

DIGITAL TRANSFORMATION DEPENDS ON EFFECTIVE IMPLEMENTATION OF INTELLIGENT SYSTEMS



aidrivers

Dr Rafiq Swash, Founder of Aidrivers

Most port operators recognise that digitalisation is going to transform the way ports work. But where to start on that journey? Digital transformation can sound alarming and somewhat overwhelming to many! As with any ambitious task, this is a concept that needs to be broken down into manageable pieces.

It's always worth going back to the basics. Don't feel pressured. Take a step back from the starting line and ask: Why should I embark on my digital transformation journey? What do I want to achieve? Am I at risk of introducing new technology 'just for the sake of it', without understanding exactly what is needed and what will deliver real benefits?

Digital transformation should enable port operators to optimise operations,

reduce costs and carbon, and ultimately create a self-aware operation and the autonomy that delivers safety, productivity, predictability and resilience.

BUILD FLEXIBLE SYSTEMS

At the same time, the digital solutions and systems – hardware and software 'integrated platform' – must in themselves be accessible, scalable and flexible to sustain progress in a rapidly changing world, or the port operator can end up with costly problems around future maintenance, scaling, upgrading, equipment replacement and potential lack of compatibility as technology advances. The systems chosen must be resilient and deliver a consistent quality of service for port operations. Without doubt, the

relevant technologies will continue to develop rapidly. Port operators' systems will need to adopt new tech with forward compatibility to grow continuously. Flexibility is vital to avoid getting locked into a rigid way forward that doesn't necessarily work in the future. In short, there are a lot of things the port operator must think about beyond just paying the money if they are to sustain autonomy in their business operations.

Never rush for digital transformation just because you have the funding for it or because it's 'the thing to do'. Every change being considered must be analysed and justified. Digitalisation must deliver benefits for the hard work and money that go into it – otherwise, why do it? Rationalise every step of the way.

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Sustainability is key and that encompasses several issues. It is essential that systems should work together – however, they should not be so integrated and interdependent that if one element fails, the entire operation goes down. Solutions should be scalable so that staging can be achieved without any downtime.

A digital transformation programme should allow for one piece of equipment to be introduced, then tried, tested and adjusted as required without operational downtime. A robust plan would then enable scaling up easily by spending 10 per cent of the first effort put in, without risk of failure or downtime. For example, at Aidrivers we will work on one vehicle to deliver AI-enabled autonomous operations – once that vehicle has achieved everything required, and has been thoroughly tested, the next step is to introduce the same, proven software to other vehicles, with zero downtime and risk.

With any technology project, the direction taken at the start will have a lasting impact – and not always in a good way. Hotels, banks and others that were early adopters of digital technology often got tied down into a certain system and platform which could then not easily be changed later, due to the need to change many things in the operations.

Port operators need to avoid being tied to certain systems which take away freedom to expand and adjust in the future. It’s vital to retain autonomy on any technology and system upgrades because today’s technology will need to be upgraded or further improved to accommodate the digital growth. Look at it from the ‘traditional’ point of view. All ports have more than one brand of equipment and humans are themselves ‘platform agnostic’ – they can operate any equipment. Technological solutions must have that same advantage. There is a reason why Software as a Service (SaaS) is out there; it provides an effective model for providing the latest software support.



System agnostics will be key in the future, giving sustainability, scalability and resilience and protecting the port operator from systems or suppliers that don’t keep up with your needs.

As a result, there is no need to tie yourself down to a particular equipment supplier which seems to offer everything in one package – because if you later want to change anything, you may have to change everything or many things (and vice versa).

IS DE-COUPLING POSSIBLE?

Understand how much de-coupling you can do – for example, between vehicle and crane, crane and software, software and fleet system. It might sound easy to hand it all over to one company doing everything so they can take the full ownership and responsibility, including software, crane, operational optimisation and so on, in order to get things up and running. However, as your operations progress, you may find yourself constrained in your next choices.

Understand the foundations and dynamism of any provider. If a sensor requires replacing in five years’ time but the company is no longer producing it, you may have to pay a premium amount to get a solution that works or is compatible. Bear in mind that longer equipment lifetime is a key element of any commitment to sustainability. Having stuff that lasts and can be simply fixed is an obvious priority. This is also an important

element for technology providers which need to provide a system with future compatibility or scalability without re-doing everything.

Not tying yourself to one solution or provider will also build in resilience. It is no coincidence that ports generally have more than one brand of vehicle or crane in their fleets – it spreads the risk.

Of course, knowing when you can work with a sole supplier and when you cannot is an art in itself. Integration of equipment and systems is a matter of finding the right architecture to enable multiple systems to work together. One of the beauties of the ports industry is that the variants are minimal; basically, operating software and equipment such as cranes, trucks, etc. You can probably count the different components you need to put together on the fingers of one hand.

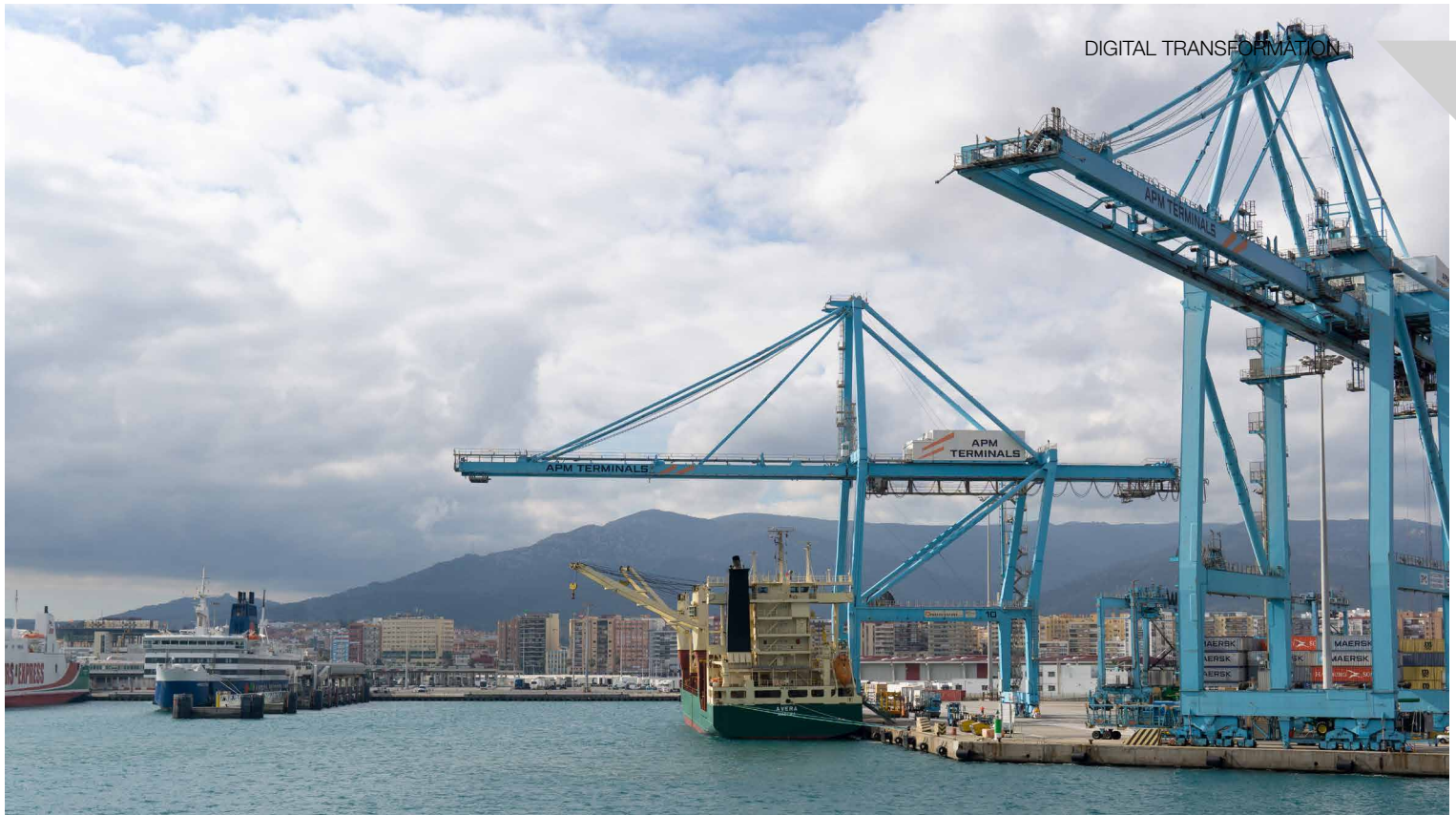
Effective integration will ensure that all systems work together – but also that they can work without each other where possible or applicable. If one particular vehicle or crane fails to work, this should never lead to the downtime of other equipment. There is plenty of advice available from port design and optimisation consultants.

FORWARD-THINKING

I would also emphasise that digital transformation is not just about technology being implemented that are compatible now – it is making sure those technologies



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are forward-compatible. What if new equipment is being brought in that requires interfacing? Can this work with the system?

There are two big themes in the maritime world right now – the push for digitalisation and, above everything else, the drive for decarbonisation. AI and machine learning will play a huge role in the industry’s journey to Net Zero. In the past, optimisation came out of knowledge and experience. Someone who has managed a port for years will have the expertise and knowledge regarding how many drivers are needed on a shift, what the likely pattern of traffic is, and so on. Artificial Intelligence (AI) will provide the detail and real data that has not been available before – and some of it may well bring surprises. In future, machine learning will be applied to data to identify unseen patterns and generate a model for complex problems with far more accuracy. It will pinpoint areas of waste – however tiny, they add up. It will make clear where savings can be made in time, fuel and costs. One of the easiest ways to reduce carbon emissions is through energy efficiency – that will come from effective machine learning and green energy engineering.

COMPLEMENT WHAT YOU HAVE

There is no question that port operators are very conscious of the opportunities

presented by digital transformation, including through AI, autonomous mobility, simulation and digital twins, and they are more open to new technology than ever before due to continue servicing the global supply chain. They want to see how this new tech can help them and that is really positive.

Those ports that take the first steps will indeed be ahead of the game – as long as they factor in the ability to stage this digital journey and the ability to scale up without downtime or tying themselves down to a specific system.

I am only too aware of the wealth of knowledge and experience held by port professionals who have spent 30, 40 or 50 years in the industry. They know how a port works. They understand the priorities and pressures. That expertise must not be waved out by the digital transformation! Any new systems must not replace but complement their valuable operational knowledge.

This isn’t a sprint to the finish line – this is a long journey. The ‘winners’ will be those that deliver well thought-out, carefully implemented, sustainable and scalable digital technology that complements and builds on current operations and the skills and experience of those who have been immersed in the industry. An unbeatable combination!

ABOUT THE AUTHOR

AIDrivers’ founder Dr Rafiq Swash of Brunel University London contributes to international research in AI, visual information search and retrieval, computer vision, 3D sensors, predictive data analytics and automation. Professionally this has expanded into further international leading collaborations in connected robotics, AI-enabled automation, sensor intelligence and fusion, digitisation and behaviour and pattern modelling.

ABOUT THE ORGANISATION

AIDrivers provide specialised AI-enabled autonomous mobility solutions for port terminal automation that meet the needs of port operators. The company is working passionately to address industrial mobility challenges by optimising industrial operations and improving the quality of service towards a sustainable future.