Digitally transforming EPC brownfield project execution with AWP: Applying the ADKAR change management model for scalability and improved uptake

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1   Abstract

This paper proposes the use of a recognised change management tool to significantly improve the successful adoption of digital technology and improve the rate of returns in project delivery.

A brief literature review confirms the low levels of digital adoption in the Energy Industry, particularly where the solutions overwhelmingly focus on technology, overlooking the people element. This paper argues that the human element is critical to success and that the adoption of a change management process will unlock easy-to-correct oversights in digital deployment. Importantly, the change management approach proposed by this paper is agnostic; anyone can use it to improve the uptake of any digital transformation regardless of industry, sector or service line.

This paper relies on a substantive case study to add context to the proposed change management approach. This case study revolves around a digital partnership that introduced Advanced Work Packaging (AWP) solutions across 28 brownfield project sites. Brownfield projects in the construction phase are a recognised area of project delivery where low rates of digital adoption prevail, and digital maturity remains stubbornly below benchmarked industries (Deloitte, 2019).

The application of a proven change management tool, coupled with the notoriously challenging business context of brownfield development, provides insights into unblocking hurdles and improving rates of digital adoption for any industry and service. As a direct outcome, through implementing these lessons learned, the reader can expect a greater return on investment from their digital transformation programme.

2   Introduction: The Digital Adoption Dilemma in Oil & Gas

> "The barrier to adoption [of new technological solutions] at a personal level is lower than at an organisational level, and once it is part of an individual's 'way of living', there is an increasing need for it to be part of their 'way of working' too." (OEUK, 2023)

The Oil and Gas (O&G) sector is notoriously one of the lowest on the digital maturity scale (Deloitte, 2019). Case in point: in late 2019, the 28 separate project sites throughout the United Kingdom Continental Shelf (UKCS) that form the basis of this Case Study were relying on traditional, paper-based processes. O&G companies continue to be slow in deploying digital technologies at scale. A recent survey report identified three reasons why digital adoption in O&G faces challenges (OEUK, 2023):

1) The prevalence of legacy systems.
2) Complexity of the industry.
3) A risk-averse culture.

These overarching barriers point to cultural and organisational issues that impede the progress of digital transformation in O&G, limiting the industry's ability to fully capitalise on the benefits offered by digital technologies. In fact, embracing digitalisation with a combination of technical and people solutions stands to save the sector trillions of dollars, yet onsite digitalisation of construction execution in O&G remains largely stuck in the pipeline (Deloitte, 2019).

While many O&G companies have initiated digitisation projects in an attempt to streamline workflows, improving construction and operations and maintenance efficiencies, around 70 percent have not progressed beyond the pilot phase (Hansmann et al., 2022). Many of these pilot projects have been successful, however, in achieving their technical goals. So, the issue is not the technology itself. Instead, the research points to cultural and organisational barriers that interfere with the successful uptake and scalability of digital technologies.

The main organisational and cultural barriers to successful digitalisation of O&G were identified as follows:

- The digital technologies and use cases of these technologies do not consistently demonstrate clear value, so people aren't fully convinced of their benefit.
- Employees tasked with using the technologies may be resistant to change, even if managers support the digitization.
- Companies often neglect considering how new digital tools integrate with their existing systems, instead onboarding these new tools on an isolated project-by-project basis.

At its most basic level, digital transformation (often abbreviated "DX") is the process by which paper processes are replaced by digital tools and systems. Dependence on paper-based information to manage both greenfield projects and brownfield asset maintenance and upgrades results in extra costs, lost productivity, a lack of resiliency, inefficient communications, convoluted workflows and supply-chain management, as well as unsustainable practices. Successful adoption of efficiency-seeking methodologies such as AWP and digital tools therein can[1]:

- Reduce time spent providing key project data to clients by 50 percent.
- Reduce offshore administrative time and ensure accuracy and control of paperless, workflow-based digital work packs, material management and progress monitoring.
- Shorten the closeout schedule.
- Deliver a high volume of wide-ranging brownfield modifications on schedule and within budget.
- Fast turnaround to replace critical pipework to ensure continuous operations.
- Eliminate a 7-to-14-day turnaround time for paper work packs to reach an offshore asset[2].

Successful digital transformation demands alignment of people, processes and technology. Organisations, especially in O&G, tend to focus on the technological more than the human component. Yet, the people component is a ubiquitous pressure point. As users of new technological tools, people need to change mindsets, develop new skills, embrace new processes and alter established working practices. Without the right incentives, desire and support, employee buy-in becomes challenging; adoption rates will be low and the return on investment will be poor. For example, there was a pivot point when drivers started adopting SatNav as a replacement to less efficient, outdated navigation methods. This point came when a desire to be more efficient trumped fear of change.

This paper argues that to maximise the return on investment of new technologies, there should be as much focus on how the end users adapt to the technology as there is on the development of the technology itself. To do so, a recognised organisational change management programme can be an invaluable tool to convince, educate and empower end users so that the digital transformation delivers maximum return on investment.

The digital partnership responsible for this paper selected the ADKAR Model of Change Management (Section 3.3) to understand where and why both successes and failures occurred at the onset of digital transformation journeys across 28 separate brownfield project sites, enabling decisions to be made to increase the likelihood of uptake and, ultimately, scalability.

After all, digital transformation is nothing if not a change management programme and there are fully developed and vetted tools that can be applied in this vein. Recognition of the human element as the stumbling block to a successful digital transformation strategy enables solutions such as the right change management model to come to the fore.

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[1] https://www.petrofac.com/services/our-work/brownfield-modifications-uk-cygnus-neptune-energy/
[2] https://blog.mods.solutions/what-are-work-packs

3   Background

Digitalising brownfield project delivery at an organisational level has historically proven elusive, particularly during the construction phase. Through the introduction and implementation of a software solution to digitise and digitalise work packs, materials management, completions and reporting across a portfolio of 28 separate brownfield project sites, this paper aims to demonstrate:

- The novel use of Advanced Work Packaging (AWP) in a brownfield context.

- The essential nature of human-informed user interface / user experience (UI/UX) development.

- The transformative uptake and scalability of technology when applying the ADKAR Model of Change Management.

Combining deployment of technology with ADKAR provides a roadmap for improving the uptake on any digital project delivery transformation. This paper offers guidance on how to best manage change to optimise the uptake and scalability of digital systems to increase construction efficiency. This requires understanding of three background concepts, elaborated upon in the following sections:

1. Advanced Work Packaging (AWP) for Construction Efficiency (Section 3.1).

2. Brownfield Assets versus Greenfield Projects: Unique Challenges (Section 3.2).

3. The ADKAR Model of Change Management (Section 3.3).

3.1   Advanced Work Packaging (AWP) for Construction Efficiency

The first of the three background concepts is AWP.

> "[An] industry best practice that begins during early project planning and spans the entire project lifecycle. AWP aligns engineering, procurement, and construction to improve overall project performance by filling the gap between what design creates and what construction needs to execute work. Gain visibility into project details by supplementing design models with schedule resource, and construction related information."[3]

The traditional approach to project planning and execution is to plan the work and then work the plan (i.e. "left to right" workflows). Too often, plans are either overly optimistic or misaligned with how the work will be executed. Not having strong enough desk-to-dirt connections can lead to major project disconnections, costing time and money. To more accurately predict how the project will perform, the plan needs to be representative of how the work will be executed.

The requirement for a more predictable project execution was studied in detail by Construction Industry Institute, USA (CII) and Construction Owner's Association of Alberta, Canada (COAA), resulting in the Advanced Work Packaging (AWP) concept, which effectively reverse engineer's workflows from the desired endpoint (i.e. "right to left" workflows), striving for constraint-free execution. AWP is now considered an industry best practice for EPC projects.

With the advent of AWP and the digital solutions underpinning this methodology, efficiency no longer has to be the elusive white rhino of construction (Barbosa et al., 2017). Adopting new ways of overseeing, managing and executing construction and maintenance workflows can help tackle around 40 percent of global greenhouse gas emissions and save the global economy USD 1.6 trillion every year (Fairs, 2021; Barbosa, 2017).

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[3] https://www.construction-institute.org/resources/knowledgebase/best-practices/advanced-work-packaging

Many digital workflows – such as work packages, materials management, completions and reporting – throughout the lifecycle of a project stand to benefit hugely from digital AWP solutions and over-arching approaches that, at their most basic level, cut down on person hours, increasing efficiencies and saving money and reputation. When these processes are paper-based, EPC contractors, owners and operators all experience delays and reputational compromise, which cost time and money.

Seven innovative approaches were identified that hold the potential to increase the construction sector's efficiency by 60 percent, summarised as follows (Barbosa, Mischke, and Parsons, 2017):

1. Increase transparency.

2. Align interests and foster trust between and among stakeholders (i.e. contractors, owners, etc.).

3. Prioritise value engineering (i.e. standardisation and repeatability).

4. Improve procurement and supply-chain management.

5. Transform onsite execution (i.e. management systems, technical systems and mindsets).

6. Adopt digital technology, new materials, and advanced automation.

7. Upskill the workforce.

AWP methodology addresses construction efficiencies through the adoption of digital technology and other tools to increase transparency and trust. AWP aims to optimise time, materials and value, revolutionising construction execution with a predetermined course of action that is clear, accessible and flexible to real-time conditions. Simply put: AWP covers all of the above-mentioned seven recommendations to increase construction efficiency, which is both an essential and significant step-change in the brownfield context.

To date, AWP has predominantly been applied in the greenfield project context and as such the tools and systems have been designed to serve that market. Whilst brownfield projects often follow the principles of AWP, this is predominantly not achieved in a digital environment. A brownfield project will benefit from this digital AWP approach in a similar manner to a greenfield project, but the digital tools need to be well suited to this particular delivery model.

This paper uses the adoption of AWP tools in a brownfield project setting as a challenging test case for the hypothesis of this paper, namely that in order to accelerate digital adoption a change management tool is required in conjunction with the introduction of technology to ensure the human element is emphasised.

3.2   Brownfield versus Greenfield Projects: Unique challenges with respect to AWP

The second of the three background concepts is the difference between brownfield and greenfield projects in order to highlight some of the reasons why AWP has not been universally adopted on brownfield projects.

Table 1—Brownfield projects have different challenges than those for greenfield. Particularly when considering project execution with AWP software, there are key differences between the two project contexts as highlighted below:

Key Difference	Greenfield	Brownfield
Definition	Development of a new, untouched site	Development of existing site or property with pre-existing structures
Scale	Often larger than Brownfield projects	Often smaller than Greenfield projects
Design flexibility	More flexibility in design	Design constraints due to existing structures

Permitting and Regulations	Lower permitting hurdles	Additional requirements and permits
Operational Risk	Not applicable. Plant is not operational	Higher risk environment including working around live plant
Site access & constraints	Largely constraint free in terms of construction personnel at site and material laydown.	Often highly constrained in terms of construction personnel at site and material laydown
Planning detail	Less detail required due to lower constraints	More detail required due to higher constraints
Tools and systems	Company and Contractor free to choose and adopt latest technology	Often limited & inherited from the CAPEX and OPEX phases. More difficult for Contractor to blend existing tools with their modern preferred suite
Digital funding	Typically, a larger % of budget than brownfield project. More attractive due to scale	Typically, a smaller % of budget than greenfield project. Less attractive due to scale
Data and information	Often 3D digital models with common data environments	Often 2D CAD files as PDFs. As-built documentation not always robust and difficult to extract data and information

Existing AWP solutions have traditionally been used on large greenfield projects and have not translated easily to the brownfield project environment because documented proofs by Clients and Contractors in the brownfield context are rare.

Whilst AWP tools such as software used to manage key workflows including work packs or materials management can be used on brownfield projects, its implementation tends to face additional and different challenges relative to those of greenfield. Most AWP software typically relies on engineering data to be complete and up to date. Many existing facilities would need to be retrospectively digitalised, at least partially, for a brownfield project to be designed, planned for construction, and progressed during construction within a digital environment.

As a result, when carrying out a cost-benefit analysis on a brownfield project, many operators may desire a simple digital 3D model, and actively only maintain existing 2D documentation for their facility, especially when these move into late-life operations. The low adoption of digital tools in brownfield projects can be attributed to several of the aforementioned reasons but, broadly speaking, it is a testament to the inherent complexity in brownfield projects and the challenges in amalgamating archival asset and construction information with new. Further, whilst digital tools exist for use in the brownfield context, the approach tends to be more piecemeal and less holistic, owing to the relative value of brownfield versus greenfield projects.

While the level of detail and precision in work packaging may differ to those of greenfield projects, applying AWP principles can help improve coordination, communication and overall project efficiency. Because brownfield execution is typically smaller in both scope and capital versus greenfield, it is often constrained to utilising in situ methods, systems and processes.

Adopting AWP software may require additional effort and flexibility to adapt the digital tool(s) to the specific constraints and conditions of brownfield projects; but the potential benefits in terms of productivity and project performance make it worth considering. Whilst AWP principles and practices can be hugely beneficial for brownfield projects, adopting innovative processes and technology in the brownfield construction phase faces significant organisational, behavioural and cultural challenges, which this paper argues can be helped by applying the ADKAR Model of Change Management.

3.3 Brownfield versus Greenfield Projects: Unique challenges with respect to AWP

The third of the three background concepts is an overview of the ADKAR Change Management framework.

The ADKAR Model of Change Management aims to implement frictionless organisational change with a focus on outcomes. Applying broadly to business, ADKAR is a five-step process, as follows below (Malhotra, 2019):

1. **Awareness**: Draw attention to the need to change and convince that change is positive.

2. **Desire**: Cultivate support behind the change and convince that change is necessary.

3. **Knowledge**: Educate users on how to adopt and adapt to the change.

4. **Ability**: Arm employees with the skills to adapt to and uptake the change.

5. **Reinforcement**: Create a positive feedback loop where user input is valued and actioned, so users become ambassadors for the change, promoting a bottom-up approach for lasting, sustainable change.

The first two steps (Awareness, Desire) apply to the current status quo situation. The second two steps (Knowledge, Ability) apply to the transition phase. And, finally, the final step (Reinforcement) applies to the future scenario. Continuous improvement in a DX journey would view ADKAR as a continuous loop, when the future scenario is achieved a new set of outcomes are identified and the change management can act as a positive feedback loop as demonstrated in the below ADKAR figure:
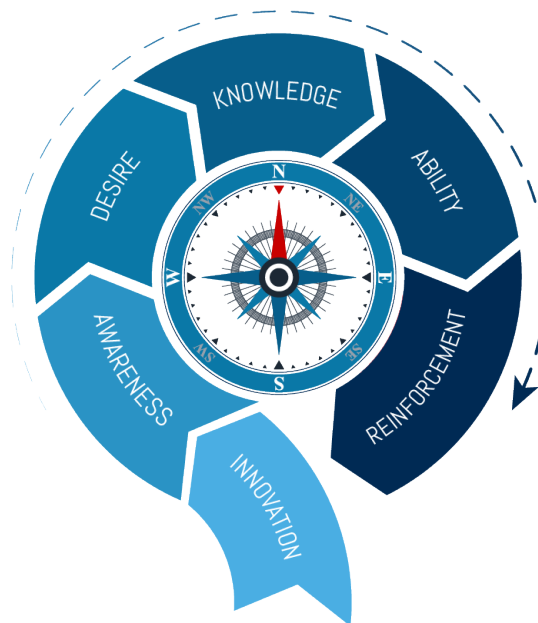

Fig. 1—ADKAR Model of Change Management continuous DX improvement

As per the ADKAR change management model, Awareness and Desire aim to move you out of the current state, where change is needed but has not yet begun. Knowledge and Ability occur during the transition, and Reinforcement focuses on the future. Providing organisations with a roadmap to the successful uptake and scalability of any new technological solution, AKDAR improves productivity, predictability and certainty of outcomes to create lasting cultural change in a DX process.

Note: Other change management models should be considered by the reader. ADKAR was adopted by the digital partnership responsible for this paper as it offered the most suitable framework.

Table 2—The ADKAR model was adapted for use in the case study that follows and is provided as follows.

ADKAR Step	Goal	Recommended Actions	Progress Monitoring
Awareness	Draw attention to the need to change and convince that change is positive.	Identify a fit-for-purpose solution. Create an evidence base for the benefits. Document benefits and value proposition. Communicate the need for change and present the evidence-based solution.	Regular meetings with effected staff. Define roles and responsibilities. Introduce the solution. Communicate throughout via different channels.
Desire	Cultivate support behind the change and convince that change is necessary.	Identify and appoint key leaders to roll out the solution. Key leaders to become ambassadors of change – convince them of the benefits with evidence, so they can convince their teams. Hold these key leaders to account and provide them with visible resources.	Train key leaders in the use, functionality and purpose of the solution. Business leaders and, in turn, key team leaders issue communications (both written and in-person meetings) to mandate use. Ensure resources are made available to teams/users, both written documentation and managerial. Take complaints about the transition seriously. Present evidence, encourage and help troubleshoot.
Knowledge	Educate users on how to adopt and adapt to the change.	Make training and material in different formats (online, written, person) available, consistent and easily accessible.	Orchestrate a training programme and issue standardised documentation. Track rollout in terms of materials, dates and people/teams involved.
Ability	Arm employees with the skills to adapt to and uptake the change.	Ensure all users are aware of their resources. Confirm effectiveness and establish a routine	Communicate support focal points and other resources. Communicate roles and responsibilities.

		for continuous improvement. Establish super-user groups	Conduct surveys to assess where improvements are needed. Monitor improvement suggestions, action and communicate solutions.
Reinforcement	Create a positive feedback loop where user input is valued and actioned so users become ambassadors for the change, promoting a bottom-up approach for lasting, sustainable change.	Encourage and reward use. Proactively identify supportive use cases to monitor. Continue to invest in improvements and communicate these	Monitor usage statistics. Identify pinch points. Solicit feedback from users and team leaders. Recognise and reward use. Document user cases by both project and function; reward best improvement suggestions and best implementation.

4   A Case Study in **Uptake** of Digital AWP Solutions Across 28 Brownfield Sites
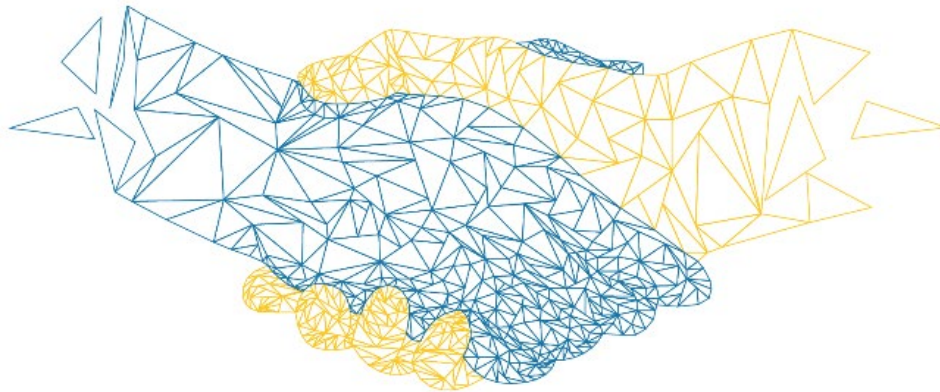
Fig. 2—Digital Handshake

A collaboration between a Tier-One Contractor and leading software developer specialising in EPC project delivery forms the basis of this case study in the uptake of AWP digital tools across 28 brownfield North Sea Assets. The 5-stage ADKAR Model of Change Management – creating Awareness, promoting Desire, providing Knowledge, increasing Ability and positively Reinforces the change for continuous digital transformation – was applied to understand adoption pitfalls and to recommend corrective next steps.

This case study in digital partnership started with analysing the existing digital approaches to four key workflows within a standardised brownfield project execution model: work packages, materials management, completions, and reporting. The cloud-based software packaged used to enhance the efficiency of these workflows introduced AWP methodology to the sites.

The software is technology agnostic, meaning that it can integrate with any archival digital system, whether off-the-shelf or proprietary, to import any and all legacy information. This makes both archival and current information accessible for all stakeholders throughout all project phases. From the contractor's perspective, brownfield projects can be delivered in the same repeatable manner; software that digitalises the primary workflows enables this value engineering to occur.

The software with digital work packs, materials management, completions, and reporting functionalities was offered to existing asset operators, the teams selectively agreeing the extent of the functionality that would be applied across the 28 sites.
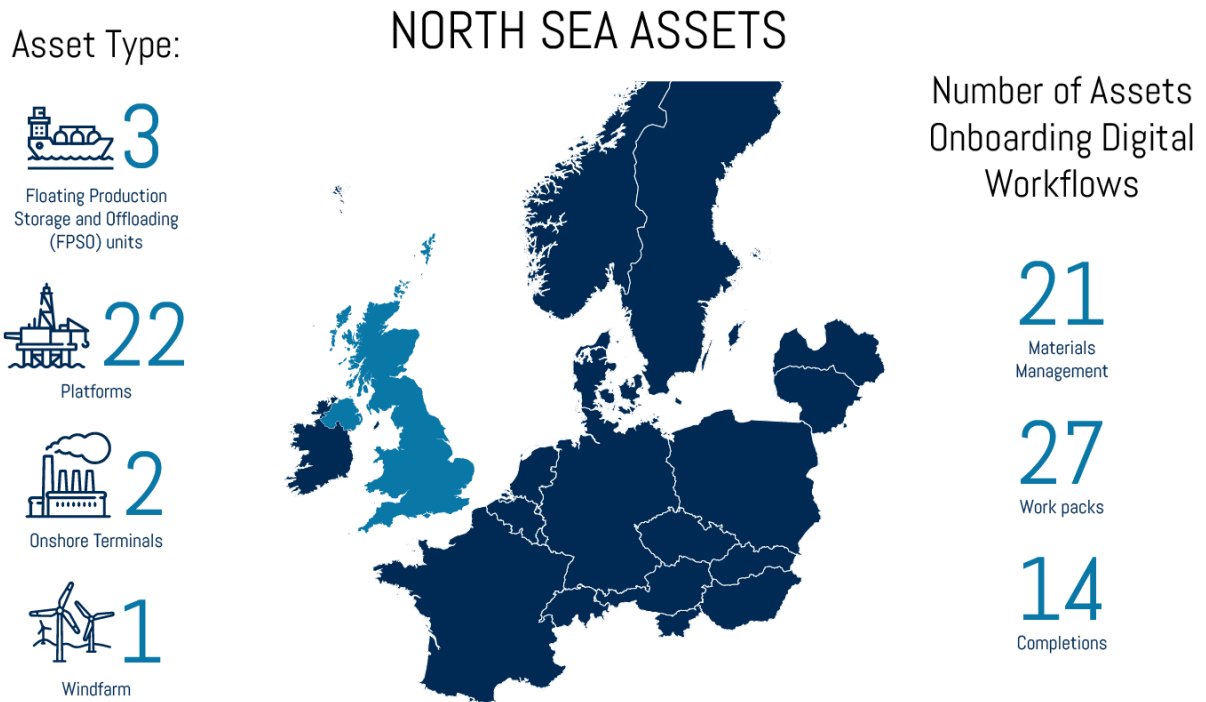
NORTH SEA ASSETS

Asset Type:

3 — Floating Production Storage and Offloading (FPSO) units

22 — Platforms

2 — Onshore Terminals

1 — Windfarm

Number of Assets Onboarding Digital Workflows

21 — Materials Management

27 — Work packs

14 — Completions

Fig. 3—Case Study categorisation of Assets

The 28 brownfield sites achieved varying levels of digital transformation. Two mini-case studies from either side of the spectrum were selected to identify reasons for levels of achieved uptake and to recommend next steps; a brief discussion comparing and contrasting the two selected examples follows.

4.1   Case Study 1: Stalled in a streetcar named Desire

Initial conversations with upper-level management were promising; they were receptive and even embraced the idea of adopting digital solutions. These higher-level strategic decision makers identified which projects and assets would initiate their digital transformation journey.

On the surface, Awareness (Step 1) around the benefits of digitalization to improve brownfield construction efficiency was propagated. This is certainly the case among upper-level management who also demonstrated a Desire (Step 2) to ready their team for a phased digital approach. However, for ADKAR to successfully advance an organisational transformation through the five steps, it's not enough for only some effected groups within that organisation to progress. All impacted parties must be active and willing participants through all five ADKAR states.
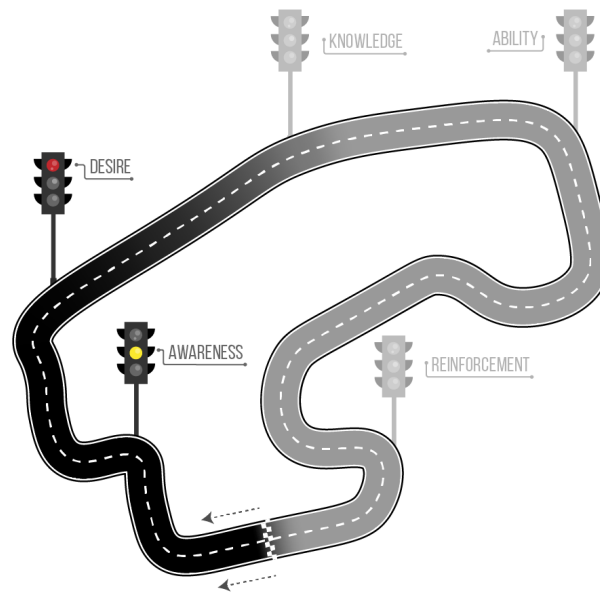
CASE STUDY 1

Fig. 4—Case Study 1

The stumbling block in this instance was in cultivating a Desire (Step 2) among middle management and engineering, who demonstrated far less willingness to change their current way of working relative to their upper-management counterparts. When looking at the digitalisation value chain, the stumbling blocks to successful adoption tend to be downstream, closer to the hands-on and regular use of, in this case, the new technological tool. Middle management and engineering, it turns out, expressed a reticence to adopt new practices because it changed the way they worked on a daily basis.

The reticence from middle management and engineering to adopt new digital processes reverberated back to the energy services company and EPC contractor, paradoxically creating more inefficiencies as the overseeing entity had to reverse course, changing their preferred processes to suit the client/owner. It became clear that the only way in which any digital system would be adopted by middle management and engineering would be to replicate the current paper system(s), which would obliterate the benefits of going digital in the first place.

Pushback to adopting the new digital solution also came from the client Document Control Department (DCC) who, similar to middle management, didn't have the Desire (Step 2) to change their current way of working. The lack of Desire to change throughout the organisation resulted in negligible uptake of the provided tool. The only element of the software that was used in part were the digital job cards (part of the digital work pack functionality), which were unnecessarily printed off, filed away in binders and referenced in the manifesting and shipping of goods.

To cultivate a Desire to change, a dual top-down and bottom-up approach is best. In this case, upper management were on board, but their Desire did not naturally trickle down to middle management. This needs to be an active process whereby a case is made for how the change will make people's jobs easier and improve their performance. It is middle management downstream through to the end users who will become ambassadors for uptake of a new system. Involving middle management in the decision-making process as to which software solution best solves on-the-ground workflow problems would have helped. Granting agency and choice can go a long way to generating Desire to change.

Table 3—Progress for Case Study 1 can be summarised as follows:

ADKAR Step	Status	Recommended Next Steps
Awareness	Yellow	Re-define roles and responsibilities and communicate through in-person meetings, emails and distribution of materials. Make clear that the change *is* happening. When this status progresses to Green, then advance to the Desire phase in earnest.
Desire	Red	Cultivate Desire, revert back to the Awareness phase. Ensure an evidence-base for the benefits. Clarify the benefits of the proposed solution. When this status proceeds to Green, advance to the Knowledge step.

4.2   Case Study 2: Full throttle with a committed digital transformation roadmap

Similar to Case Study 1, initial client discussions were well received by upper management. However, this time the client gave more control to middle management who were brought in and adopted the recommended standard. Unlike Case Study 1, Awareness and Desire were cultivated earlier in the process, which fostered an ecosystem of trust. The change management process, therefore, was rooted in that trust and, hence, a willingness to adapt. Upper management promoted adoption of the system and responded to middle management's request for training sessions. Owing to the timely communication, trust and encouragement, the asset owner demonstrated not only a willingness but Desire (Step 2) to look at changes to their current working practices in the uptake of a digital approach.
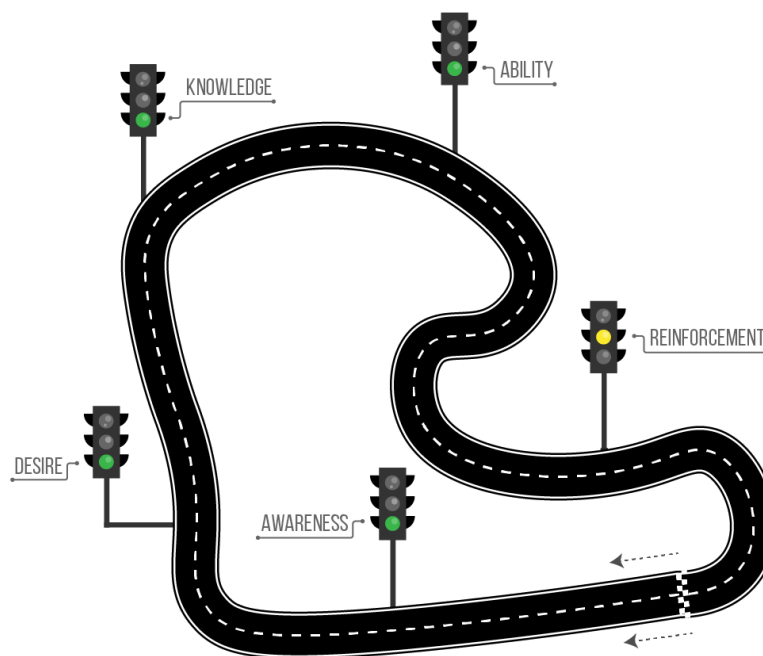

Fig. 5—Case Study 2

This case study made it all the way to the final Reinforcement stage of the ADKAR model. The client requested small customisation changes to the software that might help with overall team integration. Such feedback was sought out, effectively communicated and acted upon to improve the software according to user feedback.

The asset owner understood from the get-go that the adoption process would require patience and activation energy to overcome the initial stresses associated with initiating any workflow changes. But because the Desire was there, the client was prepared to invest in the totality of the solution to optimise return on investment. This included displaying a willingness to forge a digital path and a willingness to pay for onsite vendor support. This also included employing a specialist in a particular field to assess a system and help with its integration into their existing systems. The partners are now looking at the next phases of what can be achieved together.

Table 4—Progress for Case Study 2 can be summarised as follows:

ADKAR Step	Status	Recommended Next Steps
Awareness	Green	None identified
Desire	Green	None identified
Knowledge	Green	None identified
Ability	Green	None identified
Reinforcement	Yellow	Implement onside vendor support, as requested by users. This also included employing a specialist in a particular field to assess a system and help with integration. Small customisation changes to the software were requested by the client, to help with team integration. When new changes are ready, revert back to the Awareness phase of the AKDAR Model of Change Management.

4.3   Case Studies Discussion

The two mini-case studies represent opposite ends of the spectrum with regards to successful uptake under the ADKAR change management model. The first failed at Stage 2; Desire for adopting the change was not successful. The second, in contrast, succeeded in digitally transforming brownfield project execution with AWP because of the Ability to cultivate Desire and advance the ADKAR model.
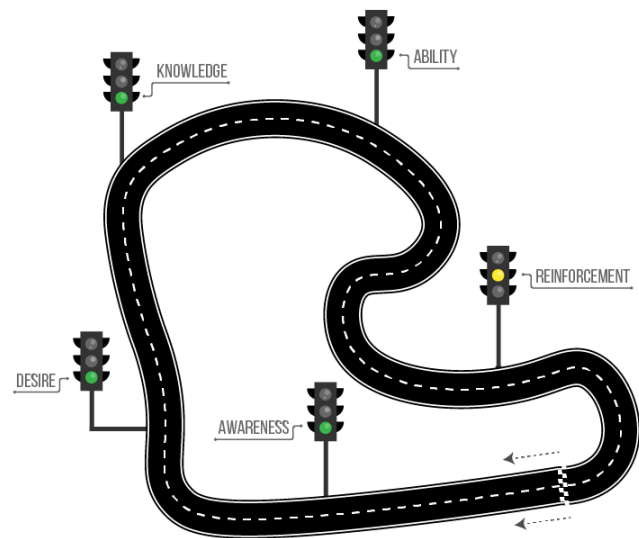
CASE STUDY 1
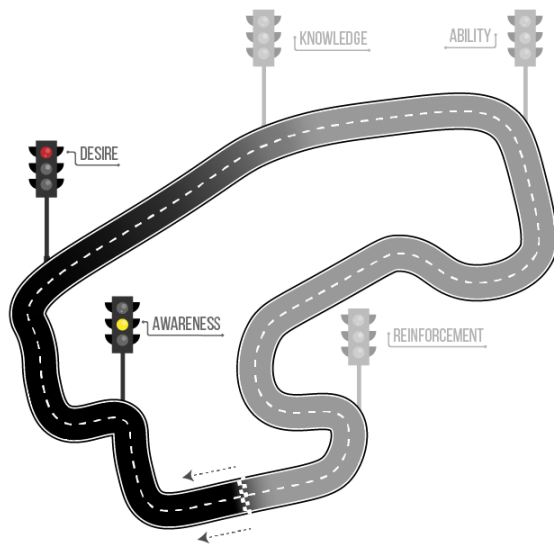
CASE STUDY 2

Fig. 6—Overview of the comparative progress of the two case studies under ADKAR

About 70 percent of change initiatives fail to successfully implement the change because of what, on the surface, appear to be obvious requirements such as lack of management support, lack of clearly defined and achievable objectives and poor communication (Bellantuono et al., 2021). As Case Study 1 demonstrated, change is never easy and, without Desire, the motivation to overcome the activation energy hurdle needed to learn new skills doesn't exist. The ADKAR model helps avoid these devastating pitfalls, shepherding organisations through successful uptake and upscaling of digital solutions.

Rather than look for solutions to an issue, such as changing current working practices to suit the digital adoption, the engineering and middle management in Case Study 1 put up barriers and held their stance because they simply did not have the Desire (and, hence, motivation) to change. Without the Desire for a digital roadmap, advancement stalls. A driver may have a dashboard SatNav in situ, but if the device isn't used then the driver will continue driving the only route they know, even if it's not the fastest, safest or best option.

Even though the second case study was considered a success, it is important to note that successfully managing change through a digital transformation has no endpoint. In fact, Reinforcement will cycle back to Awareness, creating a positive feedback loop built on continuous improvement to the new system and processes. This is how a digital change can be upscaled from one asset and/or project to a portfolio of Assets and/or projects. Particularly as mindsets and behaviours may differ even across regional teams, implementing change through the ADKAR lens – taking into account lessons learned from other sites and with other teams – will increase the potential for a truly sustainable, value-added digital transformation.

Applying the ADKAR change management framework emphasised the human element for successful adoption – Awareness and Desire are the foundation for successfully encouraging user uptake, converting even the most reticent people into agents of change. To ensure acceptance, understanding, and adoption of these digital brownfield solutions,

this case study in digital partnership demonstrates through ADKAR that it is crucial to prioritise user needs – a lesson that can be translated to any DX undertaking.

For those sites where uptake of the new technology was less advanced, the ADKAR change management model helped identify why this was the case. The recommended ADKAR action plan helps accelerate adoption by both office and site personnel, ensuring scalability and extracting lessons learned for successful EPC brownfield project execution in any context.

Given the strata of successful adoption of the new software, and despite other variables such as geographical location being controlled, feedback surveys were issued to users across the 28 sites in an attempt to understand where the user pitfalls to uptake and, eventually, scalability, lay. Personnel involved included; Construction Engineers and Managers, Project Managers and Offshore Construction Supervisors.

This qualitative survey highlighted successes but, more importantly, identified common pitfalls, which were collated into an Improvement Report. The ADKAR model was applied to the identified pitfalls to strategise a path forward, encouraging progress toward successful digital transformation.

Ten modifications to maximise the user interface and experience were identified and acted upon, which enabled the Knowledge and Ability of project teams to perform effectively. When coupled with Reinforcement strategies, these user-initiated changes enable a continual learning loop that maximises technology adoption and return on investment.

Returning to the SatNav metaphor: a digital dashboard tool replaced paper-based navigation methods, which significantly increased the ease and efficiency with which drivers can navigate unfamiliar roads. The AWP methodology with its tools provide a roadmap so that the end user can navigate brownfield project execution with reduced effort and in real time. But, for digital adoption to be successful, this paper argues that the end-users have at least as much impact as the technology itself.

Software re-development on the basis of qualitative user feedback proved essential to garnering support, fostering Desire among users, and improving user Knowledge and Ability through user-informed UI and UX improvements. It helped the software service provider deliver a more fitting digital solution and underpins the latest generation of software release currently being rolled out.

This approach is not a one-off, but ought to be a continuous process of improving usability of the software based on user feedback. Doing so kicks off a positive feedback loop supportive of ADKAR in that it nurtures Awareness, Desire, Knowledge, Ability and Reinforcement of the users who are the ultimate gatekeepers of successful uptake.

> "Focus equally on adoption and development. User adoption starts with developing great technology solutions that offer an excellent customer experience. But companies often underestimate all the additional elements of the business model that need to be changed to secure adoption…That end-to-end system approach, with a focus on the people side of the equation, is what differentiates digital leaders. They achieve this by making the business accountable for the end-to-end transformation of the domain. As a rule, for every $1 spent on developing digital and AI solutions, plan to spend at least another $1 to ensure full user adoption and scaling across the enterprise." (Lamarre et al., 2023)

The novel application of ADKAR in the digitalisation of brownfield project execution using AWP solutions carries transferrable lessons to the digitalisation of global project delivery. The phenomenal success of the now ubiquitous digital navigation (i.e. SatNav) systems sheds insights on the essential buy-in from end users in the successful uptake and scalability of efficiency enhancing technologies. This so-called buy-in is reflected in ADKAR's second step, which cultivates Desire for the change at hand. This paper identifies this Desire as a crucial pinch point in the uptake of brownfield AWP solutions.

5   Conclusion: User-centric DX supported by ADKAR for lasting cultural transformation

> "Even the most advanced technology can't achieve anything by itself. Value emerges as a combination of the tool and the people who operate it. Advanced solutions often fail not because they produce erroneous results but because the workforce doesn't understand, or trust, those results. That's why successful digital transformations take a people-first approach." (Hansmann et al., 2022)

People used to navigate while driving using paper maps and atlases. This would require either a passenger to act as navigator so the driver can focus on the road, or for the driver to study the route in advance and/or pull over frequently. In either scenario, navigation efficiency is suboptimal, wasting person and time resources.

Construction inefficiencies are much the same as paper-based navigation prior to the ubiquity of SatNav devices, which revolutionised a driver's ability to traipse uncertain areas. Specifically, brownfield construction execution in O&G is fraught with jerky starts and delays as contractors, operators and owners try to access, collate and understand fragmented information that is both archival and reflective of the current asset status.

AWP methodology with underpinning technological tools such as the software referenced in this paper, are for those responsible for brownfield execution like the SatNav devices that revolutionised driving. But the paper-to-digital transition is never easy. The inescapable truth is that technological tools such as industrial software solutions designed to capture efficiencies throughout construction projects are important, but it is the users who are the most important element to successful uptake and eventual scalability of the technology. The users determine whether or not available technologies are onboarded successfully and, if so, only then can at-scale benefits be realised. If SatNav wasn't easy and intuitive for drivers to use, it wouldn't have been a success, eliminating paper maps and atlases from the overwhelming majority of vehicles.

If the users are so important to uptake and scalability of technological advances, so it goes that a tried and tested organisational change management model, such as the 5-stage ADKAR model referenced in this paper, is useful to identify and rectify stumbling blocks, aligning technology, people and processes. As with the advent of SatNav and with the development of AWP software tools, technology may be an enabler of enhanced efficiencies. But, people, as users of these tools, are the eventual gatekeepers for seeing these efficiencies take hold. To do so, there must be a culture of: Awareness, Desire, Knowledge, Ability and Reinforcement.

We have proved this works for a highly challenging brownfield AWP environment and recommend the approach for all digital transformations.

For the end users of our digital partnership and our clients, there is great interest in the next generation of the AWP product being rolled out currently. A ground-breaking software solution will become even better. For us, we are starting the ADKAR cycle all over again!

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