



mobile vertical applications

driving enterprise mobility

foreword



Anne-Marie Thiollet
EVP, Enterprise Line of Business,
Orange Business Services, Paris



Etienne Bordry
Director, Innovation and Development,
Enterprise Line of Business,
Orange Business Services, Paris

Orange Business Services

Orange Business Services is actively involved in developing, delivering and supporting our customers with mobile applications for business. In recent years, smartphones have become a ubiquitous business tool, enabling today's companies to think beyond emails and surfing the Internet. People can now not only communicate and collaborate freely, but also connect seamlessly with their core business activities while on the move. Ever-higher specifications and capabilities of these devices mean more and more businesses are considering which fixed processes they can mobilise for maximum benefit.

In writing this white paper, we have studied the impact of mobile applications in many different industries. Across these industries, businesses are customising mobile applications specifically for their needs, leading to greater efficiencies and cost reductions (especially in back office and processing functions).

Orange continues to push the boundaries and lead the way by making business life easier through a focused and unique response to our customers' needs. This includes maximising new device and service capabilities to create real opportunities for our customers to build their businesses in a cost-effective, innovative and productive way. While at the same time ensuring that our customers discover not just the latest technology, but also the benefits it brings them.

In the previous white paper "[mobile enterprise applications – transforming business](#)" we looked at horizontal applications and how their capabilities and benefits are transforming enterprises. Through this white paper, we hope we can inspire you to investigate the differences that vertical mobile applications can make to your business, inform you of the benefits you can expect and guide you through the best options that you have to develop your applications.

Arthur D. Little



Stuart Keeping
Director, Arthur D. Little, London

Mobile applications are having an increasing and significant impact in the workplace. More and more organisations clearly see the value they can bring – whether increasing sales, improving productivity or delivering customer and employee satisfaction – and use is increasing.

The mobile application landscape is diverse, with applications aimed at a variety of end-user types and ranging from relatively standard "horizontal" solutions to highly-specialised applications that serve a specific industry need. While it is only relatively recently that some sectors have begun to explore the benefits of "vertical" applications tailored to their specific industry, there are already some exciting success stories from early adopters.

In this white paper, we examine the benefits and challenges associated with some of these emerging mobile applications, specifically exploring vertical applications in eight key industries (healthcare, transport, manufacturing, construction, retail, finance & insurance, public sector, professional

services). We describe the drivers and rationale for their adoption, the processes they support, the benefits they deliver and how they are being developed and deployed. We also explore the similarities and differences in how various industries approach and leverage mobile vertical applications.

This report draws upon insights from over 60 organisations across Europe. We would like to thank all the organisations that agreed to participate, several of whose successes with mobile vertical applications are profiled in these pages, and extend our thanks to Orange Business Services and to our colleagues from the various Arthur D. Little offices who have made this white paper a reality.

For decades, Arthur D. Little has been at the forefront of designing successful strategies for our clients in telecoms. We take great pride in continuing to be involved in one of the most promising opportunities in this industry.

We hope you enjoy the report.

executive summary

This white paper examines the business benefits of mobile vertical applications across eight key industries. It describes the reasons why organisations are adopting mobile vertical applications, what processes they mobilise, the benefits and how applications are being developed and deployed.

Leading organisations are realising the benefits of such applications to support specific industry processes. They are typically highly customised, often involve bespoke development and can lead to numerous gains in productivity, cost efficiency and sales performance.

There are also considerations in terms of customer and employee satisfaction. Employees expect greater flexibility, mobility and constant connectivity. Personal applications and devices are becoming more widespread as tools in the workplace, which is resulting in a “consumerisation” of corporate IT. Customers demand faster response times, increased transparency and competitive pricing.

Today’s smart devices, high bandwidth network coverage, development ecosystems and decreasing costs are all contributing to many success stories, but the scale of the opportunity and approach differs between industries and organisations.

Each vertical is different in terms of its underlying industry drivers, critical processes and potential benefits.

- **finance and insurance:** vertical applications focus on field and sales-related processes, given competitive intensity. In-house application development is popular (for secrecy/security) but not universal
- **manufacturing:** focus on aligning production with demand requires mobilisation of core processes such as inventory management, production processes, quality management, equipment management, plant-level performance tracking, and after-sales product maintenance. Development

is typically bespoke, with greater commoditisation expected in the future

- **transport:** increasing expectations of journey reliability, safety, flexibility, information visibility and cost mean applications are used in fleet management, safety and security, maintenance, customer interaction and warehouse management. In the future, applications are likely to become more interconnected, crossing organisation and transport mode boundaries, and increase in functionality
- **public sector:** pressure to do more with less focuses use on frontline field staff. Examples include cleaning teams, police, and social workers who are using applications to increase workforce efficiency. Healthcare and police services in particular have already demonstrated benefits. Government-approved technology means security concerns are now more easily managed
- **construction:** complex project management focuses use on on-site project management and quality, and health and safety management. In the future, an increasing number of fixed applications are likely to be mobilised. Growth will be driven from two directions: large contractors will dictate the use of mobile applications across their subcontractor base, while smaller, more flexible companies are likely to be more experimental and act as a test bed
- **healthcare:** focus on reducing the cost of healthcare means applications are being used to improve patient services through improved clinical workflows, prescription management, paramedic teams and hospital performance

management. Healthcare organisations are now developing mobile vertical applications more quickly, flexibly and cost effectively

- **professional services:** mobile applications are highly attractive to the professional services industry, which has high mobility, high reliance on IT/telecoms and high expectation towards differentiators. The majority of vertical applications are tailored versions of horizontal applications, as used by sales teams, project delivery and workload/capacity managers. Client data confidentiality is a key consideration in the development process
- **retail and wholesale:** tight margins in the retail sector concentrate potential application demand on efficiency (logistics, inventory, quality management) consumer engagement (digital couponing, mobile payment, product info provision), and large retailers (who can access economies of scale)

There are many pathways to vertical mobilisation; proactive process re-engineering is becoming more common.

In the future, organisations are expected to take a more holistic, top-down approach to identifying opportunities. Already some companies are adopting a more radical enterprise system redesign with core process mobility as a central consideration.

The development of mobile vertical applications needs careful consideration of the technology and skills required.

Most organisations currently adopt a bespoke development approach, combining connectivity, platform, software and device requirements separately to deliver a highly customised solution. However in some sectors, off-the-shelf solutions (that offer a complete end-to-end solution for a specific vertical need) are becoming more common. These reduce the development and maintenance effort.

For development support, organisations exhibit a range of approaches, specific to their priorities. Some organisations adopt an in-house approach, often for security and secrecy reasons. Others choose to outsource the entire approach, as internal competency is considered a key strategic imperative.

What is clear is that organisations who involve employees during all development phases tend to get the most benefit out of mobile applications. This includes

using an iterative development process, developing a proof-of-concept before rollout across the organisation and dedicating sufficient attention to usability and ergonomics.

An organisation considering launching mobile vertical applications should think about six elements from the outset.

- 1. rationale:** how should I identify potential opportunities? Which business processes could deliver significant benefits if mobilised? How will that process change as a result of the application? What are the benefits?
- 2. engagement:** how do I engage the correct stakeholders, both internally and externally? Who owns the IT and mobility strategy? How can I engage the potential application users in the specification, design and implementation process? Who else's organisation is involved? How could I collaborate with them?
- 3. pathway to mobilisation:** what is the best approach for vertical application mobilisation? Should it be built on an existing fixed vertical application, tailored from a mobile horizontal application, or should a mobile application that supports a previously non-IT enabled process be developed? To what extent is integration with legacy systems required?
- 4. technology choices:** what are the device, software, platform and connectivity requirements? Will the existing device fleet provide the functionality that the applications are likely to require? Where should I host the application and its data?
- 5. capability:** do I have the skills and resources in house to develop, launch and maintain the application?
- 6. return on investment:** how can I convincingly demonstrate the benefits of the application? Will the applications deliver the intended benefits? Is the business case clear?

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introduction

Mobile vertical applications are mobile applications that support specific industry processes. They are typically highly customised and often involve bespoke development. This industry specificity is a key distinction over horizontal applications, which, by contrast, serve common needs seen across multiple industries, such as sales support applications or generic workforce management applications, and are typically purchased off the shelf.

	fixed	mobile
vertical applications	<p>Definition: Fixed, industry specific applications</p> <p>examples</p> <ul style="list-style-type: none"> Stock market trading applications Production line control applications 	<p>Definition: Mobile, industry specific applications</p> <p>examples</p> <ul style="list-style-type: none"> Mobilised manufacturing quality management applications Mobilised healthcare patient database Mobilised insurance claim adjustment applications
horizontal applications	<p>Definition: Fixed applications that serve the needs of many industries</p> <p>examples</p> <ul style="list-style-type: none"> Account and payroll management applications Building control management applications Communication and collaboration applications 	<p>Definition: Mobile applications that serve the needs of many industries</p> <p>examples</p> <ul style="list-style-type: none"> Mobile CRM applications Sales force applications Field force applications Mobile messaging (e.g. BlackBerry)

Fig 1: Application definitions¹

In reality, the dividing line between vertical and horizontal applications is a fine one. Some applications are clearly vertical, such as those used by healthcare professionals to remotely monitor patient information.

Other vertical applications may be more horizontal in nature, such as a mobile Customer Relationship Management (CRM) application that has been tailored to integrate with other industry-specific processes and systems.

Why are organisations looking at mobile vertical applications?

Benefits of mobile applications.

Organisations are adopting mobile applications for the following business benefits:

- **productivity gains:** the use of mobile applications can increase process efficiency and workforce productivity through real-time information transfer, improved resource allocation and more accurate data management
- **cost reduction:** mobile applications can reduce physical infrastructure costs due to an increased workforce mobilisation
- **sales performance:** real-time data access enables faster response times resulting in increased win rate and ultimately increased market share, as well as realising additional selling opportunities
- **customer satisfaction:** internal process improvements result in a better level of customer service, aligned with increasing customer expectations (such as speed of response)

- **employee satisfaction:** application use enables greater workforce flexibility, freedom and sense of reward for employees, at the same time as meeting ever-increasing expectations (set by an increased awareness of applications from their personal lives)

Both horizontal and vertical applications can deliver these benefits.

Motivation for mobile vertical applications.

Organisations are adopting mobile vertical applications because they allow more flexibility and can address specific industry needs:

- **potential for radical process redesign:** the development flexibility means processes can be completely redesigned from first principles allowing maximum benefits to be achieved
- **greater integration with core business processes:** a higher level of customisation can offer greater alignment with core, often critical, business processes. This means mobile vertical applications can make a more significant impact on business performance
- **specific requirements can be accommodated:** applications can be tailored to ensure industry-specific requirements, such as security concerns, are met
- **the process is inherently industry specific:** this means a horizontal alternative is not available or suitable, and therefore, a vertical application is needed if the benefits are to be realised

¹ Sources: company interviews, Arthur D. Little analysis

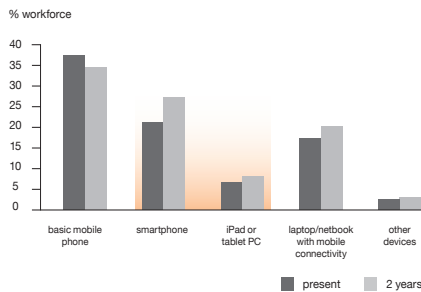


Fig 2: Current and future workforce mobile smartphone and tablet penetration²

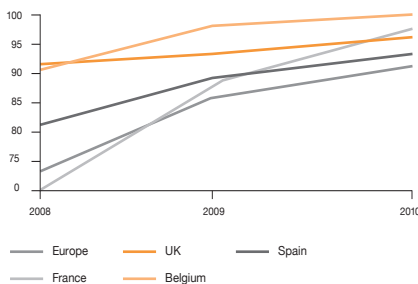


Fig 3: C3G coverage (as a % total population) 2008 – 2010³

What are the challenges?

Despite the potential benefits, mobile vertical application use remains in its infancy. Six key challenges need to be addressed to realise the benefits:

- **security:** additional protection measures are needed to manage security issues such as the transfer of critical enterprise data over a wireless network or data protection in the event a device is lost or stolen
- **technology:** complexity in existing device and operating system portfolio is increased by the trend of employees using their own devices and expecting a professional environment to work on it. Service management and control issues are an important concern for IT departments, who need to adapt governance practices accordingly. Decisions need to be made about where data should reside, in the context of security and usability considerations. Legacy IT systems present additional complexity
- **justification:** providing a quantified business case can be difficult due to uncertain project costs and benefits. Qualitative arguments are sometimes needed in order to gain project approval
- **complexity in process redesign:** application development sometimes requires a complete redesign of business processes, which demands specific business process understanding and complexity management. Diverse process boundaries mean collaboration can be crucial. Unclear user requirements mean significant effort is needed to define the right process, often involving extensive employee involvement. Ensuring existing business-support systems are minimally impacted during the transition to a mobilised application must be planned for during implementation
- **experience:** IT departments need additional experience and skillsets to support application development such as software coding or knowledge of device or operating system restrictions

- **culture change:** deployment often requires change initiatives, with senior level support, to manage different ways of working and shifts in corporate culture

Despite these challenges, companies are now starting to deploy mobile vertical applications more widely, driven, in part, by greater network and device capability. A significant increase in uptake is expected. One recent study, for example, predicts a rise from 10% of existing vertical applications being mobilised now to approximately 30% by 2013 (Fig 2).

Why do they require consideration?

- **businesses are changing:** employees require greater flexibility, mobility and constant connectivity. They are more aware of the benefits of mobile applications from their personal lives, resulting in a “consumerisation” of corporate IT. Customers are requiring faster response times, along with increased transparency and competitive pricing
- **devices are more capable:** the processing capabilities and penetration of devices have increased with enhanced functionality, battery life and screen size
- **high bandwidth network coverage is available:** the rollout and uptake of mobile data networks across Europe means sufficient bandwidth is increasingly available
- **development ecosystems are in place:** an abundance of potential support partners is available to help all stages of the development process
- **costs are lower:** device, connectivity, development and deployment costs are all decreasing
- **success stories abound:** across all industries, there are already many success stories that show real benefits can be achieved today, such as an increase in revenues by over €3 million (Fig 3)

²Large-Enterprise Survey: Corporate Mobility. Ovum (2011)

³Through use of a sales-related mobile vertical application, USG People has estimated that sales have increased by €3m. European Commission Digital Agenda Scorecard (2011) See the success story on USG People later in this report for more details

understanding the opportunity within each vertical

1 what processes should I mobilise?			2 how can I mobilise?	
what are the strategic drivers in my industry?	which processes are important?	which processes benefit from vertical mobilisation?	what are the application requirements?	what development pathway should I choose?
<ul style="list-style-type: none"> ■ cost competitiveness ■ process efficiency ■ customer service ■ organisational agility 	<ul style="list-style-type: none"> ■ marketing ■ sales ■ workforce management ■ project planning ■ asset tracking ■ performance management ■ ... 	<ul style="list-style-type: none"> ■ drivers and benefits of process mobilisation ■ benefits of vertical mobility 	<ul style="list-style-type: none"> ■ cost ■ usability ■ interoperability ■ security ■ performance ■ legacy systems 	<ul style="list-style-type: none"> ■ technology options <ul style="list-style-type: none"> - architecture - devices - software - connectivity ■ partnership choices
example industry insights (non-exhaustive)			example industry insights (non-exhaustive)	
<ul style="list-style-type: none"> ■ competitive pressures force manufacturing companies to focus on optimising supply with customer demand ■ customer expectations drive a need for rapid response times by financial service companies ■ value for money is a key focus for public sector organisations 	<ul style="list-style-type: none"> ■ sales process improvement is a key focus for finance and professional service companies ■ project management process optimisation is key in the construction sector ■ improving frontline workforce process efficiency is key in the public sector 	<ul style="list-style-type: none"> ■ significant benefit in mobilising certain vertical healthcare processes due to increasing demand for employee mobility and technical nature of processes ■ in the transport sector, many processes already mobilised, so focus is on improving existing systems and expanding to new areas 	<ul style="list-style-type: none"> ■ cross-vertical dependence between manufacturing, logistics and retail companies means collaborative industry-wide development approaches are taken ■ security and innovation protection concerns by finance and insurance companies drive partnership approaches; in-house development common ■ new rapid-development environments mean healthcare organisations are now developing mobile vertical applications more quickly, flexibly and cost effectively 	

Each vertical is very different in terms of its underlying industry drivers, critical processes and the impact of mobility upon them. To understand the scale and focus of the opportunity, there are two key questions that an organisation should consider:

1. What processes should I mobilise (based on the potential benefits to the organisation)?
2. How can I mobilise (based on the specific needs, constraints and available solutions)?

This is described in more detail in **Fig 4**, along with example insights from selected industries.

Fig 4: Key questions for consideration when deciding what and how to mobilise⁴

⁴ Source: Arthur D. Little analysis

finance and insurance

Driven by increasing pressure for operational efficiency following the recent financial crisis and the need for deeper customer interaction, Finance and Insurance professionals are using mobile vertical applications to maximise time in front of the client, accelerate their response time and enable better cross-team collaboration.

Current use of applications focuses around sales and field staff. While many of the applications used in the Finance and Insurance sector are horizontal in nature, companies are now realising that additional customisation and alignment with core processes present additional benefits:

■ **finance professionals:**

– investment managers are using CRM applications tailored specifically for the Finance sector to access key market and client data whilst in the field. The applications integrate basic CRM tools with other critical business systems to place the relationship intelligence in the context of core business. Asset managers can access client and real-time market information when in the field, and enable push alerts according to key criteria such as price thresholds. This allows them to make decisions with their clients, away from the office

– retail sales teams use applications to support visits to potential and existing customers. Applications are used to push out workforce tasks. Functions like GPS and digital route planning suggest the best routes for customer visits, improving meeting efficiency. Another function of applications is to use location information, such as GPS, to enable or disable particular functions, allowing tailored content (e.g., when on-site, additional content can be made available through the application). Cameras are used to digitise key customer documents, such as legal papers, without the need for time-consuming back-office processing. Applications are being used to simulate financial solutions

using the latest system updates (such as financing rates) directly on their mobile devices, allowing sales to draw up proposals in real-time in front of the client, without the need to go back to the office.

– credit managers are better informed of asset status. Auditors use applications in the field to increase information flow with creditors, meaning credit limits, acceptance levels of risk and terms of payment can be processed more efficiently and accurately

■ **insurance professionals**

– Insurance agents can enter data on goods to insure in the field, including text and photographs. The information is then sent directly to the back office for analysis and pricing. Data accuracy and speed of response is increased resulting in faster, less error-prone customer service

– claim inspectors can process claim adjustment data in the field. These can be linked to geo-localisation and video/picture for more accurate, content-rich reporting

Two trends are likely to shape future use:

■ we will likely see an increase in the use of applications that support two-way information flow. Many of the mobile applications currently employed are “information only”. Two-way information flow applications are sometimes more difficult to deploy due to regulatory and security issues, but this is expected to change in the future as technology advances are likely to allow greater control

■ an increase in tablet penetration amongst staff is likely to lead to an increase in dashboard-style applications and applications that allow employees and clients to visualise key information in real time and provide the ability for clients to read and sign documents digitally

An increase in use is likely for both large and small players. Small players have more flexibility and can therefore pilot new technologies with fewer restrictions. Large companies have more resources and therefore more capability to develop and implement significant projects.

Many financial service companies develop applications in-house. This is because companies are protective of their plans and therefore cautious of working with vendors and third parties. In-house development also allows continuous interaction between business areas, project managers and deployment teams, and ensures consistency between projects (delivering greater synergies and technology reuse).

Where application development is done through partnership, both finance and insurance companies typically partner with industry-specific players who have expertise in the specific challenges around security, regulation and legacy systems. Companies tend to work with smaller niche players, with the larger players sometimes not yet having the required specialisation.

finance and insurance success story: BBVA and mobile sales teams

Banco Bilbao Vizcaya Argentaria (BBVA) has recently developed a bespoke mobile application that supports the Commercial Banking sales team. The application provides client data in the field, in addition to innovative use of GPS and the camera function. The application has delivered a significant reduction in end-to-end workflow time.

Background

Banco Bilbao Vizcaya Argentaria, S.A. (BBVA) is a multinational Spanish banking group with operations in over 40 countries across Europe, Asia, the U.S., Mexico and Latin America. BBVA employs 104,000 people in over 30 countries around the world and has more than 47 million customers and 900,000 shareholders. Technology is a key focus of their group strategy, along with people, teamwork and ethical principles.

BBVA is a recognised leader in mobility integration in the Financial Services industry. Luis Uguina, Global Head of Remote Channels and New Digital Business informed us that BBVA, “were the first bank in Europe to create the position of ‘Chief Mobility Officer’ to fully deploy mobile applications and services within the company. The team is responsible for understanding the needs of the group in the mobile ecosystem (both internally and externally), and vertical applications have been one of the key pillars in the group’s mobile strategy ever since”. To date, BBVA has deployed more than 80 internal and external mobile applications. That said, BBVA will only deploy a mobile solution where they are guaranteed a return on investment.

Mobile vertical application example

BBVA has developed a mobile application that supports the Commercial Banking sales team with visits to customers. The application serves as a complete set of mobile tools for BBVA employees and allows them to access customer information when in the field. The application is connected with BBVA’s

CRM, and it schedules commercial actions on a daily basis. In addition to CRM functionality, the application uses advanced device features like GPS and digital compass (to suggest the best routes to visit all the customers) and a camera (to digitise customer legal documents such as an identity card or deeds to a house or company). The application is also location-aware, using Wi-Fi and GPS to enable application features depending on the location of the device. The application was developed for three “certified” platforms at BBVA: iOS (both iPhone and iPad versions), Android (smartphone and tablet) and BlackBerry versions.

BBVA are leaders in the field. We have developed over 80 applications to date and think there are many more opportunities we’ve yet to get benefit from.

Luis Uguina

Global Head of Remote Channels and New Digital Business, Digital Innovation, BBVA

Benefits

Mobilised workflows, such as weekly expense or project budget authorisations, have seen astonishing reductions in end-to-end execution time. Average workflow time was more than one week prior to implementation, with much of this time “human time” – delays between handovers between staff and

tasks awaiting admin attention. “As soon as we ported applications to mobile, we noticed that the average time of many workflows dropped from one week to just a few hours,” highlights Luis Uguina.

Ensuring success

- most of BBVA’s development work is done in-house, and they work deliberately only with smaller suppliers, enabling BBVA to participate strongly in the development process
- significant focus was given to user experience – a third of the time is spent on this (rather than back-end integration, etc.) – and beta testers and “prototyping” were extensively used
- deploying on devices appropriate to the user base was also key, with a heavy emphasis on smartphones, since they are most likely to be with the employees all of the time. Niche applications are developed for larger form-factor devices like tablets

Future

Whilst these achievements are already striking, BBVA has a high level of ambition for the future. Luis Uguina states, “our goal for the coming years is to increase the adoption and usage of mobile applications – internally by giving a smartphone device to every employee and externally, developing new financial and non-financial applications.”

manufacturing

Manufacturing companies are facing increasing pressure to produce products more quickly, with greater efficiency and flexibility, while maintaining margins through an ever-present focus on cost efficiency. Optimising supply with demand remains a focus.

Supply and delivery chains are becoming increasingly globalised, introducing new complexity. At the same time, expectations from retailers and consumers in terms of accountability of operations and traceability of products is increasing.

Manufacturing companies are only just starting to realise the benefits that mobilising vertical applications can deliver. Because many activities are fixed in nature, such as production and assembly lines, use has typically focused on more mobile activities such as sales and logistics. As a consequence, horizontal applications, such as fleet tracking and CRM solutions are now relatively common. However, as companies look to improve their production processes and better align supply with customer demand, companies are now turning to mobilising applications that are more closely integrated with core manufacturing processes.

Some examples include:

- **inventory management:** employee mobile devices enable raw materials, unfinished goods and final products to be tracked from the moment they enter the factory to the moment they are sent to the customer. This end-to-end visibility allows a closer integration of team requests, reduces inventory costs and provides greater visibility to sales teams, customers and management
- **quality management:** paper-based quality management systems are being replaced with mobile applications. Inspections and audit processes are now being done with mobile devices that allow real-time

data capture of key quality metrics using peripherals such as temperature probes. Some applications allow alerts to be sent out directly if entered data is outside critical limits, resulting in faster responses. Real-time data entry improves accuracy (through constrained entry formats) and facilitates immediate reporting and comparison of performance versus trends and thresholds, enabling faster and more informed decision making by management

- **production line optimisation:** mobilised access to production line job requests, inventory and scheduling information allows greater operational control
- **equipment management and maintenance:** mobile applications are being used by technicians to remotely monitor equipment and automatically alert them to issues in real time, resulting in faster repair times and less production line downtime
- **plant-level performance tracking:** management can better monitor performance indicators in real time, drawing on data from multiple plants, sometimes across regions

These applications are already delivering benefits. For example, a recent study concluded that manufacturing employees using mobile applications as part of complex production processes are able to save or recover an average 42 minutes per day versus fixed information systems⁵.

In the future, overall growth is expected to focus on applications that allow greater alignment of factory capacity management with customer demand. In particular, increasing adoption of

mobilised radio-frequency identification (RFID) technology is set to enable further adoption of mobile applications by linking contextual product information and process information to items moving through the production line, leading to more visibility and richer information over the process as a whole and a reduction in “compartmentalised manufacturing”.

Companies often work with smaller, sub-sector specific companies for application development and deployment. This is to better understand the complex underlying processes and business needs. Sometimes multiple partnerships are adopted, drawing on expertise on business process and software development from different organisations.

Application development has typically been highly bespoke as this ensures that applications are completely aligned with core manufacturing processes. These were sometimes high-cost projects with lengthy delivery (and often unreliable) timescales. However, this looks set to change.

Some manufacturing companies are now adopting commoditised solutions. For example, food and beverage companies already use such applications to improve quality management. Customer flexibility is built into the system via additional customisation features (such as incorporation of specific questions or information flows) so company specificities can be accommodated. However, the software is purchased off the shelf, meaning the testing and maintenance effort is reduced.

⁵ Motorola (2009) - 2009 Mobility Barometer: Manufacturing

manufacturing success story: ArcelorMittal and quality testing

ArcelorMittal has achieved significant efficiency gains through the use of mobile applications in their sample testing process, with improved visibility of the request status, immediate correction of errors, improved workload planning and increased traceability. This enables ArcelorMittal to deliver products more quickly and efficiently to their customers.



Background

With extensive manufacturing operations in 60 countries, ArcelorMittal is the largest steel producing company in the world and market leader for use in automotive, construction, household appliances and packaging.

Challenges

To meet customer expectation and ensure product quality, ArcelorMittal Atlantique (composed of four sites in the north of France) sends samples of manufactured steel to the laboratory for physical and mechanical testing. The company faced significant challenges with this process, as tracking information was not available between sample creation and delivery to the laboratory, which could be up to two days later. With no visibility on the sample delivery schedule, the laboratory had issues with workload scheduling. This resulted in significant delays to the testing process, which in turn could delay customers' orders.

Solution

ArcelorMittal Atlantique developed a mobile application solution that would enable them to track their samples from production to testing. Staff were provided with a ruggedised device that enabled barcode scanning recognition, which

was linked to the laboratory's information management system.

- manufacturers create samples with a barcode
- the contractor collects the samples and scans them with a handheld device that informs the laboratory's system in real time when samples have been picked up
- when the barcode is missing or unrecognised, the contractor can manually specify new samples in the system, through the device application
- the contractor delivers the samples to the laboratory, and connects the PDA to a local system (through a dock), which retrieves further information about all samples delivered
- the samples then enter the laboratory's internal analysis cycle

The main driver for the mobile application was process efficiency – better visibility for sample factory staff and laboratory workers, leading to improvements for both sides. The application is integrated with the factory laboratory systems and allows employees to track steel samples through their journey from distant factories to the laboratory, allowing better workload scheduling.

Olivier Vansteene

ArcelorMittal Atlantique

Benefits

The mobile application has delivered benefits to both the factory and the laboratory.

- **for the factory:**
 - improved visibility of sample status between collection and delivery
 - immediate correction of errors by factory workers rather than after samples are sent to the laboratory
- **for the laboratory:**
 - improved productivity through workload planning
 - improved traceability of samples

These benefits ultimately lead to improved efficiency of the testing process and greater customer service and delivery.

Ensuring success

ArcelorMittal attributes the success of the application to partnering with a specialist hardware provider that had not only developed solutions for their production operations previously, but had also really understood their needs and their operational context. The hardware provider brought in a third company for software development. This expertise, combined with the commitment of internal teams, was important to the overall project success as it meant they were able to develop a successful application at the first attempt, without significant re-working.

transport and logistics

Transport and Logistics companies are using mobile vertical applications to manage increasing expectations of journey reliability and safety, service flexibility, employee responsiveness, information visibility and cost competitiveness.

Transport and Logistics companies have been using mobile applications in areas such as vehicle tracking and ticketing for many years. These typically relied on specialised devices, sometimes without constant connectivity. This looks set to change. Transport companies are looking to maximise the benefits from their recently adopted smartphones and for ways of integrating these with existing processes and IT systems. In other cases, companies are looking at ways of integrating new technology into existing mobile applications that have typically not had constant connectivity or have yet to realise the benefits from new advances in geolocation technology.

Transport and Logistics companies are seeing a number of benefits across a diverse range of processes:

- **fleet managers** are using applications to improve fleet scheduling, route planning, dispatching and tracking. Shortened information feedback cycles and real-time information allow quicker decision making and greater optimisation. For example, in logistics, idle vehicles can quickly be identified and redeployed in areas of need
- **drivers** can stay connected in real time with scheduling teams through fully connected vehicle terminals or personal devices. A two-way flow of information provides them with up-to-date traffic alerts or timetabling information, at the same time as providing scheduling teams with an accurate picture of driver status. Logistics drivers can receive automated alerts for job requests in real time and stay better connected to back-office route and traffic intelligence

- **maintenance staff** can detect breakdowns in real time and use automated push alerts to schedule a response, resulting in a faster response time and a reduction in vehicle down time
- **customer-facing staff** can provide a greater level of service. In Logistics companies, real-time order status provided directly to customers reduces back-office staff burden. Customer-facing transport staff use applications to provide real-time timetabling and vehicle status information to passengers, improving customer satisfaction. Smartphone applications are also being used to process and validate tickets, reducing queuing times

Despite early signs of a shift to more widespread workforce adoption, opportunities for passenger transport companies are still very much focused on applications used by customers. However, many transport companies see employee applications as the natural extension of this trend. And the customer is likely to remain at the centre of application development in the future, with employee-focused applications ultimately being oriented to improve customer services, such as real-time awareness of motorway traffic or improved queue management at rail stations.

For implementation, a key challenge within the Transport sector is that management systems often involve interfaces across different organisations. For example, because Logistics companies are a crucial link between manufacturers and sellers, the development and deployment is dependent on what others are doing.

As a result, collaboration between companies is essential, either directly or with the support of industry associations.

In the future, mobile vertical applications are likely to become more interconnected. Organisations are already considering how applications can work in conjunction with each other, reflecting a broader trend towards networked-based systems such as cloud computing. For example, highly optimised route planning needs to draw on data from various sources (private and public vehicles and infrastructures) to then be able to choose the most efficient route across the transport network as a whole.

For application development and implementation, Transport companies typically work with industry-specialist partners who have a good understanding of the underlying business processes and transport network and access to a range of specific technology solutions such as barcode scanning capability and GPS tracking.



Fig 5: voyages-sncf.com application

transport success story: voyages-sncf.com and employee information provision

voyages-sncf.com has developed a suite of mobile applications that provide on-demand, dynamic information to passengers during their entire journey, resulting in an improved passenger experience and increased satisfaction. To allow employees to access the same information tools as passengers with smartphones, the application was then extended with additional functionality to allow station and train staff to be more informed and provide a greater level of service.

Background

voyages-sncf.com is the Internet travel agency of SNCF, the French national state-owned rail company. SNCF operates freight and passenger rail services in France and also manages the physical infrastructure.

Challenges

voyages-sncf.com customers were requesting more information over the entire course of their journey and onward travel. In the past, voyages-sncf.com had little contact with the customer between the ticket sale and train departure and wanted to stay more connected. At the same time, train and platform staff were looking for a way to provide more information to passengers directly.

Solution & Benefits

voyages-sncf.com developed two applications that enable passengers to access quick, complete and dynamic information about their travel. The first application ("Horaires & Résa") allows purchasing of SNCF tickets and covers the sales and after-sales processes. The second application ("Compagnon") then provides useful journey information over the course of their journey, and will be incorporated in the overall "SNCF Direct" application as of December 2011. The application provides information about the ticket, such as train number, schedule, station and seat number. At the departure station, the application provides information on the platform number and information about delays. The application also highlights services available in the station such as shops and restaurants. During travel, the customer is provided with a map with scheduled

stops and train progress. Upon arrival, the application provides information about services in the surrounding area and integration with onward travel.

As the application was deployed, it became apparent that passengers now had more information on scheduling and surrounding services than SNCF employees, with many employees informally logging in to the passenger application. The development team therefore extended the functionality of the application to support employees. The application was modified to enable employees to access information about all trains across multiple stations and therefore allow employees to provide information to all customers without being restricted to a specific journey.

This enabled platform staff and train drivers to keep pace with their customers in terms of information availability and increase the level of service provided.

The application was initially developed to provide quick and complete information to passengers. However, the project team discovered that the application was also used by SNCF's station and train agents to answer travellers questions. A new version of the application was then developed to better support employees.

Adnane Kassamaly
Innovation Lead, voyages-sncf.com

For development, voyages-sncf.com

partnered with Orange Business Services for support with application and mediation platform development. This project development involved three main work streams:

- the mobile application itself
- a mediation platform to collect data from different voyages-sncf.com's legacy systems and send it to the mobile application
- the integration of voyages-sncf.com's legacy systems to allow communication with the mediation platform

The application development process was used as a way to develop in-house competencies at voyages-sncf.com. For example, drawing on the partnership with Orange Business Services, the in-house team now has Android development skills that can be used on subsequent programmes.

Ensuring success

The success of the application was attributed to three key areas:

- **ergonomics:** since screens are small and input methods very specific, there is a strong need for simplicity, easy information access and compliance with OS guidelines
- **simplicity:** optimisation of data streams between the application and the service platforms to overcome network constraints as the application was typically used in transit and in rural areas
- **communication:** explaining the application and the benefits to both customers and employees

public sector

Public Sector organisations across Europe are facing increasing pressure to “do more with less” as they strive to maintain world-class frontline services during a period of intense cost cutting. The focus on public sector process efficiency, value for money and visibility of information has never been so intense.

Public Sector departments and their suppliers are therefore deploying mobile applications to improve frontline productivity and enable management to make faster, more informed decisions.

- **frontline staff:** faster, more reliable entry and reporting of data reduces errors and administrative burden. Real-time access to back-office information systems and job requests whilst in the field reduces the need to “return to base.” This means less time in the office.
- **building cleaning and renovation staff** in a major European city have recently switched to using mobile applications to plan routes, access building information, take notes, mark buildings and trigger intervention requests directly on their mobile devices resulting in significant productivity gains
- **police** are now registering crime reports in real time with added functionality such as geotagged photo capture, finger print readers and record checking. These are significantly reducing the administrative burden on police staff and increasing their time in the community. Some demonstrated success stories have resulted in a reduction in case time by up to thirty minutes per case⁶
- **social care workers** are now using mobile applications in their support work with victims of domestic violence, allowing more efficient and less intrusive data capture. Some social work organisations have been able to save over €500,000 in terms of time saved by using mobile technology⁷
- **management staff:** workforce efficiency is increased through improved job scheduling and workforce tracking. Decision-making is improved through more reliable, real-time data collection directly from the field, providing a better understanding of workforce location, status and performance. Management staff are using dashboard type applications to better track work-team performance

The level of adoption varies between sub-sectors. Some, such as police and healthcare, are currently seeing many benefits, driven by intense pressure for improved frontline productivity.

In the future, applications that allow for a more integrated government will make a significant impact – for example merging the management of a city’s field teams across organisational boundaries resulting in an improved, more efficient and responsive level of service. Indeed, wider adoption of mobile applications within the public sector is dependent on taking a less fragmented approach to mobile application deployment – which remains a significant challenge in terms of supplier coordination and integration.

While security remains a key concern for Public Sector organisations, some governments are approving the security specifications of certain technologies. This means that, in some cases, security concerns are reduced as organisations have confidence that stringent security and data protection standards are maintained (for example, adherence to the UK CESG standards⁸).

While in-house competency is typically used in the first instance, development and implementation of mobile

applications in the Public Sector relies heavily on private organisations to provide both process and application delivery expertise – and even project management expertise in many cases. This is likely to increase in the short term, as governments turn to the private sector for a larger proportion of their resourcing.

Many applications in the Public Sector are entirely bespoke rather than a customisation of existing systems. Government departments typically draw on small, sometimes start-up software developers to provide coding capacity, which typically isn’t available in house.

In terms of deployment, internal resistance to change is sometimes a challenge. Departments overcome this by having senior level sponsorship for development projects as well as engagement with staff from all parts of the organisation over the course of the project development.

⁶ <http://uk.blackberry.com/solutions/types/government/> (accessed October 2011)

⁷ OLM Systems: <http://www.olmgroup.com/systems/where-we-work/children/mobile-working.aspx> (accessed October 2011)

⁸ CESG is the UK Government’s National Technical Authority for Information Assurance, responsible for enabling secure and trusted knowledge sharing



public sector success story: ISS & the City of Gent – time registration

Driven by a request from the City of Gent, ISS developed a mobile application to improve the management of teams cleaning public buildings. The mobile application was implemented in place of an expensive clocking-in system and allows faster, more accurate planning and reporting. It also allows immediate validation and acknowledgement of the work leading to faster and more accurate billing.

Background

ISS is one of the world's largest facility service providers, with market presence in Europe, Asia, South America, North America, and Australia and employs more than 520,000 people in over 50 countries.

Challenges

ISS is a cleaning contractor for the City of Gent. ISS cleaning teams are always on the move – servicing a diverse range of public buildings such as public landmarks, libraries and schools. This entails complex field activity scheduling and resource planning for numerous teams. ISS relied on a time-clocking system for planning and registration of cleaning teams' schedules but, as the number of teams and service locations grew over time, the time-clocking system was proving to be difficult to manage and too expensive. The City of Gent requested a new registration system that combined time recording with automatic scheduling and payroll administration.

Solution

ISS, in conjunction with the City of Gent, developed and equipped all of their 150 cleaning teams with a mobile vertical application that acts as a personnel time registration system and also notes the employees' locations via an NFC reader. Each employee records the start and end of the working day, travel time, and work time spent on each assignment. Work orders are dispatched directly to the cleaning teams.

ISS worked with a variety of partners for development. Mobistar (Orange) facilitated the search for Mobile application partners. SAGEM was

responsible for the device, Mobile Token managed the implementation via a proof-of-concept phase, which lasted for about 3-4 weeks.

After agreement from the client, the progressive rollout started group-by-group over a four-month period. According to Vera Weckx, ICT Manager at ISS BeLux, "the proof-of-concept went smoothly as all the 'test-employees' (regardless of their abilities) were very motivated to test the new device."

The application was initiated by the City of Gent, who wanted ISS to have the most efficient and cost-effective workforce management.

Vera Weckx
ICT Manager, ISS

Benefits

The mobile application allows automatic timing, scheduling, and geopositioning of cleaning teams, which has significantly enhanced the overall process efficiency:

- faster, immediate validation and acknowledgement of the work, leading to shorter billing times with greater accuracy and greater client acceptance due to full visibility of the authorisation process
- less errors in salary calculation, which leads to greater employee satisfaction

Vera Weckx, ICT Manager at ISS, considers that "the overall process efficiency is now seriously enhanced."

Ensuring success

An iterative approach to the design of the application was crucial. ISS's partner managed the implementation via a proof-of-concept phase. This ensured the user-friendliness and practicality of the solution. Change management became very important during the rollout phase. "To ensure adoption we had to balance the needs of staff who felt positive about the device, since it gave them the feeling of importance, against those who felt it was too invasive compared to established practices," highlighted Vera Weckx.

- real-time job dispatching to staff
- direct and advanced field reporting, including time tracking, activities and localisation via NFC keys
- increased control and accuracy through set data entry
- reduced travel times due to wireless data transmissions
- quicker and more accurate planning and reporting

construction

Complex project management, pressure to meet tight deadlines to stay within budgets and the increasing demand for client responsiveness are driving the use of mobile vertical applications in the Construction sector.

On-site project management

Complexity in managing construction projects arises not only due to the use of multiple subcontractors, but also due to the high-risk exposure to unexpected events such as weather, faulty materials and failed deliveries. On-demand data access and ability to track issues as they arise, therefore, offer significant benefits.

- by providing on-demand access to project data on-site, mobile applications are allowing project managers to update project information more efficiently, schedule tasks for subcontractors, maintain audit trails and keep track of deadlines
- tablets are being used to access and annotate complex site drawings without the need to carry vast quantities of paperwork
- site workers are using mobile applications to receive job requests and provide real-time progress updates, enabling managers to reduce downtime and improve workforce planning
- inventory managers can instantly log component delivery status and access product installation information, reducing the time needed to travel between the site and office
- inspectors are using applications to directly annotate actions onto drawings and take photos to describe and document issues
- plumbers working on site are beginning to use mobile applications to find pricing information on the parts they need to complete a job, enabling them to provide better and faster estimates for their service to the building contractors

Quality, health and safety management

Since construction defects and building rework can cause costly delays, applications are being used to support quality management. Improving safety and working conditions for on-site workers is another priority for construction companies, with the use of applications to support safety management and reporting starting to emerge.

- construction staff are accessing quality and reporting systems on their mobile devices to identify and report on-site problems faster, minimising delays
- real-time reporting of safety incidents, drawing on functionalities such as the smartphone camera, can enable managers to quickly take corrective action and automatically create a documented audit trail

In the future, an increasing number of existing fixed vertical applications are likely to become mobilised. Examples include mobile applications that enable construction staff to perform analysis on site rather than having to return to the office, such as building throughput and risk analysis. Using a tablet with a larger screen size are one of the factors expected to encourage this transition.

Wider adoption of mobile applications in the Construction sector is likely to be driven from two directions. On one hand, application use is likely to be dictated by the level of uptake by large contractors who specify the IT systems used by subcontractors and wider partners during large construction projects. However, integration with existing industry standard software remains

a key challenge. On the other hand (as with the Financial Services industry) smaller companies are likely to drive use bottom-up, leveraging their flexibility and detachment from legacy systems.

Industry collaboration is further driving advancement. Industry-wide working groups are being formed, bringing together representatives from construction, technology and research organisations. The objective is to facilitate the business benefits from the adoption of mobile information and communication technologies in Construction, such as the industry-owned organisation “Construction Opportunities for Mobile IT” (COMIT).

For development, the device fleet choice is a crucial consideration. In the past, companies have used single-device, single-application solutions (such as PDAs). However, many companies are now considering the advantage of multiple applications on a single, smartphone/tablet device. This maximises return on investment through increased functionality, although these advantages need to be balanced against the need for robustness – with ruggedised device requirements remaining a key criteria.

construction success story: Salmson building component selection

Salmson has developed an application that enables plumbers and installers to access product information in the field.



Background

Salmson designs, manufactures, markets and maintains pump systems worldwide, with a focus on the buildings, water management and industrial processes. Products are distributed to plumbers and heating engineers who then install them for the building or site owners.

Challenges

For each job, plumbers and installers have to choose from thousands of products available from many suppliers. This means identifying a suitable circulator is a complex task, especially given new regulation on energy efficiency requirements⁹. This decision making process typically relied on paper, web or CD-based catalogues, which might not have been up to date or accessible from the field.

Solution

Salmson has developed a mobile application that allows plumbers and installers to better select and purchase circulators. For component replacement, the application helps find compatible

Salmson pumps for over 6,000 products (both Salmson and other manufacturers). For new installations, after collecting information about the project, product category and component requirements, the application suggests the best options from the catalogue. The application provides detailed specifications for each pump, as well as using smartphone geolocation features to suggest the nearest distributor. The application also highlights the most energy-efficient solutions.

The application is available for download on iOS and Android platforms. Salmson outsourced the development, drawing on support from external advisors and project leaders and an external software developer for application design and development.

Salmson has promoted the application through a variety of mechanisms. These include an initial press release, a dedicated mini-website, communication through industry bodies, specialist trade shows and targeted mailings.

Our application allows plumbers and installers to more easily select correct products and identify distribution outlets. It allows us to provide a better level of service to our customers, securing loyalty.

Hella Joudi

Head of Marketing, Salmson

Benefits

Benefits for plumbers and installers:

- the application provides easier and faster selection of products for product replacement and new installations
- it enables users to access vast catalogues of information on-site in a structured fashion and easier identification of local distributors

Benefits for Salmson:

- the applications improves their brand and image
- it serves as an incentive for customers to use Salmson products

Ensuring success

Salmson attributes the success of the application to two aspects of the approach:

- precisely defining the scope of the application at an early stage, including markets, end users and technologies
- working with a partner with a deep knowledge of mobile application design and development as application design constraints are very specific

⁹ The European Directive "ErP" (Energy Related Products) is set to dramatically impact the building market by specifying energy efficiency requirements

healthcare

Healthcare industry growth, increased focus on the cost of healthcare, changes in organisational models and the emergence of new technologies are changing the way healthcare is delivered.

Healthcare providers are using mobile vertical applications to make prescription management more accurate, increase information flow between paramedic teams and hospital staff, and allow easier performance tracking by management against targets. Ultimately these result in improved patient services.

- clinical workflow optimisation

- nursing staff can record patient data at the point of care and send it electronically to doctors on duty. This not only improves the efficiency of the nursing staff through a reduction in paperwork, but it also speeds up response times in a crisis and improves the accuracy of data. One report, for example, concluded that healthcare mobile applications attributed to a 31% reduction in manual errors¹⁰
- doctors are using mobile devices to schedule patients' laboratory tests, resulting in faster delivery of results through direct information requests
- senior specialists are using applications to facilitate cross referral of patients between hospitals and centres of excellence. For example, specialists at regional referral centres can use mobile applications to record advice given, answering the request and also automatically logging the advice in electronic patient management systems

- prescription management

- in hospitals, on-call remote pharmacy teams are using mobile applications to track drug stocks in other wards and provide information on potential alternative treatments
- doctors are prescribing drugs to patients wirelessly, drawing

on immediate access to patient-specific information such as patient history and other medications. This significantly reduces order fulfilment errors at pharmacies due to illegibility of handwritten prescriptions and also improves the productivity of the prescribing doctor

- paramedic teams

- paramedics are using mobile tablet devices to alert doctors in the hospital while en route. In such critical-care cases, where time is of the utmost importance, having detailed patient information can help doctors prepare for the patient's arrival ahead of time
- a major European city recently launched an initiative that provides volunteer first aiders with mobile devices and specific applications. Drawing on GPS functionality, when an emergency call is made, the location of the volunteers is assessed and a message is sent to nearby volunteers asking them to provide immediate first aid before the paramedic team arrives

- hospital management

- to ensure compliance with government performance targets, mobile applications are being used by hospital management to monitor key performance indicators in real time

There are a number of key trends that are expected to shape the future adoption:

- as the security concerns are addressed and device capabilities evolve, growth is expected in systems that integrate with in-hospital patient monitoring. Applications that enable a smartphone to serve as a remote ECG monitor, for example, may become

commonplace

- as IT managers want to maximise the value from their investments in smartphones, new vertical applications are being developed for these existing, multi-function devices that use mobile network connectivity, rather than previous Wi-Fi based, specialised devices

In terms of mobile vertical application delivery and implementation, partnerships are considered essential in the development of healthcare mobile applications, bringing together healthcare, hardware technology and software capabilities at the same time as ensuring regulatory and security requirements are met.

Healthcare organisations are now developing mobile vertical applications more quickly, flexibly and cost effectively. Rapid development environments are being used to quickly provide mobile access to existing back-end systems. For example, a hospital in the UK has adopted a system that enables them to quickly connect their smartphone device fleet to a range of bi-directional enterprise resources including performance indicators, out of hours staff management and referral management. The toolkits allow mobile access to enterprise data without significant coding or the installation of additional development frameworks. Applications can now be developed in hours rather than weeks, enabling in-house hospital IT teams to better meet the demand for new applications without an increase in team size.

¹⁰ Motorola Mobility Barometer Report: State of Mobility in Healthcare (2009)

healthcare success story: AirStrip and mobile patient data monitoring

Medical mobile applications are being used by healthcare professionals to view critical patient monitoring information remotely on their smartphone devices and tablets. This significantly increases workflow efficiency and the level of patient service and satisfaction.



Background

AirStrip Technologies is a medical software development company focused on enabling mobility in healthcare. They have recently launched a suite of healthcare-related applications that enable healthcare professionals to remotely access real-time critical patient data.

Challenge

Increasing pressure on healthcare resources means doctors face demands to multi-task and attend to multiple patients simultaneously. They cannot be everywhere at once – and there are many occasions where they must be temporarily away from the bedside. This means maintaining visibility on patient progress is challenging.

Historically, the doctor would either visit the patient themselves or, if this was not possible, have a nurse describe the information over the phone or send it via email or fax. The information was often low quality, not real-time, and only covered a limited number of criteria.

Solution & Benefits

Doctors, nurses and other healthcare professionals can now access critical information from patient monitoring systems remotely on their smartphones or tablets using a dedicated and customised vertical application. This enables immediate visual interpretation, collaboration, and more timely and appropriate patient care.

This technology is a tremendous advance in cardiac care. It affords a beautiful transmission of information that is easy to read.

Dr. Lawrence Lovitz
 Cardiologist, HCA JFK Medical Center

- **cardiology:** mobile applications are being used by cardiologists to remotely visualise waveforms (ECGs) and measurements. This supports enhanced analytics, easier visual interpretation, and serial presentation of current and historic tracings
- **obstetrics:** mobile applications are being used by obstetricians to monitor maternal/foetal waveforms (CTGs), annotations, exam status, medications, laboratory test results, logistical information, and progress notes to improve communication during labour and delivery
- **patient monitoring:** mobile applications are being used to monitor

other waveforms (such as SpO₂, ventilator, arterial line), vital signs, medications, intake and output, laboratory results, allergy lists, and patient electronic medical record data

The applications have a range of innovative features. For example, drawing on smartphone touch screen technology, the user can scroll through waveforms, review and compare past ECGs in high resolution up to a 20-fold improvement over paper tracings and PDFs, and access four times the data for analysis as required.

Connectivity to the hospital network may be accomplished through a standard mobile network connection, Bluetooth or Wi-Fi. Compression technology within the application means high-quality information can be transferred without a significant drain on bandwidth or battery.

The applications have already been adopted by hundreds of hospitals in North America.

The application can greatly reduce and even eliminate time delay in the clinical assessment and treatment of patients. The application drives efficient information flow among clinicians and strengthens communication and collaboration. Ultimately it enables an improved level of healthcare, as staff can make better, more informed decisions about their patients.

professional services

Professional Services employees provide expertise and resource capacity in diverse fields such as law, business strategy, accounting and human resources.

Regardless of the expertise they provide or the industry they serve, there is a common need to be able to quickly identify and convert potential opportunities, rapidly respond to client requests and ensure impactful, efficient project delivery with accurate, timely billing.

Mobile applications are potentially attractive to Professional Services companies due to the high level of workforce mobility, high reliance on IT/telecoms, need to differentiate existing services and be seen as modern, dynamic and technically advanced businesses. However, the use of vertical applications by Professional Services companies is still in its infancy. Like other sectors, the use of horizontal applications has increased in recent years, such as CRM used in management consultancy or digital dictation applications used by legal professionals. This reflects the predominantly horizontal nature of the Professional Services sector, with many of their needs being met by applications applicable to more than one industry.

However, it is only now that Professional Services companies are turning to the benefits associated with more industry-specific applications:

- **sales teams:** horizontal applications are being tailored to incorporate processes specific to a given industry and company. This is a similar trend to that seen in other industries, such as Finance and Insurance. Bespoke CRM applications are being used by Professional Services companies to develop proposals without the need to return to the office, instantly accessing key back-office pricing and market data. This leads to faster response

times and better client service. Additional customisation allows the application to be integrated with core business processes, resulting in increased functionality

- **workload and capacity managers:** bespoke applications are being developed and deployed for job scheduling, status tracking, timecard completion and billing. Real-time, two-way data exchange enables management to more efficiently organise and monitor their project teams, resulting in faster billing cycles and an improved cash flow
- **delivery staff:** applications are being used to track project delivery progress in real time, provide job requests while with the client and access proprietary information from in-house IT systems without the need to return to the office. This frees staff from the administrative burden, and enables them to spend more time in front of the client, leading to an improved level of service

The need, ability to implement and benefits of mobile vertical application adoption are underpinned by the functional area, industry focus and nature of the service offered. For example, businesses that are centred around providing information and expertise (such as legal professionals) are using applications to enable faster access to key information, whereas resource intensive, outsourcing companies (such as building facilities teams) are using applications for scheduling and workforce tracking to help manage complex staffing arrangements.

Development resources are sourced internally where possible, but companies

also draw on software developers and equipment manufacturers where needed or where it is more cost effective. Decisions are typically made on a case-by-case basis.

Deployment often involves significant focus on cultural change and embracing revised working practices. Some employees enjoy the sense of empowerment the new applications bring, while others find them intrusive.

Professional Services companies develop tailored employee engagement programmes to make sure these issues are adequately managed, which include employee involvement with the design, proof-of-concept stage and deployment stages, as well as employee training and awareness-raising sessions during roll-out.

Employee input into the development process is considered crucial. For example, some companies use internal innovation processes (such as internal innovation communications) to collect application ideas and engage employees in the development.

professional services success story: USG People and sales force optimisation

USG People has equipped its sales teams with a mobile application that optimises working times and improves productivity. The application frees employees from administrative tasks and gives them information about their activity and their customers in real time.

Background

USG People provides general and specialised staffing solutions, human resources, education and training in several countries across Europe. With revenue of €3.1 billion in 2010, USG People is one of the largest HR services companies in Europe with a wide array of well-established and recognisable brands. The company employs over 7,000 people and maintains over 85,000 client-based personnel.

The application has helped each sales representative increase productivity by 13%, which has added up to 11,000 additional sales calls annually and a net increase in annual revenue of €3 million.

Oriol Mas

Managing Director, USG People

Challenges

The sales process is a crucial part of USG's business. In the past, it was mainly supported with paper-based processes and was considered inefficient due to the constant loss of working hours because of trips from the office to the client and back again to retrieve business information.

Solution

To address the challenge, USG People developed a bespoke application called eMobile. The application provides the sales teams with real-time access to

enterprise data, such as customer contact information, sales history, pricing and inventory levels on their mobile devices. The integrated geolocation technology helps sales teams structure and optimise customer visit route planning.

Benefits

The application has delivered numerous benefits:

- better identification of customer requirements resulting in shorter sales cycle time and reduced operational costs
- faster deal closures with up-to-date account, inventory and order information – making the sales process more transparent and auditable
- quicker response to sales opportunities by accessing enterprise data and systems on the go
- call reporting completeness and speed of resolution for customer inquiries
- improved communication and collaboration between sales teams
- increase of commercial productivity and sales

Oriol Mas, Managing Director, USG People Spain Services, is positive about the benefits the application has delivered. "The application has made us a leader in innovation for business process improvement."

Ensuring success

According to Oriol Mas, "The main challenge was to implement mobility

as part of the day-to-day work, with success that we can measure and in a profitable way. When the application was developed, a group of the 'best performers' were asked to collaborate in the design process. The application was therefore conceived to integrate all the best practices that help these individuals outperform competitors."

The application has therefore consistently met all the expectations of the sales force, ensuring immediate adoption. USG People also worked closely with their clients, who supported the development and testing process.

retail & wholesale

In response to the recent economic climate, companies in the Retail & Wholesale market in Western Europe are diversifying to access new revenue pools and achieve greater in-store efficiencies.

At the same time, both branded goods manufacturers and retailers themselves are seeking to deepen their links with consumers (to protect market share). Mobile applications are already, and will increasingly, be used to support all of these strategic objectives.

Current examples of mobile application use within the Retail & Wholesale sector include:

- **logistics & inventory management:** common to any logistics-intensive sector, mobile devices are used to support the monitoring of logistics flow, support stock control and ensure timely delivery of products, both to stores and to consumers directly (home/office delivery services)
- **shop floor management:** mobile devices are being used by shop-floor employees to obtain real-time data on warehouse inventory levels for particular products or alternative models/sizes that may not be on display, so they can recommend alternatives without the need to leave the customers. This facilitates stocking, as employees can scan required items and automatically generate a list of items for refilling
- **auditing and quality management:** as pressure for accountability and visibility increases, retailers and wholesalers are looking to reduce overhead. Mobile applications are being used to replace legacy paper-based systems. The applications allow direct, real-time, verified data collection, which significantly reduces administrative burden, reduces potential reporting errors and increases process efficiency

- **digital couponing:** providing promotional coupons and special offers from branded manufacturers to consumers, often in conjunction with other enabling parties (coupon clearing houses), supports the sales volumes and brand promotion of many key manufacturers
- **mobile payment:** retailers are keen to further reduce transaction handling times (thus maximising “browse time” spent in store), and gain even deeper insights into consumer preferences. In-store mobile payment services increase through-till efficiency and out-of-store payment for virtual goods, eliminating bricks & mortar retail costs entirely
- **product information provision:** these applications allow partners to exchange relevant product information and focus especially today on dietary, allergy and ingredient information within the food & beverage retail sector. Increasingly, sustainability, carbon footprint and warranty information for a wider range of products is now falling within the scope of such applications
- **product price comparison:** mainly a consumer application, but of significant interest to retailers, PPC applications are increasingly offered to consumers in retail stores

Emerging trends point to some key areas to monitor in the retail sector in the future. For example, some retailers are now enabling free in-store wireless (Wi-Fi) access networks to facilitate such application delivery to, and use by, end consumers. This includes those competing on a “price value-based” strategy – supporting price comparators

– and those seeking to increase dwell time in single-brand stores.

Capital scarcity remains a key barrier in the highly competitive Retail & Wholesale sector, resulting in mobile application initiatives being pioneered by the largest retail players (who bring economies of scale) and branded manufacturers (who are keen to deepen end-consumer touch points to retain market share).

For consumer-facing applications, application portability across devices and application usability remains a challenge, since the retailer has low predictability and no control over the type of end-user devices and needs the service to be useable for all customer types.

While many applications deployed within the retail sector focus on consumers, their end-to-end delivery increasingly involves multiple parties (manufacturer, wholesaler, retailer) to derive maximum benefits. This encourages cooperation within specific supply chains, but also more widely within the sector through industry forums and standards-related initiatives (relating to areas such as product information, barcodes and Near Field Communication).

retail & wholesale success story: GS1 and mobile digital couponing

GS1, working with numerous players involved with the retail industry, is pioneering a standards-based process for the setup, communication, validation and reconciliation of digital coupons. The standards will eventually allow retailers to accept digital coupons from multiple distribution channels and process them in a uniform manner, simply integrated with the POS equipment.

Background

GS1 is an international not-for-profit association with members in over 100 countries. The association is dedicated to the design and implementation of global standards and solutions that improve the efficiency and visibility of demand and supply chains globally and across sectors. The GS1 system of standards is currently the most widely used supply chain standards system in the world. GS1's technology teams are active in coordinating the implementation by the retail industry of mobile applications based on their standards in many markets.

Challenges

The Retail & Wholesale sector depends on the production, delivery, sale and exchange of billions of products every working day, with ever increasing complexity of product specification, attributes and path of delivery. Against this background, branded goods manufacturers, together with other partners, are seeking to deploy Digital Couponing services that bring product, consumer and time/context-specific promotions to the market across a broad range of products. To achieve this, unprecedented levels of cooperation are required, with integration and information exchange between different organisations.

Solution

The standards being developed by the GS1 Digital Couponing work group, composed of representatives of many organisations (for example in Belgium,

working with Carrefour, Delhaize, Nestlé, Sara Lee, Unilever), consists of five mobilised business processes:

- setup and communication of the coupon offer by the brand house to the Digital Coupon Enabler (DCE), so that the coupon is then accessible by the consumer
- the consumer then has knowledge of the offer (through a mobile device)
- the consumer then presents the offer at a retail store for validation
- the retailer checks back with the brand house and validates the offer for the customer
- brand owners can execute offers in the same way in multiple countries and with multiple retailers and can have more relevant/targeted campaign opportunities tied to specific factors (location, consumer, etc.)
- retailers can accept digital coupons acquired from multiple distribution channels and process them in a uniform manner, simply integrated with the POS equipment
- mobile operators/solution providers will have a single standard to implement and support
- consumers will have a consistent experience when they use coupon offers (digital coupons are searchable and sortable, allowing customers to browse by merchant, category, offer date, and other criteria, across a wide range of supported devices) and can redeem them more efficiently at POS

According to GS1, “We’re looking at the usage of mobile handhelds for distribution and redemption of digital coupons. The plan is to come up with standard protocols across various industries that will support a number of different devices and platforms.” Once developed, companies will be able to develop standards-based solutions leading to a range of benefits compared to proprietary solutions available today.

Benefits

Compared to the traditional paper-based barcode coupon systems in place today, this system will offer benefits to many parties:

Ensuring success

There are two key areas that ensure success of the project:

- the ability of the industry to set aside day-to-day competitive differences and work together to establish a common standard for the application
- technological solutions to put the service in place, where interoperability of both user devices and the retailer POS with the platform present significant challenges given the scale of potential deployment

retail success story: PMT and marketing service offering improvement

PMT, one of the pioneers in merchandising and marketing services, has developed an application to help conduct market and customer surveys and reports on behalf of the retail industry more efficiently. The application is used to communicate with employees and clients – mainly hyper and supermarket suppliers. The application is also used for reporting in accordance with the client's needs. By equipping its 2,000-strong workforce with the application, they have significantly increased their productivity and reduced operational costs, while meeting their mobility needs, and are starting to develop new services that utilise the application.



Background

PMT Marketing System is one of the pioneers in merchandising and marketing services in Poland. They provide a range of services to retailers and retail suppliers in order to support sales activities and brand creation processes. They operate nationwide with their services currently being rendered in over 500 hyper and supermarkets as well as cash-and-carry warehouses. They support their clients in all the strongest retail brands.

Challenges

PMT conducts extensive retail market and customer surveys and reports in retail stores. In the past, surveys were handwritten and sent back to PMT to be synthesised into reports for their clients. Such reports then help the retail suppliers to better understand and predict the latest sales trends across their channels and adapt their marketing and branding strategies accordingly. Working for an increasing number of clients, keeping the workforce mobile as well as productive was already becoming a challenge for PMT. Moreover, the changing market conditions were adding additional pressure. With increasing competition in the market, retail suppliers were demanding short-time reports to

better predict demand and drive revenue increases. In order to remain competitive, PMT needed a solution that would offer better service to its clients as well as enhance PMT's internal productivity.

Solution

PMT equipped their entire 2,000-strong workforce with an application called Mobile Office, which improved their reporting activity whilst also enhancing the service offering to clients. Being fully integrated with the company's data systems, the application enables PMT's workforce to conduct market and customer surveys and reports with ease and report data back wirelessly to their headquarters.

Benefits

The surveys are now more detailed and can capture more information (e.g., photographic, store planogram and location information) than before. The application also provides collaboration tools, whereby PMT can ask clients to support part of the survey and easily combine the results. Being the only such mobile vertical application in the industry in Poland, Mobile Office has given PMT a significant competitive advantage and radically changed how the company conducts its operations. Some of the key benefits include:

- significant cost saving and increase in workforce productivity by elimination of the manual process of writing reports
- wider client coverage by the existing workforce due to increased business process efficiency
- improved collaboration and information sharing within the company

Ensuring success

After careful reviews, a full service partner was chosen to develop the application. This gave PMT the flexibility to work at their own pace and ensured that the integration of the application into the company's data systems was seamless. The choice to support all devices and platforms helped the adoption of the application, since employees didn't feel restricted to using company-owned smartphones. Since the application fundamentally changed some of PMT's business processes, employee training for the application was also a key factor in its success.

realising the opportunity

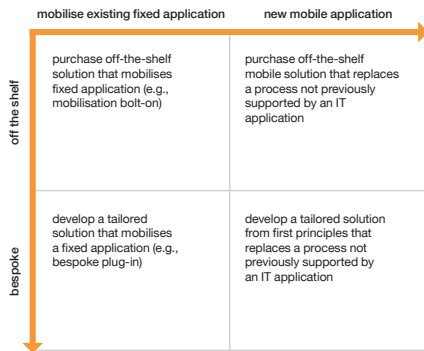


Fig 6: Mobilisation pathways¹¹

Setting the ambition

While there are many benefits of increasing the use of mobile vertical applications within an organisation, the potential complexity means a clear ambition and a sensible scope are vital for success. There are two key elements:

- approach to opportunity identification:** identification and selection of opportunities can be proactive (actively seeking them out) or reactive (responding to needs as they arise). Organisations are starting to shift from a reactive to a proactive approach, leading organisations having already appointed a “Chief Mobility Officer” to oversee a company-wide approach

- scale of the response:** organisations tend to focus on small-scale stepwise change (mobilising existing enterprise systems or small stand-alone projects), where significant internal IT infrastructure investment has already occurred (e.g., Healthcare, Financial Services and Construction). Alternatively, some organisations are undertaking a complete redesign of the system architecture and underlying processes. Organisations tend to be more radical when the mobilisation is occurring in parallel with wider IT transformation (as seen in Manufacturing or Professional Services organisations) or when the projects are part of a wider strategic initiative

		examples			
		platform	software	device	connectivity
choices	architecture	<ul style="list-style-type: none"> integration with existing databases and systems dedicated vs. shared 	<ul style="list-style-type: none"> off the shelf bespoke, tailored solutions modify existing 	<ul style="list-style-type: none"> single device with multiple applications (e.g., smartphone) dedicated single application device (e.g., specialised form factors) 	<ul style="list-style-type: none"> constant connectivity vs. off-line mode GPRS vs. 3G vs. Wi-Fi cost/ performance/ ubiquity trade-off
	considerations	<ul style="list-style-type: none"> architecture heavily dictated by security requirements and legacy systems opportunity for process redesign 	<ul style="list-style-type: none"> heavily dictated by legacy systems integration occurs where process closely linked to others stand-alone occurs where process performed in isolation 	<ul style="list-style-type: none"> off the shelf less involved, but offers less flexibility bespoke, the only option for many applications off-the-shelf becoming more common as a result of bespoke to commoditised transition 	<ul style="list-style-type: none"> legacy dedicated devices being replaced by multi-application devices dedicated devices still common in Construction and Manufacturing industries

Fig 7: Technology choices¹¹

¹¹ Source: company interviews and Arthur D. Little analysis

Development pathway

There are a number of development pathways. Some companies are mobilising fixed applications, while others are developing new mobile applications that replace processes that were previously not supported by IT (e.g., paper-based processes).

Companies also need to decide which development approach is appropriate: some companies are adopting off-the-shelf solutions, while others are developing bespoke solutions. One of the ways to consider the options is outlined in Fig 6 above.

- **vertical off-the-shelf applications:** these are applications typically provided by a commercial vendor. They fit specific processes seen in an industry and cover most (if not all) of the required technology components as a stand-alone solution
- **bespoke vertical applications:** these are purpose-built for an organisation's specific needs and may involve considerable amounts of custom development

While buying an off-the-shelf solution is often more feasible for a small business

or one that has fairly common needs, bespoke development can offer a more tailored solution and may indeed be the only choice available. However, off-the-shelf vertical solutions are becoming widely available and are being developed for more complex vertical needs, therefore an increase in adoption is expected.

Technology choices

Organisations considering investment in vertical mobile applications face a set of choices, outlined in Fig 7 above. The choices are ultimately dictated by cost, usability, interoperability, security and performance as well as the IT infrastructure already in place.

Sourcing the required capabilities

Once technology requirements are identified, a company must choose between in-house development, full outsourcing or using particular suppliers for key competencies. Each of these options has its own advantages and disadvantages as outlined below.

While overall industry factors can influence the choice of development

approach, company factors are often more important. For example:

- one major financial corporation successfully developed and deployed a bespoke mobile vertical application to automate its global sales teams. All development and integration was carried out internally, because the in-house team strongly believed that long-term competitive advantage could only be achieved by keeping all development proprietary and “under-wraps”. As adoption becomes more widespread, in-house development can also bring benefits of consistency across different projects, synergies and technology reuse
- another financial services company used a hybrid partnership approach to develop an application for its asset managers to access customer information on the go. The development of key modules was done internally, in order to control and retain knowledge about their core business processes and to keep customer data secure. However, since the in-house team lacked expertise in areas such as graphic design and ergonomics, they worked with a partner firm to address this

- a major manufacturer found, while developing a mobile vertical application to track their deliveries, that outsourcing the complete development cycle was the most appropriate option for them. Since they had well-defined requirements, it was straightforward for them to start a tender process for application developers. The company also needed a robust distribution channel for the newly-developed mobile vertical application, which the outsourced developer provided

Some organisations take a tactical approach to capabilities, deciding on the right approach for each project.

Others take a more strategic view, considering their long-term mobility aspirations and aligning in-house resources and organisational structure to ensure consistency between projects.

development approach	stated benefits	stated disadvantages	typical profile
1. in-house	<ul style="list-style-type: none"> ■ flexibility to accommodate future enhancements ■ employee involvement during design and testing phase ■ control and retention of knowledge about core business 	<ul style="list-style-type: none"> ■ limited ability to leverage external best practices ■ limited access to leading-edge technology 	<ul style="list-style-type: none"> ■ for organisations with a strategic need for mobility and strong internal IT capabilities
2. external support	<ul style="list-style-type: none"> ■ ability to bring missing expertise by partnering with niche players ■ help for internal staff to gain initial experience with app development 	<ul style="list-style-type: none"> ■ challenges of integrating modules developed in-house and by the partner ■ potential loss of ownership rights to the complete solution ■ risk of external knowledge transfer 	<ul style="list-style-type: none"> ■ for organisations in the early stages of mobile adoption that either lack any internal IT support or have limited expertise with the mobile vertical application development process
3. full outsourcing	<ul style="list-style-type: none"> ■ fast alternative for companies lacking in-house IT capabilities ■ consideration for specific software/hardware requirements 	<ul style="list-style-type: none"> ■ greater need for employee training to achieve similar adoption rates ■ lesser control over the design and integration 	<ul style="list-style-type: none"> ■ for organisations that prefer to stick to core business competencies

Fig 8: Benefits of different partnership options¹²

¹² Source: Arthur D. Little analysis

Ecosystem dynamics

Many of the decisions around when and how to mobilise are dependent on the wider supplier ecosystem. This can respond to demand, but also drive demand and catalyse adoption.

The recent rapid growth of applications used by customers was driven, in part, by the emergence of “app stores” that allowed consumers to access, download and use a vast range of applications with minimal effort. However, due to the industry specificity and often bespoke nature of mobile vertical applications, the supplier ecosystem is unlikely to evolve in the same way.

For mobile vertical applications, the ecosystem is characterised by partnership and collaboration – to support the required flexibility and level of customisation needed. Device manufacturers, network operators, system integrators and software developers are all responding to companies’ needs for mobility. However, rather than offering end-to-end solutions individually, partnerships and

collaboration amongst suppliers are common, with each supplier offering a part of the overall solution.

While projects typically have one party taking the lead, most mobile vertical application projects involve multiple parties to deliver the final solution. Software developers, connectivity providers, integrators or device manufacturers can take the lead role.

Key success factors for mobile vertical application development

The organisations deriving the greatest benefits from mobile vertical applications consistently identified the following key success factors during the development process:

1. **ensure employee involvement:** because vertical applications support or even reinvent core business processes, prospective users must be engaged in defining the requirements of the application, from an early stage and throughout the development process. For example, some companies identify

“application champions” that contribute to the design process and ease adoption by their colleagues through informal coaching

2. **develop a proof of concept:** this not only demonstrates the viability of the application but also helps test and refine the business objectives the application is intended to meet. A proof of concept can help give employees a real feel for the application before the full development starts. For example, one manufacturing company relies on small-scale pilots before wider adoption
3. **iterative “agile” development process:** because processes and application requirements evolve, an iterative and flexible design process can help track these changes and contribute to a significant improvement in the quality of the design and the final result. For example, one services company needed to develop several iterations of the application before the users felt it satisfactorily met their needs. Another company selects partners specifically on their ability to support an iterative design process

4. **focus on simplicity, usability and ergonomics:** applications need to be convenient and intuitive to get used – with up to a third of the overall development budget sometimes being dedicated to the user experience. A company working in the Finance sector makes sure its employee applications share similar interfaces to customer applications, as familiarity reduces the need for training. Other companies partner with ergonomic specialists to ensure success

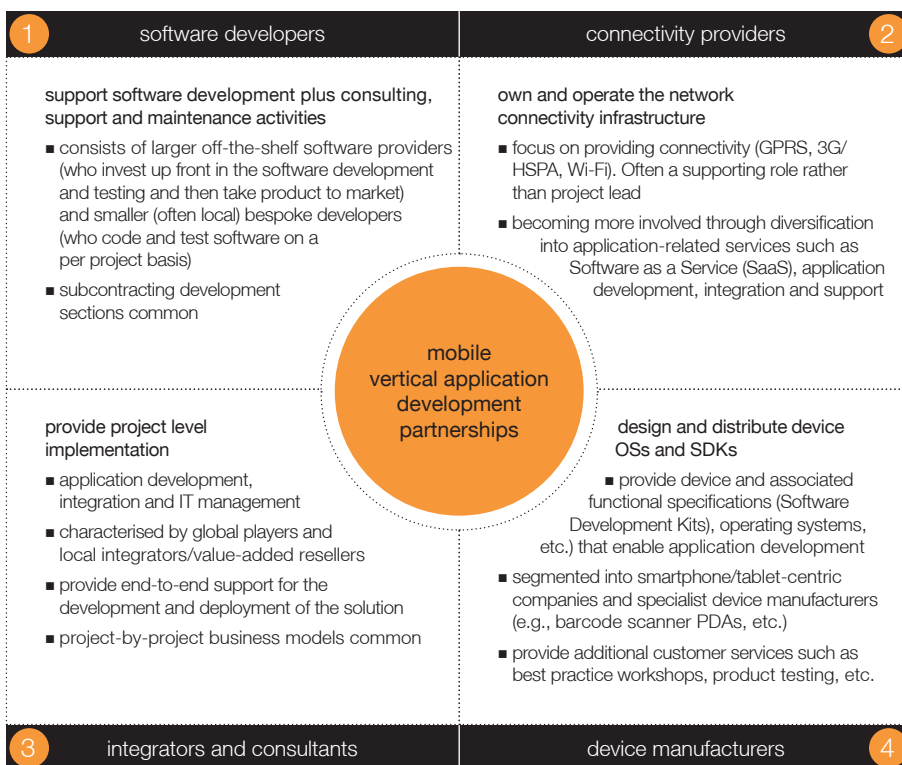


Fig 9: Key ecosystem players¹³

¹³ Source: Arthur D. Little analysis, company interviews

deciding to act

To recap, in the light of these real-world examples of the benefits and challenges, a company considering launching mobile vertical applications should consider the following questions from the outset:

- 1. rationale: how should I identify potential opportunities? Which business processes could deliver significant benefits if mobilised? How will those processes change as a result of the application? What are the benefits?**

Many of the organisations examined in this white paper demonstrably transformed working practices, eliminated inefficiencies and accelerated performance as a result of deploying mobile applications.

- 2. engagement: how do I engage the correct stakeholders, both internally and externally? Who owns the IT and mobility strategy? How can I engage the potential application users in the specification, design and implementation process? Who else's organisation is involved? How could I collaborate with them?**

Organisations struggle to drive internal adoption of an application designed in isolation or failing to meet usability expectations. Thus finding appropriate approaches to bring user groups into the design and usability testing stages is essential. Partners can bring economies of scale, fresh perspectives and potentially greater paybacks, but can sometimes add greater complexity.

- 3. pathway to mobilisation: what is the best approach for vertical application mobilisation? Should it be built on an existing fixed vertical application, tailored from a mobile horizontal application or should a new mobile application that supports a previously non-IT enabled process be developed? To what extent is integration with legacy systems required?**

Almost everything has been tried once already – successful companies find ways to access and leverage this. Working with external parties – peers, consultants, third-party developers, telcos – is one route to ensuring that lessons learned by others are not repeated at additional cost.

- 4. technology choices: what are the device, software, platform and connectivity requirements? Will the existing device fleet provide the functionality that the applications are likely to require? Where should I host the application and its data?**

There are many possibilities, but finding the right one requires expertise and careful consideration. The key is working with partners who have addressed these technology choices before and understand the challenges of deploying applications alongside business-critical legacy systems with minimal disruption.

- 5. capability: Do I have the skills and resources in house to develop, launch and maintain the application?**

There are many potential avenues – the path must be debated and selected with care. Detailed implementation planning and objective skill-gap assessment are essential to choosing the best path. Progressive development – “starting simple” – can mitigate this challenge if launching applications afresh.

- 6. return on investment: how can I convincingly demonstrate the benefits of the application? Will the applications deliver the intended benefits? Is the business case clear?**

Solid financial business cases create compelling arguments to ensure executive sponsorship and investment in mobile application deployment.

about Orange Business Services

Orange Business Services, the Orange entity for business, is both a telecommunications operator and IT services company dedicated to businesses in France and around the world. Our 20,000 employees support companies, local government bodies and public sector organizations in every aspect of their digital transformation. This means we're at hand to orchestrate, operate and optimize: mobile and collaborative workspaces; IT and cloud infrastructures; connectivity (fixed and mobile networks, private and hybrid systems); applications for Internet of Things, 360° customer experience and big data analytics – as well as cybersecurity, thanks to our expertise in the protection of information systems and critical infrastructures. More than 2 million businesses in France and 3,000 multinationals place their trust in us. See why at: orange-business.com or follow us on Twitter [@orangebusiness](https://twitter.com/orangebusiness)

about Arthur D. Little

Arthur D. Little, founded in 1886, is a global leader in management consultancy, linking strategy, innovation and technology with deep industry knowledge. We offer our clients sustainable solutions to their most complex business problems. Arthur D. Little has a collaborative client engagement style, exceptional people and a firm-wide commitment to quality and integrity. The firm has over 30 offices worldwide. Arthur D. Little is proud to serve many of the Fortune 100 companies globally, in addition to many other leading firms and public sector organizations.

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