From Barcode Scanning to Smart Data Capture

Time for a more intelligent approach

FREEFORM DYNAMICS

in association with

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About this guide

This document is intended as an update for CIOs, architects, software engineering leads and other senior IT professionals involved in reviews, approvals and decision-making that relates to scanning and data capture solutions. These are the technologies that we use to identify and track goods, assets and other tangible objects as they move around within the business, along supply and demand chains, and within the customer and public domains, for example via barcode, QR-code and ID scanning.

Specifically, we'll discuss the impact of an important shift that's taking place from a hardware to a software-centric approach. Rather than each type of scanning device being powered by proprietary software, we're moving to a world that revolves around standards-based, open software that can drive a range of different devices in a smarter and more consistent way. This enables any camera-equipped programmable device to be turned into a smart scanner, from traditional scanning equipment, through commodity phones and tablets, to specialist robots and more. This focus on standard software also opens the door to other transformational developments such as the use of augmented reality user interfaces and no-code integration of scanning functionality into pretty much any on-device app.

We will mostly focus on the software aspect, not just because it is the most critical element of any modern data capture solution, but also because of the mindset shifts it enables. In particular, that's the ability to move away from proprietary workflows and data silos towards a more open way of working.

Why this discussion, and why now?

With so much current attention on digital transformation, it's easy to forget that most business activity still relies on the use, storage and/or movement of physical 'things'. Related developments like AI, IoT and digital twins can help in certain scenarios, but meanwhile, some businesses are losing money and/or living with significant risk and regulatory exposure, simply because today's data-poor and relatively inflexible data capture systems leave them struggling to keep track of goods and assets.

Why is bridging this gap between the physical and digital realms rarely high on the IT agenda? Have we accepted the constraints and issues but not noticed how potential solutions have evolved?

Either way, reviewing the current situation, we have to ask if it is sustainable, given the pace at which business is changing.

The Buyer's Guide Series

Like all Freeform Dynamics Buyer's Guides, this document, which was commissioned by Scandit but authored independently, is not intended to be an exhaustive treatment of the topic. Our aim is to provide a concise overview of the essentials in this area, firstly to help orientate those involved in planning and decision-making, and secondly to make sure business cases and solution selection criteria focus on the things that really matter.

For more Buyer's Guides on other topics please, visit www.freeformdynamics.com.

Modern solutions change the game

The need to bridge the physical and digital worlds efficiently and effectively is escalating in pretty much every industry. Whether the context is frontline activity, core operations or B2B scenarios such as supply and demand chain management, we're seeing new use cases springing up and existing applications failing to cope with changing requirements.

Against this background, it's time to think differently about the role of data capture solutions, and we'll come onto that shortly. In preparation, however, let's review some of the advances in technology over recent years that have changed the game significantly and brought new opportunities.

Here's a quick flavour of what you could or should expect from modern scanning solutions.

1 Software defined

Fast processors and high resolution cameras and screens allow even commodity-class smart devices to run advanced image processing software and AR-based UIs.

2 Hardware agnostic

Software-defined means you can choose and mix equipment freely. This includes older devices to preserve past investments and allow phased migration in a harmonious manner.

3 Robust performance

Camera versatility and advanced software allow operation in low-light and high-glare conditions. Seamless switching between recognition modes deals with damaged or obscured labels.

4 Rich user interfaces

Smart on-device applications that integrate in real-time with back-end business systems enable dynamic and interactive user experiences that speed workflow and reduce human error.

5 Composable applications

No-code standalone apps plus rich SDKs with ready-to-use UI components enable a rapid 'assemble and configure' approach to dealing with even the most advanced use cases.

Putting smart devices to work

Smart data capture software can turn any smart device, including commodity smartphones and tablets, into a highly flexible scanner. This can also include interacting with the user via AR by putting an informational overlay onto the live camera view. The important aspect, however, is a software stack that also provides open APIs, allowing a device to work with and be driven by core business applications, in real time if necessary.

The core functionality typically found in smart data capture SDKs can be used to build pretty much any data capture-based application, from scanning an entire shelf to check stock levels or that goods are correctly positioned, through adding technical data for a maintenance engineer, to popping up special offers in a customer loyalty and self-scanning app. But whatever you are building, certain scanning and recognition patterns occur over and over, and it's making these available out of the box, as pre-built templates, frameworks or components, that enables the rapid composable application building approach.
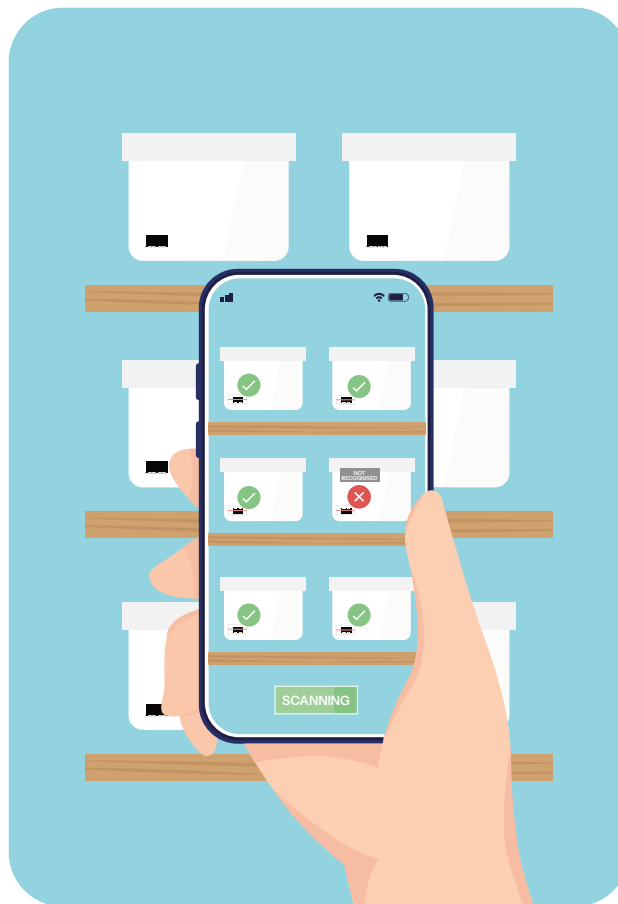
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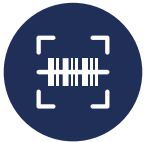
Enables multi-modal batch scanning and recognition of multiple items in a single, efficient operation.

Real-time two-way integration with back-end systems enables the user to act on feedback and alerts.

A live AR overlay can provide a visual representation of success, failure and related information.

Versatile approach for dedicated scanners smartphones, tablets, robots, drones, and other open devices.

Unlocking the broader potential

The big opportunities with smart data capture lie not just in what it can do today, but in how it helps you build a foundation for a more flexible, agile and software-defined future, in ways we outline below.

Fully unlocking this wider potential isn't just about technology, though. It also needs a change of mindset: a switch from focusing on individual applications to defining a broader, consistent and, yes, smart approach to data capture that enables innovation across the entire business. It's impossible to be completely prescriptive, but this must go beyond the data capture software stack to include a library of reusable application components, tools to provision and remotely manage devices and software, and analytics to monitor and track activity. Last but not least, you need mechanisms to deal with identity, access and compliance.

As with any software engineering exercise, it's often best to design around the outcomes you aim to deliver. With all this in mind, let's look at some of the things that smart data capture should enable us to do differently, or better, in the future.

Minimise IT and development effort

Source or build standard, open, reusable components to avoid duplication of effort, harmonise systems and streamline support.

Shift the pivot point into software

Remove hardware-based lock-in and constraints, and allow any business system to be integrated into the smart data capture environment.

Embrace advanced interaction models

Leverage the latest ideas in computer vision and augmented reality, and lay the groundwork to exploit emerging wearable options.

Enable real-time visibility

Provide insights and asset visibility in real-time to all who need them, from frontline workers to security and compliance staff.

Adopt a more 'evergreen' approach

Select software stacks with multi-modal data capture and analytics capabilities, to allow you to scale and adapt in the future.

Turn data capture into a value creation activity

Take advantage of the flexibility, simplicity and speed of smart data capture in innovative ways that enhance revenue and margin.

Taking it forward effectively

If these ideas of smart data capture resonate with you, then one of your priorities as IT leader is to encourage people to leave old habits and behaviours behind, as they pivot from a hardware-led approach to software-first. You may also need to intercept current procurement activity that could add more proprietary workflows and silos. It's obviously best, though, to course-correct in a more planned and positive way.

For example, you might begin with quick wins to gain support and trust, by enhancing existing data capture workflows with new functionality. Then go on to the richer gains to be had from adopting more contemporary solutions for new workflows, and exploring ways for smart data capture to transform other areas of business.

Let's finish with some thoughts on how others have succeeded in this important and fast-moving area.

Groundwork
Explore the latest ideas around smart data capture and take time to understand the 'art of the possible'. You can find lots of information and examples on the Web, and suppliers are typically willing to spend time bringing you up to speed.

Assessment
Review your current data capture facilities critically, looking for the kinds of inefficiencies and other issues we've covered. And look more broadly to other areas of the business that might benefit from what modern smart data capture has to offer.

Initial planning
Identify opportunities that deliver quick wins while laying the groundwork for future development and innovation. As part of this you need to consider how investments will be funded, given that early investments will be leveraged across the business.
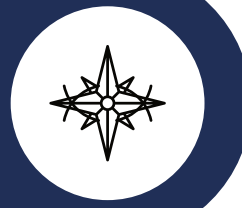
Get everyone on board
Success here will rely on the enthusiasm and commitment of everyone from business and technical teams to frontline workers. Win executive buy-in as part of this on the basis of ROI, new value creation and better overall business visibility, control and agility.

About

Freeform Dynamics

Freeform Dynamics is an IT industry analyst firm. Through our research and insights, we help busy IT and business professionals get up to speed on the latest technology developments and make better-informed investment decisions.

For more information, visit www.freeformdynamics.com.

Scandit

Scandit is one of the world's leading smart data capture companies. It was founded to capitalize on advances in smart device technology, enabling collection of data from tangible assets and physical operations to happen in a fundamentally different manner to existing data capture methods.

The Scandit Smart Data Capture Platform is a flexible software-based platform that benefits from continuous innovation to adapt and evolve in changing business environments. It automates scanning of barcodes, text, IDs and objects and supports more than 20,000 models of smart devices.

For more information, visit www.scandit.com.

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