



**BSQUARE**  
FORGING SMART CONNECTIONS

**CASE STUDY**

Intelligent Super-Vending

# Brewing Up Innovative Customer Experiences

Bsquare develops key elements of Costa innovative “Marlow” self-serve espresso bar

## Background

In 2011, Costa Coffee, a wholly owned subsidiary of Whitbread PLC and the world’s second largest coffee chain with more than 2,000 cafes in 30 countries, entered the coffee vending segment with the acquisition of Coffee Nation, the UK-based world leader in fresh bean-to-cup coffee vending. Post-acquisition rebranding of Coffee Nation machines with the “Costa Express” brand resulted in a significant upturn in sales, following which Costa decided to capitalize on the clear and present market opportunity by initiating the development of a brand-new, groundbreaking concession solution aimed at new and international markets.

## Challenge

Bean-to-cup vending is inherently challenging. Costa Express’s goal was to increase profit margins and market penetration with a machine that could prepare a cup of coffee as fresh and delicious as if it was purchased at a premium café and made by a skilled barista. In contrast to most other vending systems, the Costa system uses fresh product that is both time and temperature sensitive, including freshly roasted whole coffee beans and farm fresh milk. Adherence to strict international food safety and hygiene standards must be upheld, yet at the same time the machines must be simple enough for anyone to use under a wide variety of conditions. All this, and the user experience must be quick and efficient to ensure customers can purchase the beverage of their choice easily and accurately every time.



## Assembling the Dream Team

“We had been very successful with our current machine in UK forecourts and service areas. However, in order to break into new and international markets, we needed something else... We asked the design team to start afresh and create something completely new and iconic”, Scott Martin, Founder & MD, Coffee Nation.

The top-secret Costa product development initiative, known as “Project Marlow”, aimed to redefine the market with a new “intelligent supervending” machine that is internationally scalable and reduces on-site maintenance visits through a state-of-the-art computing and control system that can be administered and upgraded remotely.

Costa engaged Global Capital Partners to assemble and lead a high-powered, international product development team including world-leaders from multiple disciplines and led by an innovation and product development expert. The team includes chipmaker Intel, Italian design firm Pininfarina (best known for their association with Ferrari and Maserati), Swiss coffee machine leader Thermoplan, eMixPro (sound designer to U2, Cold Play and the Rolling Stones), and Atomhawk (Harry Potter web presence). The team also included leading European perfumers to deliver custom-blended scents that complete the coffeehouse ambiance, as part of a novel fully immersive, five-sense user experience. The timeline was very ambitious: just six months from first meeting to production.





To complement this high-caliber team, Costa sought a global embedded solutions provider who understands how to bring world-class products through the development cycle smoothly from licensing to system integration. For this, they chose Bsquare.

## Costa Coffee Partners with Bsquare for an Innovative User Experience on an Uncommon Platform

The user experience would include more than 240 hot and chilled coffee, tea and milk-based drink options; cashless and mobile payment options; dynamic HD graphics, and more. Project Marlow needed a robust, intuitive, and efficient

To maximize performance and simplify operations, Costa wanted to program the interface in the Windows Presentation Framework (WPF) and the .NET Framework rather than the more typical approach of using an additional presentation layer such as Adobe Flash. Bsquare worked closely with visual engineers from Atomhawk and former jet engine system control designers from Perspectives to translate immersive HD graphics into an intuitive user interface that works seamlessly with the multiple systems inside the machine. “Working with the Marlow team, Bsquare played a key role in delivering a first-time-right user interface that won digital signage awards and achieved an unprecedented 95% acceptance rate in third-party testing, far exceeding industry standards,” says Eric Achtmann, Project Marlow Program Director & System Architect.

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user interface. Bsquare’s experience with high-volume, highly scalable networked embedded systems made them a logical choice for this effort. Jim Slater, Managing Director for Costa Enterprises, explained “Bsquare brought a level of entrepreneurship, chemistry, and trust that made them a true partner, not just a supplier.”

## A Growing Project

Bsquare’s involvement with Project Marlow steadily grew to include imaging the custom-made devices running Windows® Embedded Standard 7. Bsquare recommended this



operating system because it:

- Delivers enterprise-grade security.
- Provides the features Costa needs to effectively control and manage the machines.
- Supports rich multi-touch display interactions.
- Provides a strong foundation to extend system capabilities in the future, as well as an easy upgrade path to future Windows operating systems.

Bsquare developed a comprehensive web-based telemetry system, extensions to the user interface, and new web-based options for the Costa Express back office as the company scales internationally. Bsquare also hardened the devices and implemented one-button reset functionality that enables retail workers or others to reset the machines in the case of an operating system crash without having to perform a costly truck roll. This system supports cloud connectivity for remote management and troubleshooting, giving Costa Express future options for further streamlining of operations.

## Results

The result of these efforts was a successful rollout of the CEM-200 “Marlow” Intelligent Super-Vending Concession on budget and on schedule. The first functioning prototype was delivered within 50 working days from start, and the final machine was ready for initial production within six months. Only weeks before the NRF - National Retail Federation “Big Show” conference in New York, Intel decided to debut the machine in their stand. Diagnostics showed that, within 24 hours, over 800 cups of coffee were served flawlessly from the first production unit that had been completed only 48 hours before the show. The demand for machines has greatly exceeded initial expectations, and the stylish concessions are expected to penetrate new markets beyond the traditional coffee concession, including transport hubs, catering, offices, hotels, and more. Since NRF, Marlow has debuted internationally – in Las Vegas, Europe and even the Middle East in Dubai Airport’s impressive new concourse.

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Windows Embedded Standard 7 unlocks your vision for embedded device solutions that leverage high-performance, highly reliable customer ready Windows 7 technologies and deliver innovative, rich user experiences and seamless connections.



Bsquare hardened the OS, integrated the innovative User Interface into the system, developed a comprehensive web-based telemetry system, and integrated new web-based options for the Costa Express back office.

## Bsquare Goes Beyond the Ordinary

The dedicated global teams at Bsquare have the variety and depth of experience required to work on a fast moving, innovative, and technologically complex embedded systems project like the Costa Express CEM-200 Marlow concession. “Bsquare functioned seamlessly as a partner in an international team comprising more than 120 individuals from multiple companies in 7 countries,” Eric Achtmann, Project Marlow

Program Director & System Architect points out. “In fact, two individuals from Bsquare are among those core team members who have their names permanently engraved on every single machine that rolls off the production line. To do that, one must have made an ‘extraordinary and enduring contribution above and beyond the call of duty’.”

For more information, please visit [bsquare.com](http://bsquare.com) or email us at [sales@bsquare.com](mailto:sales@bsquare.com)



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