Revolutionizing Manufacturing Through Advanced Technologies

capmation
Changing Lives

A better IT experience

Park Industries

Like any industry, manufacturing has its own set of challenges that necessitate a forward-thinking approach and the integration of advanced technologies.

The challenges of manufacturing

This sector grapples with dynamic market demands, intricate supply chain logistics, and the perpetual pursuit of operational efficiency. In an era where rapid technological advancements redefine business landscapes, manufacturing companies must embrace innovation to stay competitive.

The intricate nature of manufacturing operations—often involving highly customized processes, diverse product lines, and multifaceted supply chains—magnifies the challenges. Swift adaptation to market fluctuations, stringent quality control, and the imperative for resource optimization further underscore the industry's complexities. In this context, advanced technologies emerge as the linchpin for manufacturing companies, offering transformative solutions to navigate challenges, enhance operational agility, and unlock new levels of efficiency.

Addressing manufacturing challenges with advanced technologies

This whitepaper explores the role advanced technologies can play in meeting some of the challenges manufacturing enterprises face. It focuses on Capmation's partnership with Park Industries®, a company that has been at the forefront of providing comprehensive solutions to the stone industry since its inception in 1953. Dedicating seven decades to designing, manufacturing, selling, and supporting cutting-edge fabrication solutions, Park Industries has evolved into North America's largest manufacturer of stone-working equipment.

The challenges discussed within this whitepaper involve the application of various technologies, including low-code development, data analytics, and IoT (Internet of Things) to enhance efficiencies and better position Park Industries in the marketplace. By delving into the specifics, we aim to provide insights into some of the challenges of the manufacturing industry and the cutting-edge technologies that can be employed to navigate and effectively resolve these issues.

About Park Industries

Park Industries®

Park Industries is a machinery manufacturing company focused on designing, manufacturing, selling, and supporting industrial solutions for stone and metal fabricators. Established over 70 years ago, the company has over 320 associates and has sold over 18,000 machine solutions in North America.

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Developing Internal Innovation and Automation

The first challenge Park Industries faced revolved around the need for innovation and automation across various departments within the company. At one point, Park Industries found itself with more than 80 legacy applications that needed to be rewritten. In addition, it had a number of manual processes that required automation.

Faced with the demand for rapid deployment to align with client and customer expectations, Capmation collaborated with Park Industries to develop custom-made software by leveraging a low-lode platform. Taking this approach not only significantly reduce development time, it also enhanced application performance, fortified the development process's security, and optimized infrastructure requirements.

Working in partnership with Park Industries, Capmation conducted a thorough analysis of low-code platforms. Together, the companies assessed the top options based on specific requirements—both financial as well as the types of applications that the company needed to develop and the types of business processes that were going to be automated.

Ultimately, Park Industries chose OutSystems for its unparalleled speed in the development process and its broad and deep set of functionality, including scalability, integration capability, and robust security features.

▶ About OutSystems

OutSystems is a low-code platform that helps accelerate the development of mobile apps, portals and web applications—as well as the rebuilding of aging core systems. With OutSystems, organizations can create and manage large application portfolios that integrate existing systems and reach millions of users.

Engineers are able to build and change applications in a virtual environment where users can define their applications data model, business logic, workflow processes, and user interfaces for both web and mobile devices, including offline functionality and access to native device sensors.

All engineering is done in a powerful, yet easy-to-learn, drag and drop development environment that can be extended with an organization's custom code—from C# to HTML, SQL, CSS and JavaScript.

When everything is ready, the platform automates the DevOps process, making it easy and fast to build applications into production, while giving users complete visibility and control over the entire process.

Real time performance monitoring is built in for all applications so organizations can see exactly how each application is performing to ensure their apps are providing an optimal user experience.

OutSystems excels in supporting scalable applications, a critical factor for Park Industries given its diverse portfolio of internal applications with varying types and sizes. The platform's ability to handle projects ranging from small prototypes to large enterprise-level applications proved instrumental.

The extensive integration capabilities of OutSystems enabled the internal and external technical teams to seamlessly connect with diverse databases, APIs, and third-party services. This versatility fosters the creation of comprehensive, integrated solutions while allowing for the incorporation of external code such as .Net C# and JavaScript. This capability not only enhances efficiency but also facilitates the reuse of previously developed components.

Security is paramount in the digital landscape, and OutSystems prioritizes this aspect. The platform boasts built-in security features, including role-based access control, encryption, and robust API management. Given the sensitivity of the data handled by Park Industries, this commitment to security aligns seamlessly with the company's operational requirements.

The extensive integration capabilities of OutSystems were showcased in the development of the Park Analytics Portal low-code app, which connects OutSystems with Microsoft Power BI Service, offering a dynamic solution for rendering and displaying comprehensive reports and dashboards across various departments and user groups. The integration leverages Microsoft Power BI RLS (Role Level Security) to finely control access to information for individual users, ensuring data confidentiality. Notably, the application extends its reach by integrating with an external JD Edwards (JDE) database, strategically organizing and grouping critical company information.

The flexibility of OutSystems was further showcased by the implementation of sophisticated filtering and slicing capabilities in Microsoft Power BI, achieved through the seamless integration of vanilla JavaScript, natively supported by OutSystems and the Microsoft Power BI JavaScript API.

In addition to the Park Analytics Portal, the development teams leveraged OutSystems to create the Park Portal low-code app. This app serves as a central hub, consolidating access to various company applications. Once again, the versatility of OutSystems shined through as it seamlessly integrated with external services and databases to address specific and tailored requirements. The Park Portal significantly streamlined and simplified access to critical company resources.

In summary, OutSystems' scalability, integration capabilities, and robust security features proved instrumental in integrating custom solutions into Park Industries' existing architecture. The platform's speed and adaptability expedited the development process and contributed significantly to the overall efficiency and security of the applications implemented.

By leveraging OutSystems, Park Industries and Capmation automated a host of processes, replaced a number outdated applications that required cumbersome software maintenance and developed portals for centralized control over company operations.

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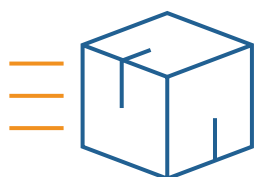
Challenge 2

Bringing Industry Leading Software to Market

The second challenge Park Industries faced centered on harnessing the potential of machine data and transforming it into a valuable asset for customers. It involved developing a digital solution that would provide real-time visibility into the workings of Park Industries fabricating machines so users could operate more efficiently and productively.

The company wanted to leverage data from the machines and present it to customers in a way that allows them to make decisions based on what's happening within their business or on a specific machine. It was a solution Park Industries' customers had asked for, and it would be the first product on the market with its comprehensive capabilities.

Creating the solution would mean capturing vast amounts of data from individual machines throughout the country; pushing that information up into a customer-segregated, cloud-based data lake; segmenting and analyzing the data per machine and user; and then displaying it on an intuitive and user-friendly dashboard instantaneously.

Capmation proposed a forward-looking strategy—analysis, transformation, and visualization of data—culminating in a bespoke Business Intelligence (BI) solution named ParkIQ. By implementing various API endpoints rooted in microservices architectural principles and advanced data analysis tools, customers gained access to comprehensive information dashboards. The implementation enabled Park Industries to recover production metrics, identify trends, and proactively address concerns. The result is a tool that aids in overcoming bottlenecks, boosting profits, and minimizing machine idleness and downtime.
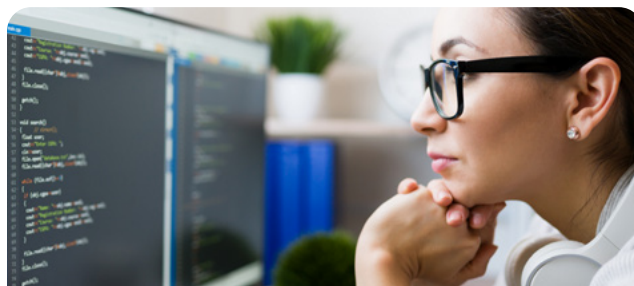
Capmation proposed a forward-looking strategy—analysis, transformation, and visualization of data—culminating in a bespoke Business Intelligence (BI) solution named ParkIQ.

The strategy extended beyond the ParkIQ Business Intelligence (BI) solution and leveraged cloud technologies, with a foundation built upon Azure Data Factory, Azure Functions, Power BI Service, Azure IoT Hub, and Azure SQL Server. The incorporation of Azure Data Lake and other cloud-based solutions further enhanced the platform's capabilities for IoT and Business Intelligence. This final component was critical to complete the Data Lake architecture for ParkIQ.

The utilization of Azure Data Factory facilitated seamless data orchestration and transformation, ensuring a robust flow of information throughout the system. Azure Functions played a pivotal role in enabling serverless computing for various tasks, enhancing the solution's scalability and efficiency. Power BI Service, as the visualization powerhouse, provided dynamic and interactive dashboards, empowering clients with real-time insights.

Azure IoT Hub became the central nerve center for managing and connecting IoT devices, facilitating the collection of data from sensors and machines. Azure SQL Server ensured a secure and scalable repository for the vast datasets generated.

The integration of Data Lake and other forward-thinking cloud solutions not only addressed the specific challenges outlined in the initial strategy but also positioned Park Industries at the forefront of IoT and Business Intelligence innovation. This Data Lake architecture streamlines data analysis and enables Park Industries to make data-driven decisions, optimize production processes, and stay ahead of industry trends.

Industrial IoT Data-Driven Architecture
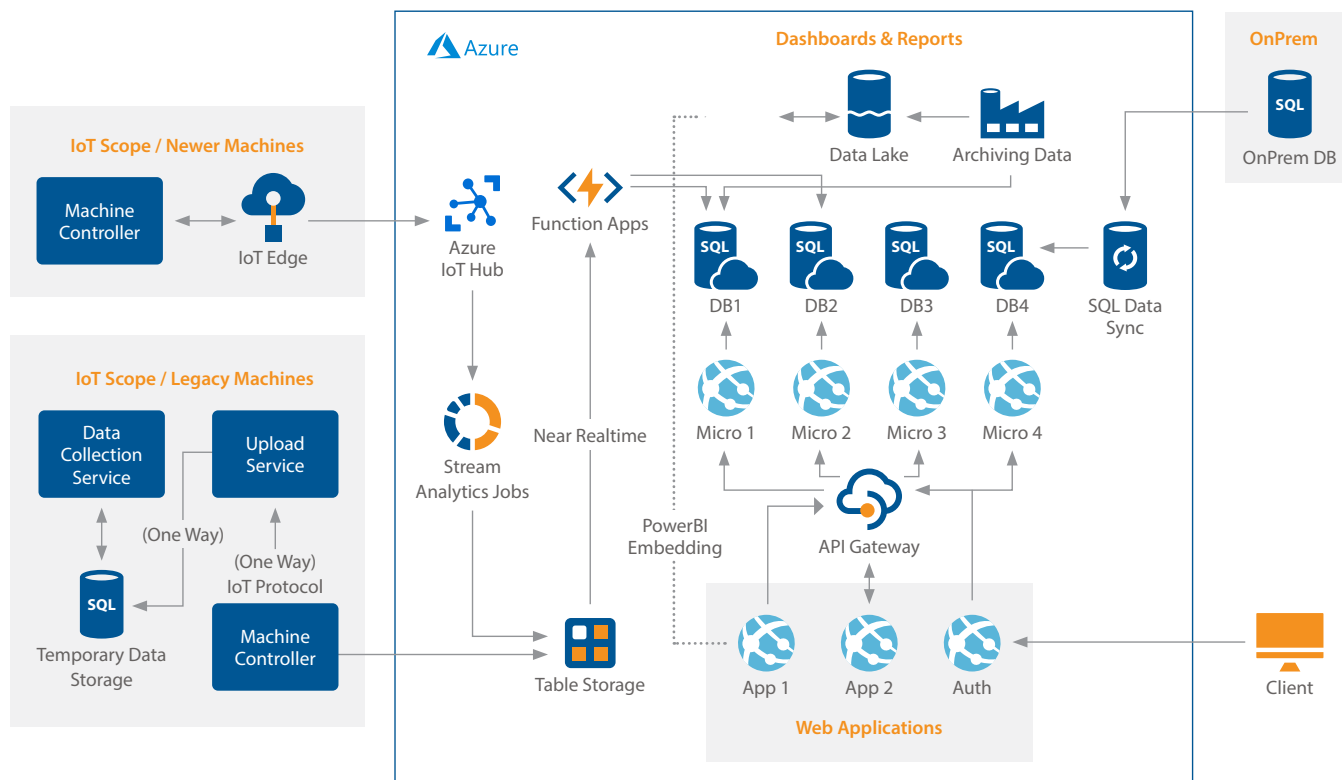
Optimizing the User Experience and Software Updates

The third challenge Park Industries faced pertained to the optimization of Human Machine Interface (HMI) and streamlining the software update process for each of the company's fabrication machines. Recognizing the importance of efficient updates, Capmation and Park Industries wanted to develop solutions that would enhance the overall HMI experience while minimizing the complexities associated with software updates.

Addressing the third challenge, Capmation partnered with Park Industries to introduce an API-driven Updater service. This service—implemented in the Native Language of the HMI's operating system (.NET)—facilitates an automated process that identifies and applies updates. This approach allows for remote software updates without the need for an on-site specialized team, ultimately optimizing both the time and cost associated with updates.

As Park Industries continues its commitment to operational excellence, the current focus is on addressing the final challenge of "Predictive Maintenance" through a proactive collaboration with Capmation. Harnessing the power of cloud technologies, the potential integration of AI Cloud services such as Azure Machine Learning stands as a strategic move towards further innovation.

The teams leveraged tailored machine learning models, utilizing the extensive data collected and stored in the existing Data Lake and Data Warehouse. This forward-looking initiative not only aims to predict and prevent potential equipment

failures but also underscores the agility and adaptability of the solution, positioning Park Industries at the forefront of predictive analytics. Through this ongoing collaboration, Capmation and Park Industries ensured the scalability and futureproofing of the overall solution.

> ▶ **An API-driven Updater service implemented in the Native Language of the HMI's operating system (.NET)—facilitates an automated process that identifies and applies updates.**

Summary

Today's manufacturing enterprises grapple with a host of challenges, including dynamic market demands, intricate supply chain logistics, and the perpetual pursuit of operational efficiency. To succeed and grow, manufacturers must embrace innovation to stay competitive.

In collaboration with Park Industries, Capmation addressed the following challenges:

Developing internal innovation and automation
by harnessing the power of low-code development through the OutSystems platform, while reducing development time, enhancing security, and optimizing infrastructure needs

Bringing industry leading software to market
by taking a forward-thinking approach to data in the creation of ParkIQ, a bespoke Business Intelligence solution that empowers clients with comprehensive insights into machine production, trends, and care. The solution solved customer bottlenecks, minimized machine idle time and ultimately maximized profits.

Optimizing the user experience and software updates
by developing an API-driven Updater service, implemented in the Native Language of the MHI's operating system (.NET), to streamline processes by automating software updates and enabling remote implementation in an effort to significantly reduce both time and cost.

By focusing on technological innovation, Capmation and Park Industries transformed obstacles into opportunities and helped the manufacturer evolve into a more efficient and prosperous enterprise.

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Park Industries Projects Completed

Health Check / Mobile Services
An application, available both as a web and mobile platform, that enables Park Industries Field Service Team to efficiently manage their work orders by enabling it to collect data and photos in a standardized way, based on the type of job, and then generate a final report.

Visitor Registration
A web application that facilitates in registering their customers by allowing them to access a dedicated portal and utilize various services. It simplifies the customer onboarding process and enhances user engagement.

ROSIE App
An application that automates the entire customer journey. It configures a piece of equipment for a customer with current pricing, creates quotes and contracts, and allows the customers to digitally sign a contract. From there the order goes into a work queue where it tracks order entry, training and installation, production and finally installation.

Park Engineering - Machine Connectivity
An extension specifically designed to integrate with and extract data from newly acquired machinery. It enables seamless connectivity, ensuring real-time data flow and enhanced operational efficiency.

Park Analytics
A standalone application that leverages the Power BI API to display comprehensive dashboards and reports. It offers customizable filters and supports various report types, serving as a versatile tool for data analysis across different departments.

Park Apps Portal
The central hub for all company-related applications where users can access both OutSystems and non-OutSystems apps via a URL. It includes features for managing roles and permissions, allowing for tailored access to applications based on user groups and individuals.

Maximizer API
An API designed to import data from the Maximizer system into the company's database. It facilitates data synchronization and integration, enhancing data accessibility and utility.

Core OS Components Update
An initiative to upgrade outdated components within the company's infrastructure, ensuring that all systems are current, secure, and functioning optimally.

Sharpen API
Similar to the Maximizer API, this API was developed to import data from the Sharpen system into the company's database, streamlining data management and accessibility.

Power BI PDF Export OutSystems
A modular solution that can be integrated into any application requiring the display of Power BI reports. It provides a convenient way to export and share insights in PDF format.

Time Entry App
Designed for technicians to log their working hours, this app supports time tracking against specific work orders. It includes features like lunch punch tracking and location-based logging, suitable for technicians on the move. Managers can also use the app to approve work hours, making it a comprehensive tool for time management.

Park IQ

A web application that presents real-time data and metrics from the company's machinery, offering insights into operational performance and program execution. It's a valuable tool for monitoring and optimizing machine efficiency and internal operations.

Credit Card Upload

An app that reads, processes, and sends company credit card transactions to the SQL database in the company's ERP software.

Integrated Manufacturing System (IMS)

An app that enables internal users to complete work orders provided by the company's ERP software and keep track of the manufacturing process.

Time Punch

An app that allows internal users to register their punches for starting and finishing their workday.

Associate Forms/HR Forms

An app built to automate internal forms creation, processing and approval steps from different departments.

Interview App

An interview application for the HR Department that enables users to create questions and reusable interview guides, schedule interviews, submit candidate evaluations, and view reports.

About Capmation

Capmation is a nearshore software engineering firm that offers clients a better IT experience. It does that by offering in a highly collaborative nearshore model, taking a holistic approach to software engineering and living its core values.

The company builds long-term partnerships by understanding an organization's goals and developing innovative, forward-thinking solutions that seize opportunities, improve efficiencies and increase RIO through a range of technologies.
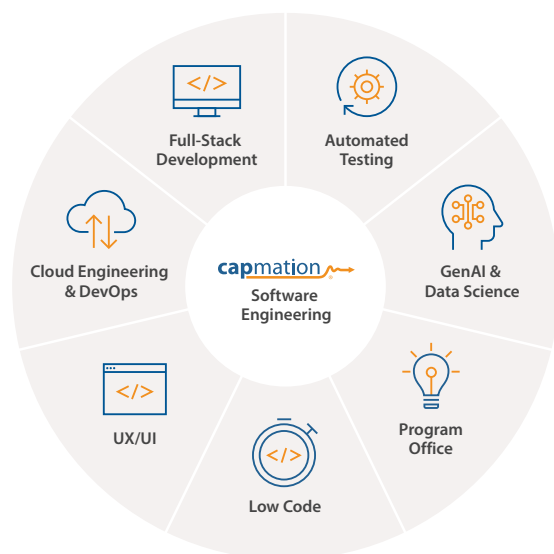
Learn more about the company at capmation.com.