thru locations resulted in improved customer throughput and a 5.75% decrease in average drive-thru wait times. As a result, the composite organization was able to increase drive-thru customer traffic volume by 9.1% since deploying outdoor digital drive-thru menu boards, positively impacting store profitability.
 - **Increased restaurant profit by \$578,297 by improving the conversion rate on promotional items.** By using outdoor digital menu boards in its drive-thrus to increase the effectiveness of its promotional campaigns, the organization was able to increase the conversion rate on promotional items by 2%, resulting in an uplift in profitability for its pilot store locations.
 - **Increased restaurant profit by \$161,442 due to an increase in average order values.** By leveraging dynamic digital content and augmenting its upselling capabilities, the composite organization saw the average order value of purchases made in its pilot location drive-thrus increase by 2.5% since deploying outdoor digital menu boards, resulting in an uplift in profitability across its pilot restaurants. For instance, customers were more likely to add additional items to their orders, such as fries and beverages, when ordering at drive-thrus with digital menu displays.
 - **Reduced restaurant labor, administration, and printing expenses by \$1,047,504.** By digitally transforming its outdoor menu boards, the composite organization eliminated the printing costs associated with its legacy drive-thru menu solutions while reducing its labor costs through more-efficient and less labor-intensive menu board data-change management, and centralized menu board auditing capabilities. As a result, the organization was able to significantly improve its cost structure and reduce its ongoing operational expenses.
 - **Reduced restaurant food waste costs by \$12,295.** Using Samsung's outdoor digital menu-board displays, the organization was able to improve drive-thru menu board visibility and increase order accuracy, reducing food waste costs by 5% in each of its pilot drive-thru locations.
- › **Costs.** The composite organization experienced \$841,432 in risk- and present value-adjusted costs over the five-year forecast period, comprising the following cost categories:
- **Outdoor digital menu display hardware and software costs of \$455,697.** These costs include upfront expenditures for outdoor digital display hardware, media player, warranty, enclosures, mounts, cables, and other network connectivity hardware and equipment. In addition, this cost category includes the annual expense of a content management software subscription, along with an associated maintenance and support contract, needed to run and manage digital menu content.
 - **Implementation and system integration costs of \$68,200.** These costs include initial outsource fees paid to a system integrator for site surveying, installation, testing, and integration with other store systems. Additionally, this cost category includes internal deployment team expenses, which accounts for the internal project management, IT, marketing, and operational resources required to plan, design, deploy, and manage the composite organization's outdoor digital menu-board pilot program.
 - **Ongoing outdoor digital menu board management and maintenance expenses of \$317,535.** These costs include internal ongoing resource costs associated with running, maintaining, and managing each restaurant's outdoor digital menu-board displays, along with external costs for bandwidth, hardware maintenance and support contracts, and incremental creative content costs.

In addition, our analysis found that as the representative QSR organization scaled the size of its deployment, it was able to grow the ROI and Net Present Value from its investment, while concurrently reducing its payback period. Our analysis found the following five-year risk-adjusted ROI benefits shown in Figure 2.

FIGURE 2

Financial Summary Showing Five-Year Risk-Adjusted Results Across Three Deployment Scenarios

Number Of Drive-Thru Locations With Digital Menu Boards 	Return On Investment 	Net Present Value 	Payback Period 
10 locations	196%	\$1,651,307	11.0 months
200 locations	229%	\$34,621,755	9.5 months
2,000 locations	257%	\$358,034,945	8.3 months

Source: Forrester Research, Inc.

Disclosures

The reader should be aware of the following:

- › The study is commissioned by Samsung and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.
- › Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Samsung outdoor digital menu boards.
- › Samsung reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.
- › Samsung provided the customer names for the interviews but did not participate in the interviews.

TEI Framework And Methodology

INTRODUCTION

From the information provided in the interviews and online survey, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing Samsung outdoor digital menu boards. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

APPROACH AND METHODOLOGY

Forrester took a multistep approach to evaluate the impact that Samsung outdoor digital menu boards can have on an organization (see Figure 2). Specifically, we:

- › Interviewed Samsung marketing and sales personnel, along with Forrester analysts, to gather data relative to Samsung's outdoor digital display technology and the marketplace for outdoor digital drive-thru menu board solutions.
- › Interviewed two organizations currently using Samsung outdoor digital menu boards to obtain data with respect to costs, benefits, and risks.
- › Conducted an online survey of 150 US respondents to evaluate their menu signage strategies and to better understand the current market impact, attitudes, and behaviors with regards to menu signage solutions. Survey participants included professionals who make, influence, or have knowledge related to menu signage selection decisions. Survey respondents all came from organizations with US drive-thru locations. The study was conducted in August and September 2016.
- › Designed a composite organization based on characteristics of the interviewed organizations (see Appendix A).
- › Constructed a financial model representative of the interviews and online survey using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews and online survey as applied to the composite organization.
- › Risk-adjusted the financial model based on issues and concerns the interviewed organizations highlighted in interviews. Risk adjustment is a key part of the TEI methodology. While interviewed organizations provided cost and benefit estimates, some categories included a broad range of responses or had a number of outside forces that might have affected the results. For that reason, some cost and benefit totals have been risk-adjusted and are detailed in each relevant section.

Forrester employed four fundamental elements of TEI in modeling Samsung's outdoor digital menu-board solution: benefits, costs, flexibility, and risks.

Given the increasing sophistication that enterprises have regarding ROI analyses related to business technology investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix B for additional information on the TEI methodology.

FIGURE 3

TEI Approach



Source: Forrester Research, Inc.

Market Overview

THE CURRENT STATE OF PRINT AND DIGITAL SIGNAGE IN THE QUICK-SERVICE RESTAURANT SPACE

In order to better understand the current state of menu signage, Forrester conducted an online survey of 150 US respondents to evaluate their attitudes and feelings related to print and digital menu signage. The study focused on organizations' behavior and their attitudes toward the use of menu signage alternatives. From the survey, we uncovered the following key demographics:

- The majority of respondents surveyed had 20 or more drive-thru locations, with an average of 54% of their revenue being generated from their drive-thrus.
- The majority of respondents served around 800 drive-thru customers each week, and lunch (11 a.m. to 2 p.m.) was the most common timeframe the drive-thru was visited, followed by dinner (5 p.m. to 8 p.m.).
- Eighty-nine percent of these restaurants are changing their menu board one to three times daily, and they are running an average of 3.7 promotions each month.

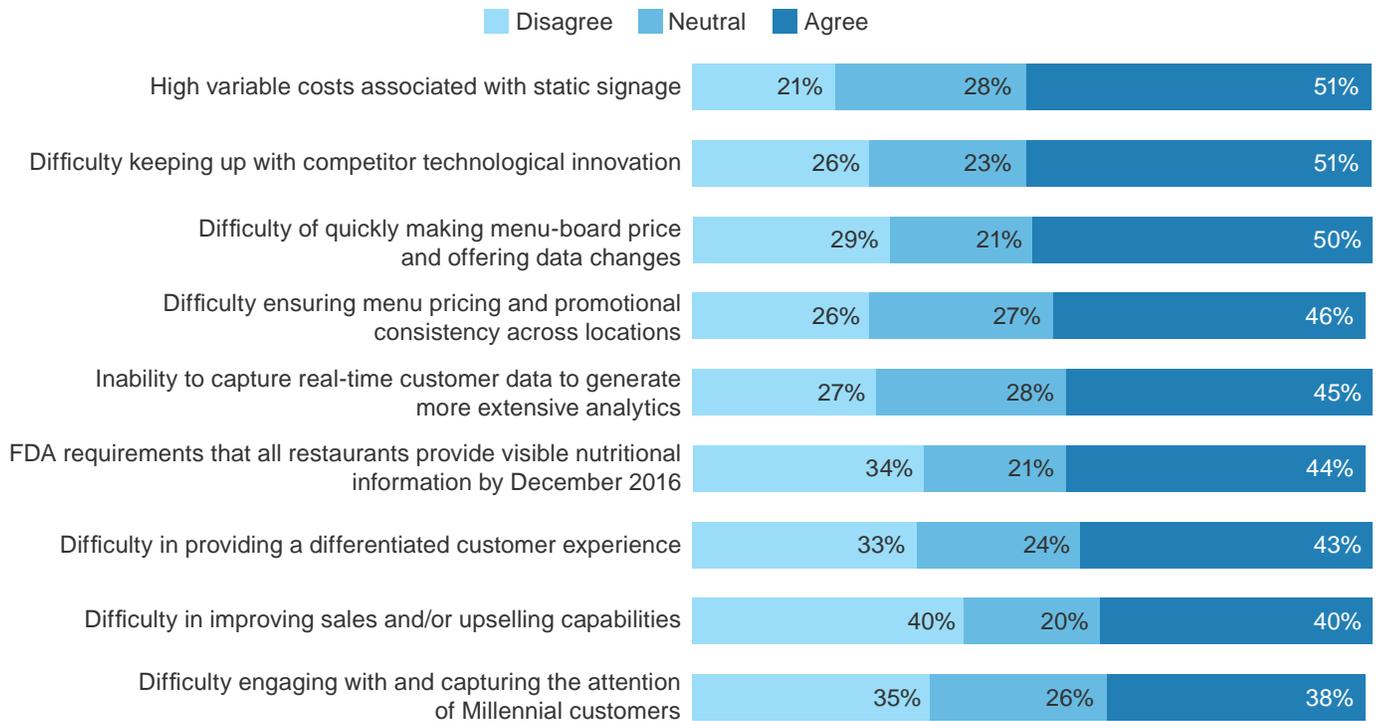
Of the 150 respondents surveyed by Forrester, 136 respondents use print menu signage solutions in their drive-thru locations. From the survey, we discovered that:

› **Print menu users are concerned about the costs of print signage and keeping up with the competition.** When we asked print menu users about their pain points or issues associated with their current print drive-thru menus, 51% of respondents said they were equally concerned with the high variable costs associated with static menu signage and the difficulty of keeping up with their competitors' technological innovations. Print menu respondents were also very concerned about the difficulty of making changes quickly to their product, pricing, and promotional content, with 50% of responses noting this as a current pain point. In addition, respondents were concerned about ensuring menu pricing and promotional consistency across location (46%) and their inability to capture real-time customer data in order to create more extensive analytics on customer behavior (45%). Lastly, since the FDA will require all restaurants to provide visible nutritional information on their menu boards by December 2016, 44% of print menu respondents indicated that they were concerned about their ability to comply with this rule. These and other pain points are highlighted in Figure 3.

A similar question was asked of respondents who had already implemented digital menu boards in their drive-thru locations. Our survey found a similar response, with all 17 of outdoor digital menu-board respondents indicating that they moved to outdoor digital menu boards to expedite the process of making menu-board price and product changes, as well as providing a better customer experience. Fifteen of the 17 survey respondents identified the desire to improve sales and upselling capabilities as a pain point that served as the catalyst for switching from static drive-thru menus to outdoor digital menu displays.

FIGURE 4
Key Pain Points Of Print Menu Boards

“What are the pain points or issues associated with your current drive-thru menu displays?”



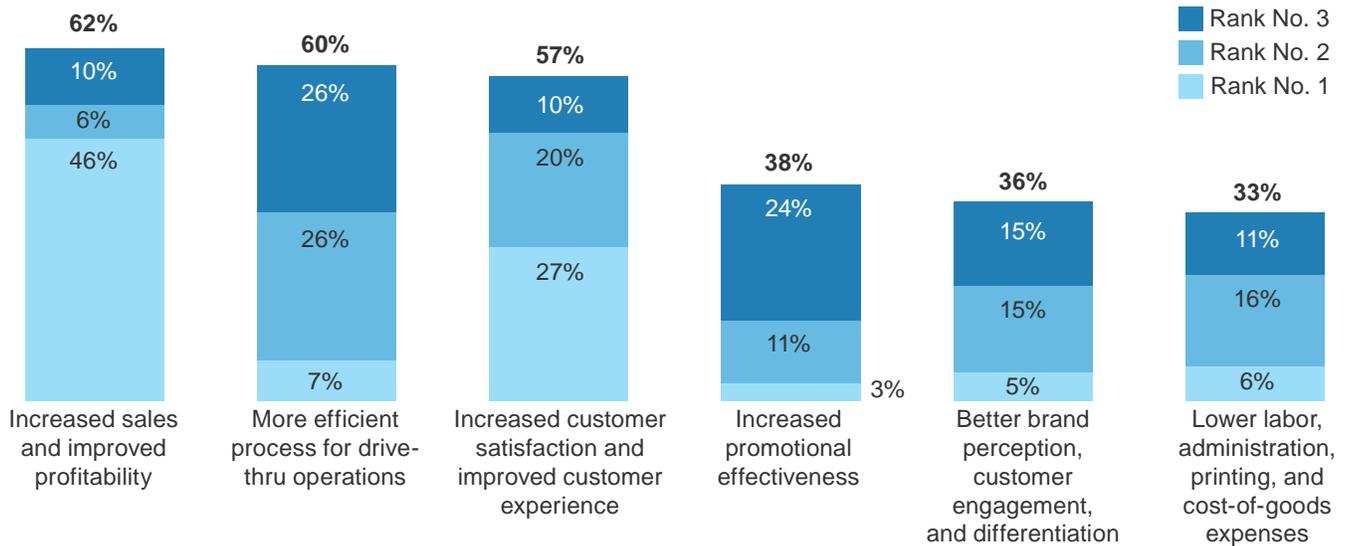
Base: 136 US print menu respondents

Source: Forrester Research, Inc.

- › **The majority of respondents currently using print menus plan to implement digital menus within their restaurants.** When asked if they were planning to use digital display menus within their restaurant, 87% of respondents said they planned to implement digital menus inside their restaurant, and an overwhelming 95% of respondents said they planned on implementing outdoor digital drive-thru menu displays. Looking at the time frame, the majority of respondents noted they planned to replace their print drive-thru menus with digital displays within the next two years.
- › **Print menu users see digital menus as a way to increase sales and improve profitability in their drive-thrus.** When we asked respondents to select areas in which they felt outdoor digital drive-thru menu displays would impact their organization, 62% cited increased sales and improved probability as a top three expected benefit. In fact, 46% ranked this as their No. 1 expected benefit. Print menu respondents also expected that, with the implementation of outdoor digital drive-thru menu displays, they would see a more efficient drive-thru process. Respondents also expected to see an increase in customer satisfaction and an improvement in their overall customer experience with digital menu displays. These and other expected benefits are shown below in Figure 4. Forrester found that these expected benefits line up closely with the benefits we heard during our conversations with restaurants currently using Samsung outdoor digital menu boards in their drive-thrus, highlighted later on in the case study.

FIGURE 5
Print User's Expected Benefits From an Investment in Digital Drive-thru Menus

“Below is a list of benefits associated with the adoption and deployment of outdoor digital drive-thru menu displays. From the list below, select the benefit categories in which you believe digital menu displays will benefit your organization.” (Rank your top three)



Base: 136 US print menu respondents

Source: Forrester Research, Inc.

- › **Of the 136 print menu respondents we spoke with, only five of those stated they were not considering digital menu displays.** The most common reason cited for not considering digital menu displays was the inability for current technology to meet their needs. Some were also concerned about high investment costs. When we asked why these individuals felt that the current technology could not meet their needs, the most common reason cited was durability concerns, followed by the risk of system downtime.
- › **Digital menu respondents report higher customer satisfaction, less food waste, and lower labor expenses than print menu respondents.** Forrester asked survey respondents using both print and digital menu displays about their customer satisfaction scores. Respondents most commonly used Net Promotor Score.² Since switching from print menus, those with outdoor digital menu boards for their drive-thrus noted a 21-point increase on a 100-point scale. Digital menu display respondents also indicated a reduction in monthly food waste, cutting the monthly cost of wasted food caused by poor menu-board visibility and order inaccuracy. Deployment and support labor resources for outdoor digital menu boards were lower; digital menu respondents required 1.7 fewer FTEs per property for planning and deployment of their outdoor digital drive-thru menus, compared with print menu users, and 2.21 fewer FTEs per property for ongoing support of those menu boards. Finally, digital menu respondents also noted they required 1.3 fewer FTEs for content management, auditing, and menu-board maintenance relative to their print menu counterparts.

Analysis

INTERVIEWED ORGANIZATIONS

Forrester conducted a total of two interviews with representatives from the following companies, who are current Samsung customers:

- › **A US-based portfolio of quick-service restaurant chains, serving lunch and dinner to customers in over 300 restaurants located across eight states, with 7,500 employees and average unit volumes of approximately \$1 million.** Prior to piloting Samsung's outdoor digital menu boards, the company struggled to control, manage, and ensure the consistency of its outdoor menu displays across its highly distributed restaurant footprint. To ensure a positive, consistent guest experience across the chain's footprint in a cost-effective way, the company needed to find a way to achieve economies of scale by allowing its field marketing team to verify the accuracy and consistency of the products, pricing, and promotional content on its outdoor menu boards across the store's footprint, from a single point of control.
- › **A global chain of quick-service restaurants serving breakfast, lunch, and dinner to customers across tens of thousands of restaurants globally, with average unit volumes of approximately \$2.5 million.** The technological and cost constraints of its static outdoor menu signage prevented the organization from changing the content on its outdoor menus more frequently and intelligently. The organization was moving toward outdoor digital menu boards as a way to be more dynamic with its content and to better target its drive-thru customers with relevant and personalized offerings. Doing so was intended to improve restaurant sales and profitability, while also augmenting the customer experience and brand loyalty.

INTERVIEW HIGHLIGHTS

Successful, growth-focused organizations, building customer-centric business strategies, are obsessing over their digital customer experience (DCX) and digital operation excellence (DOX), in order to better attract and engage customers and drive better worker productivity.³ While the need to differentiate your brand, better engage your customers, and digitally transform your business operations is a widespread business challenge impacting myriad industry verticals, establishments in the quick-service restaurant sector, in particular, are rapidly realizing the need to deliver a better customer experience and to differentiate their brands in a hypercompetitive landscape. As such, they are increasingly looking to digital signage, and outdoor digital menu boards, as a means of delivering an improved customer experience that helps win, serve, and retain customers.

Interviewed organizations and survey respondents indicated that their investment in outdoor digital menu boards was intended to catalyze a number of positive business outcomes, including increased sales, improved profitability, and more-efficient drive-thru operations. In addition, interviewed organizations indicated that they invested in Samsung outdoor digital menu boards to:

- › Improve the organization's flexibility to dynamically change outdoor menu-board content based on real-time customer and contextual data, without the cost and resource constraints imposed by traditional static menu signage.

“Having the ability to verify that all of our menus are accurate, ensuring that we don't have old products on our menus, and making sure we don't have customer complaints because our menu boards are out-of-date is of high value for us. Ensuring the guest experience is critical for our organization.”

~ VP of technology, quick-service restaurant chain

- › Enhance the customer experience through more-relevant and targeted digital content, while better engaging customer attention and differentiating their brands from the competition in the highly competitive quick-service restaurant sector.
- › Reduce manual labor and risk of human error by automating the maintenance, management, and auditing of outdoor menu boards.

“The reason why we’re going toward digital versus regular signage is to allow us to change content more frequently, be more dynamic with that content, and be more targeted.”

~ Senior project manager, corporate digital IT, quick-service restaurant chain

Results

The interviews revealed that:

- › **Samsung outdoor digital menu boards enable organizations to digitally transform their menu content to drive increased sales and profitability.** Leveraging the inherent flexibility of digital menus to deliver dynamic and captivating digital menu content to drive-thru customers, interviewed organizations and online survey respondents reported an increase in drive-thru customer traffic, average transaction sizes, and promotional item conversions.
- › **Organizations needed a way to improve their cost structures by lowering their operating costs and by achieving economies of scale.** Using Samsung outdoor digital menu boards, organizations were able to achieve economies of scale from an augmented ability to control and validate menu-board data electronically from a single point of control, significantly reducing the labor burden on restaurant management and field marketing resources. Additionally, interviewees noted a significant reduction in recurring printing costs through the adoption of Samsung outdoor digital menu boards.
- › **Samsung outdoor digital menu boards improved organizations’ flexibility to rapidly react to changing market conditions, improving speed-to-market and the customer experience.** In addition to avoiding the high printing costs associated with static menu boards, interviewed organizations needed a way to increase their calendar of offerings and better respond to market conditions. One interviewed organization noted that, “if we have a really good promotion period and we’re selling through our inventory quickly, we may want to adjust our menus to promote these items even more to drive increased sales. Using print menu signage, we have no ability to do this today, but with the digital menu boards, we can make those changes.” In addition, interviewed organizations noted that Samsung outdoor digital menu boards enabled the organization to deliver more-dynamic and relevant digital content, promotions, and product recommendations to customers relative to their legacy static outdoor menu signage solution.

“If we have a really good promotion period and we’re selling through our inventory quickly, we may want to adjust our menus to promote these items even more to drive increased sales. Using print menu signage, we have no ability to do this today, but with the digital menu boards, we can make those changes.”

~ VP of technology, quick-service restaurant chain

THE COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas financially affected. The composite organization that Forrester synthesized from these results represents an organization with the following characteristics:

- › A franchised, US-based, quick-service restaurant chain serving breakfast, lunch, dinner, and late-night menu offerings to customers across 150 restaurants located throughout the Southeast and Southcentral United States.
- › The organization has 3,000 full-time and part-time employees working across its restaurant footprint, with an additional 80 employees working in its corporate operations, in functions including operations, corporate and field marketing, sales, new product development (R&D), finance, franchise relations, and human resources.
- › Its customer base falls primarily in the 25 to 45 age range; however, its average customer household income level skews slightly towards higher annual household incomes.
- › The average order value of purchases made in its restaurants was \$7.00 prior to implementing Samsung outdoor digital menu boards.
- › Eighty percent, or 120, of the restaurant chain's locations have drive-thru service. This percentage is expected to grow as the organization's franchise program expands to new geographies and as customers increasingly demand fast and convenient drive-thru service.
- › Each drive-thru changes its outdoor menus twice daily to present customers with its breakfast and rest-of-day menus. In addition, prior to implementing Samsung outdoor digital menu boards, the organization would print new menus for its locations one to two times monthly, as it rolled out monthly and seasonal promotions.

After extensive internal deliberation, a thorough RFP process, and business case development process evaluating the feasibility and business potential of outdoor digital menu-board displays, the company initiated a pilot program to test the impact of Samsung's outdoor digital menu boards in select drive-thru locations. The pilot program had the following characteristics:

- › The composite organization worked with a system integrator to begin its Samsung outdoor digital menu-board pilot in late 2015 across 10 stores in its Southeastern US footprint with drive-thru service.
- › Each pilot drive-thru location deployed standard 3 x1 55-inch configurations of Samsung's OH series outdoor digital menu boards.
- › The composite organization employed a set of control sites with comparable customer demographics and store traffic levels to measure and benchmark the business performance of the Samsung outdoor digital menu-board pilot locations against a set of similar stores with printed outdoor menu signage.

BENEFITS

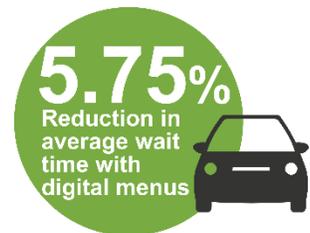
The composite organization experienced a number of quantified benefits in this case study:

- › Profit uplift from an increase in the volume of drive-thru customers served weekly.
- › Profit uplift from an increase in promotional item conversion rates.
- › Profit uplift from an increase in average order values.
- › Cost savings from a reduction in store labor, administration, and printing expenses.
- › Cost savings from a reduction in food waste.



Profit Uplift From An Increase In The Volume Of Drive-thru Customers Served Weekly

Following its implementation of Samsung outdoor digital menu boards, the composite organization saw an increase in drive-thru customer traffic at its pilot locations relative to its control sites. This increase in profit materialized due to two factors. First, restaurants were better able to engage with customers passing by its restaurant using more captivating digital content. In addition, the composite restaurant's use of outdoor digital menu boards resulted in a 5.75% decrease in the average wait time in its drive-thrus. These factors contributed to a 9.1% increase in number of drive-thru customers served daily.



Following the deployment of outdoor digital menu boards in its pilot drive-thru locations, the composite restaurant was able to increase the weekly number of customers served in its pilot drive-thru locations by 237 in Year 1, increasing to 335 by Year 5, compared with its control drive-thru sites. In order to isolate the effect of increased traffic from the aforementioned profitability uplifts resulting from the deployment of outdoor digital menu boards, Forrester calculated the profitability increase associated with the increase in drive-thru traffic using the organization's baseline average order value of \$7.00. As such, the composite organization was able to increase its profitability by \$1,032,891 over the five-year forecast period before adjusting for risk and present value.

Forrester's interviews indicated that the uplift in drive-thru customer volume can vary significantly depending on store location, menu display positioning, menu offerings, promotional campaign strength, a restaurant's digital and creative capabilities, and the degree to which each store leverages outdoor digital menu boards to advertise promotional content. Due to these factors, this benefit was risk-adjusted and reduced by 10% in Table 1. The risk-adjusted total benefit resulting from an increase in number of drive-thru customers over the five years was \$929,602.

TABLE 1

Profit Uplift From An Increase In The Number Of Drive-Thru Customers Served Weekly

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5
A1	Total number of drive-thru locations		10	10	10	10	10
A2	Baseline average number of drive-thru customers served per week	A2*A4	2,600	2,837	3,095	3,376	3,684
A3	Percentage increase in number of drive-thru customers served per week attributable to outdoor digital menu boards		9.1%	9.1%	9.1%	9.1%	9.1%
A4	Increase in average number of drive-thru customers served per week		237	258	282	307	335
A5	Baseline average order value		\$7	\$7	\$7	\$7	\$7
A6	Profit margin		20%	20%	20%	20%	20%
A7	Number of weeks per year		52	52	52	52	52
At	Profit uplift from an increase in the number of drive-thru customers served weekly	C1*C4*C5*C6*C7	\$172,245	\$187,919	\$205,020	\$223,677	\$244,031
	Risk adjustment	↓10%					
Atr	Profit uplift from an increase in the number of drive-thru customers served weekly (risk-adjusted)		\$155,020	\$169,127	\$184,518	\$201,309	\$219,628

Source: Forrester Research, Inc.



Profit Uplift From An Increase In Promotional Item Conversion Rates

Prior to adopting Samsung outdoor digital menu boards, the composite organization struggled to capture the attention of its drive-thru customers and had a limited ability to increase its calendar of offerings and to quickly react to market changes in real time. One interviewed organization noted that “the reason why we’re going toward digital versus regular menu signage is to allow us to change content more frequently, be more dynamic with that content, and be more targeted.” Outdoor digital menu boards enabled the restaurant to be more flexible in promoting items based on real-time data, such as local weather, time of day, and, eventually, the unique personal preferences of each identified customer.

By leveraging Samsung’s outdoor digital menu boards to deliver timelier and more relevant and engaging digital content in its drive-thru locations, the organization was able to increase the conversion rate on its promotional items by 1% in Year 1. As the organization’s ability to generate effective digital campaigns and to leverage big data in real time to inform better menu content and promotional items, the organization’s conversion rate on promotional items grew to 2% by Year 3.

At a conservative average cost per promoted item of \$3.75, and average profit margin per promoted item of 15%, the composite organization was able to increase its profit by a total of \$872,578 across its pilot drive-thru locations over the five-year forecast period.

The effectiveness of promotional campaigns vary widely based on a number of variables, including store location, customer demographics, and the creative and aesthetic elements of each promotion. In addition, the size of this benefit will vary depending on the organization's ability to leverage relevant data points to manage the promotions it displays on its outdoor digital menu boards. As a result, this benefit was risk-adjusted and reduced by 10% in Table 2. The risk-adjusted total benefit resulting from an increase in promotional item conversion rates over the five years was \$785,320.

TABLE 2

Profit Uplift From An Increase In Promotional Item Conversion Rates

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5
B1	Total number of drive-thru locations		10	10	10	10	10
B2	Daily impressions		5,000	5,000	5,000	5,000	5,000
B3	Increase in conversion rate for promotional items		1.0%	1.5%	2.0%	2.0%	2.0%
B4	Average cost per promoted item		\$3.75	\$3.75	\$3.75	\$3.75	\$3.75
B5	Days per year		365	365	365	365	365
B6	Profit margin		15%	15%	15%	15%	15%
Bt	Profit uplift from an increase in promotional item conversion rates	$B1*B2*B3*$ $B4*B5*B6$	\$102,656	\$153,984	\$205,313	\$205,313	\$205,313
	Risk adjustment	↓10%					
Btr	Profit uplift from an increase in promotional item conversion rates (risk-adjusted)		\$92,391	\$138,586	\$184,781	\$184,781	\$184,781

Source: Forrester Research, Inc.



Profit Uplift From An Increase In Average Order Values

A key benefit of Samsung's outdoor digital menu boards realized by the composite organization was the ability to improve its upselling capabilities and to increase the average transaction value of purchases made in its drive-thrus. Prior to adopting Samsung outdoor digital menu boards, its pilot restaurants had limited suggested selling capabilities, and all upselling and cross-selling actions were done manually by drive-thru staff members, making the company's upselling and cross-selling initiatives ineffective and inconsistent.

Following the implementation of Samsung's outdoor digital menu boards in its pilot drive-thru locations, the composite organization experienced a 2.5% increase in the average order value of purchases made in its pilot drive-thru locations compared with its control sites, which maintained their legacy, static drive-thru menu signage. For a quick-service restaurant chain with average daily drive-thru traffic of 372 customers and a baseline average order value of \$7.00, this amounted to an increase in annual revenue of \$236,600 across its 10 pilot locations. At a 20% profit margin, the composite restaurant increased the profitability across its pilot locations by \$47,320 per year, before adjusting for risk and present-value.

Interviewed organizations indicated that the uplift seen in average order values could be impacted by a number of outside variables. Of particular note, interviewees pinpointed highly effective restaurant advertising campaigns

and popular promotional items as potential contributors to the uplift seen in average order values. In order to compensate for these outside variables, this benefit was risk-adjusted and reduced by 10% in Table 3. The risk-adjusted total benefit resulting from an increase in average order value over the five years was \$212,940.

TABLE 3
Profit Uplift From An Increase In Average Order Values

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5
C1	Total number of drive-thru locations		10	10	10	10	10
C2	Weekly store visitor volume		4,000	4,000	4,000	4,000	4,000
C3	Weeks per year		52	52	52	52	52
C4	Percentage of store traffic served through drive-thru window(s)		65%	65%	65%	65%	65%
C5	Before-state average order value		\$7	\$7	\$7	\$7	\$7
C6	Increase in average order value attributable to outdoor digital menu boards		2.5%	2.5%	2.5%	2.5%	2.5%
C7	Profit margin		20.0%	20.0%	20.0%	20.0%	20.0%
Ct	Profit uplift from an increase in average order values	$A1 \cdot A2 \cdot A3 \cdot A4 \cdot A5 \cdot A6 \cdot A7$	\$47,320	\$47,320	\$47,320	\$47,320	\$47,320
	Risk adjustment	↓10%					
Ctr	Profit uplift from an increase in average order values (risk-adjusted)		\$42,588	\$42,588	\$42,588	\$42,588	\$42,588

Source: Forrester Research, Inc.



Cost Savings From A Reduction In Store Labor, Administration, And Printing Expenses

The composite organization was able to significantly reduce its ongoing operational costs through the elimination of menu printing costs associated with its static, legacy drive-thru menu signage solutions. In addition, the organization benefited further from a reduction in operational costs by automating the manual, labor-intensive process of making menu-board data changes and ensuring menu-board consistency across restaurants.

Forrester's interviews indicated that quick-service restaurants conservatively spend \$2,500 monthly on printing expenses for its drive-thru menu displays. One interviewee indicated that they needed to print out new graphics, pricing information, nutritional information, and product offerings at least once

“Outdoor digital menu boards give us more flexibility to manage our menu and what we promote. If we know we’re influencing our guest with what we’re animating, we can actually make multiple changes throughout a month rather than having to pay a printing fee every time we want to make a little change.”

~ VP of technology, quick-service restaurant chain

a month, and occasionally more often during seasonal campaigns. Perhaps more importantly, the organization's static drive-thru menu signage was inflexible, inhibiting the organization from making menu-board changes that would be more effective in influencing customers and impacting customer buying behaviors.

The cost savings associated with outdoor digital menu boards extended beyond a reduction in printing expenses, into the ongoing labor and operational costs associated with making manual menu-board changes and auditing menu boards across properties for compliance and consistency. Following the deployment of Samsung outdoor digital menu boards in its pilot locations, the composite organization decreased the number of manager hours required to make drive-thru menu-board changes by 2 hours per month. Furthermore, the composite organization realized a significant reduction in field-marketing labor required to audit the menu boards for pricing, nutritional information, product, and promotional content for compliance and consistency, by managing the digital content on its pilot menu boards using a centralized system.

Over the five-year forecast period, the composite organization was able to save \$1,535,160 in labor, administration, and printing costs through the use of outdoor digital menu boards, before adjusting for risk and present value. Since the fully loaded salary of restaurant management and field marketing staff will vary by region, skillset, exact position, and tenure with the company, this benefit was risk-adjusted and reduced by 10% in Table 4. The risk-adjusted total benefit resulting from a reduction in labor, administration, and printing expenses over the five years was \$1,381,644.

TABLE 4

Cost Savings From A Reduction In Store Labor, Administration, And Printing Expenses

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5
D1	Total number of drive-thru locations		10	10	10	10	10
D2	Decrease in manager time spent making menu-board changes per month	Hours	2	2	2	2	2
D3	Decrease in field marketing staff time spent auditing menu boards per month	Hours	15	15	15	15	15
D4	Reduction in monthly printing costs		\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
D5	Fully loaded hourly cost of store managers		\$12.80	\$12.80	\$12.80	\$12.80	\$12.80
D6	Fully loaded hourly cost of field marketing personnel		\$22	\$22	\$22	\$22	\$22
D7	Months per year		12	12	12	12	12
Dt	Cost savings from a reduction in store labor, admin, and printing expenses	$(D1 \cdot D2 \cdot D5 \cdot D7) + (D3 \cdot D6 \cdot D7) + (D1 \cdot D4 \cdot D7)$	\$307,032.00	\$307,032.00	\$307,032.00	\$307,032.00	\$307,032.00
	Risk adjustment	↓10%					
Dtr	Cost savings from a reduction in store labor, admin, and printing expenses (risk-adjusted)		\$276,329	\$276,329	\$276,329	\$276,329	\$276,329

Source: Forrester Research, Inc.



Cost Savings From A Reduction In Food Waste

The organization was able to improve visibility of its drive-thru menus and increase order accuracy after replacing its legacy print menu boards with Samsung's outdoor digital menu-board displays. As a result, the organization was able to reduce its food waste costs by 5% per month, saving the organization \$17,070 across its pilot locations over the five-year forecast period.

Interview and survey respondents provided a range of food waste cost reductions. In order to account for this variability, this benefit category was risk-adjusted and reduced by 5% in Table 5 below. The risk-adjusted total benefit resulting from a reduction in food waste over the five years was \$16,217.



TABLE 5
Cost Savings From A Reduction In Food Waste

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5
E1	Total number of drive-thru locations		10	10	10	10	10
E2	Baseline average monthly food waste costs		\$569	\$569	\$569	\$569	\$569
E3	Percentage decrease in food waste per month associated with improved order accuracy		5.00%	5.00%	5.00%	5.00%	5.00%
E4	Months per year		12	12	12	12	12
Et	Cost savings from a reduction in food waste	$E1 * E2 * E3 * E4$	\$3,414	\$3,414	\$3,414	\$3,414	\$3,414
	Risk adjustment	↓5%					
Etr	Cost savings from a reduction in food waste (risk-adjusted)		\$3,243	\$3,243	\$3,243	\$3,243	\$3,243

Source: Forrester Research, Inc.

Total Benefits

Table 6 shows the total of all benefits across the five areas listed above, as well as present values (PVs) discounted at 10%. Over five years, the composite organization expects risk-adjusted total benefits to be a PV of \$2,492,738.

TABLE 6

Total Benefits Of 10-Store Pilot (Risk-Adjusted)

Ref.	Benefit Category	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Atr	Profit uplift from an increase in the number of drive-thru customers served weekly	\$155,020	\$169,127	\$184,518	\$201,309	\$219,628	\$929,602	\$693,201
Btr	Profit uplift from an increase in promotional item conversion rates	\$92,391	\$138,586	\$184,781	\$184,781	\$184,781	\$785,320	\$578,297
Ctr	Profit uplift from an increase in average order values	\$42,588	\$42,588	\$42,588	\$42,588	\$42,588	\$212,940	\$161,442
Dtr	Cost savings from a reduction in store labor, admin, and printing expenses	\$276,329	\$276,329	\$276,329	\$276,329	\$276,329	\$1,381,644	\$1,047,504
Etr	Cost savings from a reduction in food waste	\$3,243	\$3,243	\$3,243	\$3,243	\$3,243	\$16,217	\$12,295
	Total benefits (risk-adjusted)	\$569,571	\$629,873	\$691,459	\$708,250	\$726,569	\$3,325,723	\$2,492,738

Source: Forrester Research, Inc.

Forrester also analyzed how Samsung outdoor digital menu boards would impact larger deployments. Tables 7 and 8 below show the total five-year risk- and present value- adjusted benefits across the five areas listed above for a 200-location deployment and a 2,000-location deployment, respectively.

TABLE 7

Total Benefits Of 200 Store Deployment (Risk-Adjusted)

Ref.	Benefit Category	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Atr	Profit uplift from an increase in the number of drive-thru customers served weekly	\$3,100,406	\$3,382,543	\$3,690,355	\$4,026,177	\$4,392,559	\$18,592,041	\$13,864,027
Btr	Profit uplift from an increase in promotional item conversion rates	\$1,847,813	\$2,771,719	\$3,695,625	\$3,695,625	\$3,695,625	\$15,706,406	\$11,565,938
Ctr	Profit uplift from an increase in average order values	\$851,760	\$851,760	\$851,760	\$851,760	\$851,760	\$4,258,800	\$3,228,841
Dtr	Cost savings from a reduction in store labor, admin, and printing expenses	\$5,490,936	\$5,490,936	\$5,490,936	\$5,490,936	\$5,490,936	\$27,454,680	\$20,814,968
Etr	Cost savings from a reduction in food waste	\$64,866	\$64,866	\$64,866	\$64,866	\$64,866	\$324,330	\$245,893
	Total benefits (risk-adjusted)	\$11,355,781	\$12,561,824	\$13,793,542	\$14,129,364	\$14,495,746	\$66,336,257	\$49,719,666

Source: Forrester Research, Inc.

TABLE 8
Total Benefits Of 2,000 Store Deployment (Risk-Adjusted)

Ref.	Benefit Category	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Atr	Profit uplift from an increase in the number of drive-thru customers served weekly	\$31,004,064	\$33,825,434	\$36,903,548	\$40,261,771	\$43,925,592	\$185,920,410	\$138,640,267
Btr	Profit uplift from an increase in promotional item conversion rates	\$18,478,125	\$27,717,188	\$36,956,250	\$36,956,250	\$36,956,250	\$157,064,063	\$115,659,379
Ctr	Profit uplift from an increase in average order values	\$8,517,600	\$8,517,600	\$8,517,600	\$8,517,600	\$8,517,600	\$42,588,000	\$32,288,405
Dtr	Cost savings from a reduction in store labor, admin, and printing expenses	\$54,909,360	\$54,909,360	\$54,909,360	\$54,909,360	\$54,909,360	\$274,546,800	\$208,149,675
Etr	Cost savings from a reduction in food waste	\$648,660	\$648,660	\$648,660	\$648,660	\$648,660	\$3,243,300	\$2,458,932
	Total benefits (risk-adjusted)	\$113,557,809	\$125,618,241	\$137,935,418	\$141,293,641	\$144,957,462	\$663,362,572	\$497,196,659

Source: Forrester Research, Inc.

COSTS

The composite organization made a series of investments in order to implement Samsung outdoor digital menu boards at its pilot drive-thru locations:

- › Outdoor digital menu display hardware and software costs.
- › Implementation and system integration costs.
- › Ongoing outdoor digital menu-board management and maintenance expenses.



Outdoor Digital Menu Display Hardware And Software Costs

The composite organization needed to make a series of upfront hardware and ongoing software investments in order to successfully deploy Samsung outdoor digital menu boards at its pilot drive-thru locations. Upfront expenditures of \$31,950 per restaurant included outdoor digital display hardware, ancillary media player, hardware warranty, enclosure hardware, mounts, cables, and network connectivity hardware and equipment. Additionally, the organization paid \$2,500 annually per restaurant for a content management software subscription, including maintenance and support, to run on its outdoor digital menu displays.

Hardware and software costs can vary between organizations, depending on the nature of each licensing agreement and incremental discounts. To compensate, this cost was risk-adjusted upward by 10%. The risk-adjusted five-year cost of outdoor digital menu display hardware and software was \$488,950 across the organization's 10-store pilot, or \$48,895 per restaurant. Note that larger deployments may receive a bulk discount, reducing the hardware and software investment costs.

TABLE 9

Outdoor Digital Menu Display Hardware And Software Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
F1	Number of new outdoor digital menu board deployments		10					
F2	Outdoor digital menu board displays		\$22,950					
F3	Digital display enclosure hardware, mounts, and cables		\$4,500					
F4	Connectivity hardware, networking accessories and ancillary media player		\$1,350					
F5	Content management software license and maintenance			\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
F6	Warranty		\$3,150					
Ft	Outdoor digital menu display hardware and software costs	$F1 * (F2 + F3 + F4 + F5 + F6)$	\$319,500	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
	Risk adjustment	↑10%						
Ftr	Outdoor digital menu display hardware and software costs (risk-adjusted)		\$351,450	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500

Source: Forrester Research, Inc.



Implementation And System Integration Costs

During the initial planning, design, installation, and deployment of its Samsung outdoor digital menu-board pilot, the composite organization assembled an internal deployment team, made up of marketing, IT, and operations professionals, to plan and design the outdoor digital menu-board pilot program, build its initial digital content, work with the system integrator, train staff, and integrate the system with the organization's operating procedures, at an expense of \$20,000. In addition, the company paid \$4,200 per drive-thru location in outsource fees to the system integrator for initial site surveying, installation, testing, and integration with other restaurant systems.

Upfront implementation and system integration costs will vary depending on the size and complexity of each deployment, and, as a result, this cost category was risk-adjusted upward 10%. It is important to note that organizations with large deployments will likely benefit from economies of scale, particularly as it relates to the internal deployment team, which could significantly reduce the per-location cost for implementation and system integration. The risk-adjusted five-year cost of implementation and system integration was \$68,200.

TABLE 10

Implementation And System Integration Costs

Ref.	Metric	Calculation	Initial
G1	Number of new outdoor digital menu board deployments		10
G2	Upfront, outsourced installation and system integration costs		\$4,200
G3	Internal deployment resources dedicated to implementation project		\$20,000
Gt	Implementation and system integration costs	$(G1 \times G2) + G3$	\$62,000
	Risk adjustment	↑10%	
Gtr	Implementation and system integration costs (risk-adjusted)		\$68,200

Source: Forrester Research, Inc.



Ongoing Outdoor Digital Menu-Board Management And Maintenance Expenses

In order to ensure the ongoing optimal operation of its Samsung outdoor digital menu boards, the composite organization incurred ongoing costs associated with running, maintaining, and managing each store's outdoor digital menu-board displays. The composite organization incurred annual expenses of \$1,440 annually per restaurant for hardware maintenance, monitoring, and support contracts, which guaranteed 4-hour replacement of failed equipment. Furthermore, each pilot location incurred approximately \$3,000 in annual labor expenses for annual maintenance of its outdoor digital menu boards. Lastly, the composite organization incurred expenses for annual hardware refreshes and high-speed bandwidth, a total of \$2,175 per restaurant each year.

In order to generate dynamic and effective digital content for its outdoor digital menu boards, the composite organization paid \$10,000 annually to a creative firm to develop digital content for its pilot locations. It's important to note that organizations with large deployments will benefit from economies of scale, reducing the cost per restaurant in developing digital menu content.

Internal labor needed for management and maintenance will vary across organizations, so this cost category was risk-adjusted upward 10% as shown in in Table 11 below. The risk-adjusted five-year cost of ongoing outdoor digital menu-board management and maintenance was \$418,825.

TABLE 11

Ongoing Outdoor Digital Menu-Board Management And Maintenance Expenses

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5
H1	Number of new outdoor digital menu-board deployments		10	10	10	10	10
H2	Hardware maintenance and support contracts		\$1,440	\$1,440	\$1,440	\$1,440	\$1,440
H3	Internal labor costs or man-hours to plan and conduct maintenance		\$3,000	\$3,000	\$3,000	\$3,000	\$3,000
H4	Annual hardware refresh expenses		\$1,575	\$1,575	\$1,575	\$1,575	\$1,575
H5	Incremental content management creative costs for digital		\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
H6	Annual bandwidth cost for high speed connectivity		\$600	\$600	\$600	\$600	\$600
Ht	Ongoing outdoor digital menu-board management and maintenance expenses	$H1*(H2+H3+H4+H5+H6)$	\$76,150	\$76,150	\$76,150	\$76,150	\$76,150
	Risk adjustment	↑10%					
Htr	Ongoing outdoor digital menu-board management and maintenance expenses (risk-adjusted)		\$83,765	\$83,765	\$83,765	\$83,765	\$83,765

Source: Forrester Research, Inc.

Total Costs

Table 12 shows the total of all costs as well as associated present values (PVs), discounted at 10%. Over five years, the composite organization expects total costs to be a PV of \$841,432 across its 10-store pilot.

TABLE 12

Total Costs Of A 10-Store Pilot (Risk-Adjusted)

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Ftr	Outdoor digital display hardware and software costs	\$351,450	\$27,500	\$27,500	\$27,500	\$27,500	\$27,500	\$488,950	\$455,697
Gtr	Implementation and system integration expenses	\$68,200	\$0	\$0	\$0	\$0	\$0	\$68,200	\$68,200
Htr	Ongoing management and maintenance of digital menu board solution	\$0	\$83,765	\$83,765	\$83,765	\$83,765	\$83,765	\$418,825	\$317,535
	Total costs (risk-adjusted)	\$419,650	\$111,265	\$111,265	\$111,265	\$111,265	\$111,265	\$975,975	\$841,432

Source: Forrester Research, Inc.

Forrester also analyzed how Samsung outdoor digital menu boards would impact a larger deployment. Tables 13 and 14 below show the total five-year risk and present value-adjusted costs for a 200-location deployment and a 2,000-location deployment, respectively.

TABLE 13

Total Costs Of A 200-Store Deployment (Risk-Adjusted)

Ref.	Cost Category	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Ftr	Outdoor digital display hardware and software costs	(\$6,248,000)	(\$467,500)	(\$467,500)	(\$467,500)	(\$467,500)	(\$467,500)	(\$8,585,500)	(\$8,020,193)
Gtr	Implementation and system integration expenses	(\$1,144,000)	\$0	\$0	\$0	\$0	\$0	(\$1,144,000)	(\$1,144,000)
Htr	Ongoing management and maintenance of digital menu board solution	\$0	(\$1,565,300)	(\$1,565,300)	(\$1,565,300)	(\$1,565,300)	(\$1,565,300)	(\$7,826,500)	(\$5,933,719)
	Total costs (risk-adjusted)	(\$7,392,000)	(\$2,032,800)	(\$2,032,800)	(\$2,032,800)	(\$2,032,800)	(\$2,032,800)	(\$17,556,000)	(\$15,097,911)

Source: Forrester Research, Inc.

TABLE 14
Total Costs Of A 2,000-Store Deployment (Risk-Adjusted)

Ref	Cost Category	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Ftr	Outdoor digital display hardware and software costs	(\$54,670,000)	(\$4,400,000)	(\$4,400,000)	(\$4,400,000)	(\$4,400,000)	(\$4,400,000)	(\$76,670,000)	(\$71,349,462)
Gtr	Implementation and system integration expenses	(\$10,560,000)	\$0	\$0	\$0	\$0	\$0	(\$10,560,000)	(\$10,560,000)
Htr	Ongoing management and maintenance of digital menu board solution	\$0	(\$15,103,000)	(\$15,103,000)	(\$15,103,000)	(\$15,103,000)	(\$15,103,000)	(\$75,515,000)	(\$57,252,253)
	Total costs (risk-adjusted)	(\$65,230,000)	(\$19,503,000)	(\$19,503,000)	(\$19,503,000)	(\$19,503,000)	(\$19,503,000)	(\$162,745,000)	(\$139,161,714)

Source: Forrester Research, Inc.

FLEXIBILITY

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for some future additional investment. This provides an organization with the “right” or the ability to engage in future initiatives but not the obligation to do so. There are multiple scenarios in which a customer might choose to implement Samsung outdoor digital menu boards and later realize additional uses and business opportunities. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

While interviewed organizations were in the early stages of digitally transforming their outdoor menu signage, they saw their investment in outdoor digital menu boards as part of a broader strategy to provide a better customer experience, improve sales and profitability, and drive operational efficiencies through enhanced personalization and experimentation capabilities, and better integration with other enterprise systems and consumer mobile devices. One organization emphasized the flexibility to rapidly deploy pricing changes and experiment with different content, menu items, and promotional campaigns as a significant future benefit of switching to outdoor digital menu boards. By giving restaurants the ability to rapidly deploy menu board changes using companywide and customer-specific data points, quick-service restaurants become empowered to improve their performance and customer experience, using real-time data to make more timely and effective menu board changes.

In addition, interviewed organizations demonstrated a keen interest in integrating a host of complementary disruptive technologies with their outdoor digital menu-board deployments, in order to further accrue the customer-specific real-time data needed to improve restaurant performance, and to deliver an improved customer experience that helps to win, serve, and retain customers. In particular, seamless integration with mobile and iBeacon technologies was seen as an opportunity to provide a more customized and personalized experience for each drive-thru visitor, allowing organizations to target each unique visitor with relevant digital menu content, while enabling more-effective and timely brand loyalty initiatives that help drive return visits, higher promotion conversion rates, and increased upselling opportunities. Interviewees demonstrated a similar interest in integrating facial recognition software into their outdoor digital drive-thru menu displays.

Lastly, interviewed organizations identified the ability to leverage the inherent flexibility of outdoor digital menu boards to increase menu-display utility through additional use cases, including way finding and digital billboard advertising when the drive-thru is vacant. Multipurpose use of outdoor digital menu displays has the potential to attract new traffic and convert customers who otherwise would not have visited the restaurant.

RISKS

Forrester defines two types of risk associated with this analysis: “implementation risk” and “impact risk.” Implementation risk is the risk that a proposed investment in outdoor digital menu boards may deviate from the original or expected requirements, resulting in higher costs than anticipated. Impact risk refers to the risk that the business or technology needs of the organization may not be met by the investment in outdoor digital menu boards, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

TABLE 15

Benefit And Cost Risk Adjustments

Benefits	Adjustment
Profit uplift from an increase in the volume of drive-thru customers served weekly	↓ 10%
Profit uplift from an increase in promotional item conversion rates	↓ 10%
Profit uplift from an increase in average order values	↓ 10%
Reduction in labor, administration, and printing expenses	↓ 10%
Reduction in food waste costs	↓ 5%
Costs	Adjustment
Outdoor digital display hardware and software costs	↑ 10%
Implementation and system integration expenses	↑ 10%
Ongoing management and maintenance of digital menu board solution	↑ 10%

Source: Forrester Research, Inc.

Quantitatively capturing implementation risk and impact risk by directly adjusting the financial estimates results provides more meaningful and accurate estimates and a more accurate projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as “realistic” expectations since they represent the expected values considering risk.

The following impact risks that affect benefits are identified as part of the analysis:

- › Variability in profit opportunities.
- › Variability in process improvement.
- › Variability in labor efficiencies gained and time saved.

The following implementation risks that affect costs are identified as part of this analysis:

- › Cost of solution higher than expected.
- › Implementation and integration time longer than expected.
- › Internal labor needed for management and maintenance higher than expected.

Table 15 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates for the composite organization. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

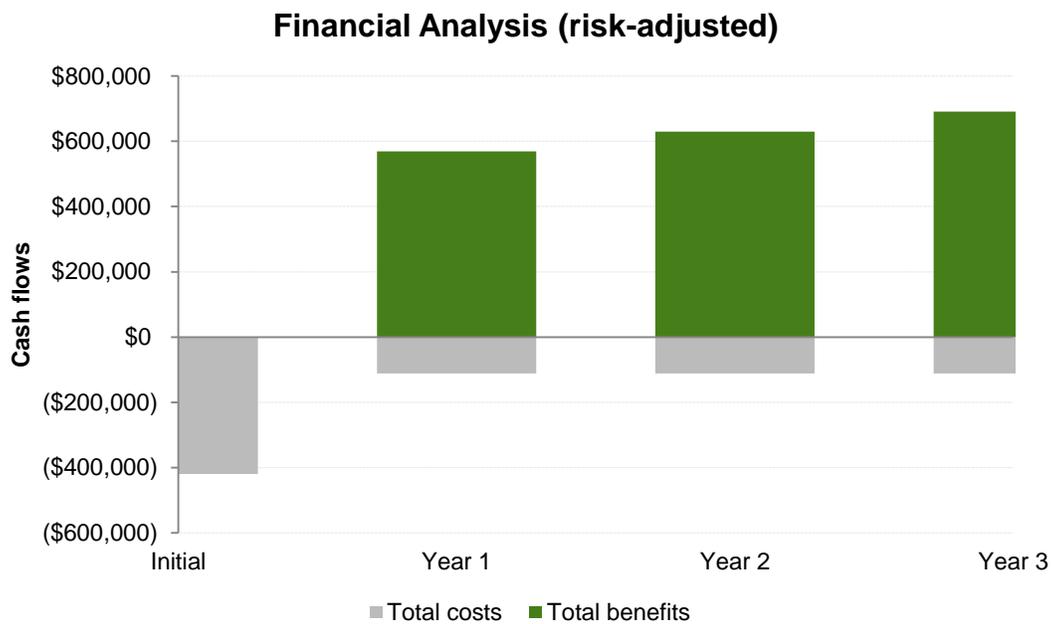
Financial Summary

The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment in Samsung outdoor digital menu boards.

Table 16 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 15 in the Risk section to the unadjusted results in each relevant cost and benefit section.

FIGURE 6

Cash Flow Chart (Risk-Adjusted)



Source: Forrester Research, Inc.

TABLE 16

Cash Flow (Risk-Adjusted)

Summary	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present Value
Total costs	(\$419,650)	(\$111,265)	(\$111,265)	(\$111,265)	(\$111,265)	(\$111,265)	(\$975,975)	(\$841,432)
Total benefits	\$0	\$569,571	\$629,873	\$691,459	\$708,250	\$726,569	\$3,325,723	\$2,492,738
Total	(\$419,650)	\$458,306	\$518,608	\$580,194	\$596,985	\$615,304	\$2,349,748	\$1,651,307
ROI								196%
Payback period (months)								11.0

Source: Forrester Research, Inc.

Samsung Outdoor Digital Menu Boards: Overview

The following information is provided by Samsung. Forrester has not validated any claims and does not endorse Samsung or its offerings.

SAMSUNG

INDUSTRY-LEADING COMMERCIAL DISPLAY PORTFOLIO

A global leader in consumer electronics, mobile devices, and enterprise solutions, Samsung offers a comprehensive portfolio of large-format commercial displays, accessories, and solutions for businesses seeking to deliver dynamic messaging, enhance their brands, and streamline operations. Samsung's commercial display offerings include both LED-backlit LCD displays and direct-view LED solutions; ultra-narrow bezel video wall displays; touchscreen e-boards for classroom or corporate use; small-sized touch displays; large ultra-high-definition solutions; and more.

Samsung's Smart Signage Platform, built on the Tizen operating system, provides an open ecosystem for digital signage software providers to develop custom solutions. Leveraging system-on-chip technology built into many of Samsung's commercial displays and a powerful software development kit (SDK), the Smart Signage Platform allows developers to create robust HTML5 applications to run directly on a smart display, eliminating the need for external media players or PCs.

TAKING THE MESSAGE OUTSIDE

Samsung has also developed a portfolio of high-brightness display solutions for use in outdoor and semi-outdoor environments.

[Samsung's OH Series](#) is a completely integrated, self-contained display solution for use outdoors. It does not require a full third-party enclosure, and the steady cooling system means there's no need for a supplementary heating or air conditioning unit. The IP56-certified display incorporates patent-pending reflection-canceling glass that protects against vandalism and graffiti, so performance is assured and maintenance is made easier. Samsung's OH Series displays offer 3,000 nits or 2,500 nits with auto brightness, so outdoor images will always be big, bright, and beautiful.

Key features include:

- An integrated solution for simplified installation, operation, and maintenance.
- IP56 certification for outdoor usage in heat, cold, rain, snow, and dust.
- Rated for 24x7 operation.
- An embedded system-on-chip media player with a quad-core CPU.
- High brightness with an auto-brightness sensor.
- Thin chassis depth for an easy and attractive installation.

READY TO SERVE YOUR NEEDS

Samsung's expert solution engineers and integration partners are experienced in designing and deploying outdoor digital signage solutions for some of the world's leading brands. This Total Economic Impact study is based upon a standard configuration of three 55-inch OH Series displays in an outdoor digital menu board application; however, Samsung can partner with your team to develop a customized solution to meet your needs.

Learn more: 1.866.SAM.4BIZ | samsung.com/outdoordisplays



Appendix A: Total Economic Impact™ Overview

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders. TEI assists technology vendors in winning, serving, and retaining customers.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, flexibility, and risks.

BENEFITS

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often, product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

COSTS

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the form of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

FLEXIBILITY

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprisewide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point. However, having the ability to capture that benefit has a PV that can be estimated. The flexibility component of TEI captures that value.

RISKS

Risks measure the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI risk factors are based on a probability density function known as "triangular distribution" to the values entered. At a minimum, three values are calculated to estimate the risk factor around each cost and benefit.

Appendix B: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Companies set their own discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organizations to determine the most appropriate discount rate to use in their own environment.

Net present value (NPV): The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

Present value (PV): The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

Payback period: The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Return on investment (ROI): A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

A NOTE ON CASH FLOW TABLES

The following is a note on the cash flow tables used in this study (see the example table below). The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in years 1 through 5 are discounted using the discount rate (shown in the Framework Assumptions section) at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations are not calculated until the summary tables are the sum of the initial investment and the discounted cash flows in each year.

Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.

TABLE [EXAMPLE]

Example Table

Ref.	Metric	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5

Source: Forrester Research, Inc.

Appendix C: Endnotes

¹ Forrester risk-adjusts the summary financial metrics to take into account the potential uncertainty of the cost and benefit estimates. For more information, see the section on Risks.

² Net Promoter and NPS are registered service marks, and Net Promoter Score is a service mark, of Bain & Company, Inc., Satmetrix Systems, Inc., and Fred Reichheld.

³ Source: "The Digital Signage And Display Opportunity In 2016," Forrester Research, Inc., January 4, 2016