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DIGITALISATION AT SEA: ALL HANDS ON DECK

In all industries and aspects of society, 'digitalisation' has become a watchword – an idea for directing the way that things are to be done. But people have quite different attitudes about this. How far should we go with digitalisation? What are the implications for human and system performance, and life more generally? In my own experience working on digitalisation projects and reviews with people in operational, technical, safety, and management roles, I tend to notice some distinct groups of 'like-minded people', each of which disagrees with one or more of the other groups. They don't see the world, with all its problems and opportunities, in the same way, nor on the best way to progress.

Related to this, Karnofsky (2021) recently proposed some nautical metaphors for the "different ways of working toward a better world", including the voyage of digitalisation. It is probably fair to say that each of us, and our like-minded colleagues, has different attitudes and favoured strategies when it comes to the development and deployment of advanced technology in operations. As you read on, you may even see yourself and others in one of the nautical metaphors below.

Rowing

Rowing involves helping the ship to reach its current destination more quickly. Advancing technology, or taking advantage of technological developments, is the primary focus, with an emphasis on speed. Rowing tends to be the preferred strategy of

technological solutionists, who have most understanding of hardware and software (e.g., engineers), are more familiar with it (e.g., operational superusers), or who favour digital solutions for other reasons (e.g., entrepreneurs).

Rowing is obviously necessary for progress, and to gain competitive advantage. As the saying goes, *"Time and tide wait for no man."* There are indeed advantages to be gained from the now-familiar cloud computing and speech recognition technologies, and less familiar artificial intelligence and virtual and augmented reality technologies. But we should not assume that all technological development is good. Hazards are harder to see at speed, and a focus on speed – like 'press-on-itis' in piloting – brings new risks. For instance, there can be insufficient opportunity or willingness for necessary checks and coordination. Overconfidence, simplifications, and assumptions can prevail. As multiple different technologies are developed and connected at speed, technological complexity grows, along with unintended consequences.

Steering

Steering involves navigating toward or away from a destination or points along the way. Steering tends to be the preferred strategy of *technological sceptics* and those with a more long-term and systemic perspective, who are not against digitalisation *per se*, but who question the claims of technological solutionists. This group tends to have

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more understanding of complexity and the wider context within which technology is introduced (e.g., safety scientists, complexity scientists, systems practitioners), but not always (e.g., policy-makers). The group is also likely to have a greater understanding of history and lessons from the past (e.g., major accidents or failed programmes).

From this perspective, speed is secondary to direction and route when it comes to advanced technologies. What might be the unintended consequences of advanced technologies, and are the intended consequences well thought out? Some of these consequences may only be evident after deployment, while others are more foreseeable, with the right expertise. Karnofsky argues that *"'steering' has become a generally neglected way of thinking about the world"*, as the primary focus is on rowing.

Anchoring

Anchoring involves holding the ship in place, or attempting to maintain the status quo. In terms of digitalisation, anchoring tends to be the preferred strategy of *technological conservatives*, who are more likely to oppose continued digitalisation or

see significant threats. But there are downsides to staying put. Karnofsky notes that there has been enormous change in the last two centuries and huge improvements in life quality for people (but not animals) on most known measures. There have also been remarkable improvements in safety-critical sectors with technological advancements.

So-called rosy retrospection – our tendency to recall the past more fondly than the present – can be problematic. Many of us seem to think the music of our youth was the best, and some have similar attachments to technologies and worldviews. We may even wish to row backwards (forming another strategy – *reverse rowing*).

But Karnofsky argues that a weaker version of 'anchoring' can be constructive: *"asking that changes to policy and society be gradual and incremental, rather than sudden, so we can correct course as we go".* As Frischmann (2018) wrote, an anchoring strategy *"enables critical reflection and evaluation of the technological world we're building".* Anchoring allows time to think about our steering and the pace of our rowing. This can be the role of several stakeholders, such as regulators, professional associations, the media, and academics in certain disciplines.

Equity

Equity involves working toward fairer relations between people on the ship. For any voyage, there are people with different characteristics on board. It is helpful for harmony and effectiveness if resources and opportunities are fairly distributed, and the right conditions exist for people to contribute their expertise. With digitalisation, equity may seem less obvious as a strategy, but many groups are grossly underrepresented not only as employees but (and partly by consequence) in the products, as their needs are not met. This is eloquently explained in the context of big data by Caroline Criado Perez in her intensively researched book, *Invisible Women*.

The agile-minded approach

So which is the best approach for our voyage of digitalisation in safety-critical industries? The answer is "none", or rather, "it depends". As Karnofsky remarked, *"The details of where the ship is currently trying to go, and why, and who's deciding that and what they're like, matter enormously."* And there are also details that matter enormously about where the ship is now, who is on it, their expertise, and the many contexts of work (technical, physical, environmental, social, cultural, regulatory, etc.). Crucially, people's

expertise concerns not only technology but also fields such as operations, complexity, systems, change, diversity, resilience, and human factors.

Even if we recognise 'favoured' strategies in ourselves or others, we rarely challenge our own interests and ways of thinking. It is problematic to get stuck in our ways, in our like-minded groups. We can become known for one mindset and one strategy. Our approaches can be in opposition, and a fifth strategy identified by Karnofsky can even emerge – *mutiny* (at least a soft form of it). There could be a variety of states that no-one wants, such as *drifting*, or worse.

To be more credible and useful in conversations about digitalisation and human performance, it is better to be agile enough to consider different worldviews and approaches, depending on the situation. The success of our voyage will depend largely on how well we communicate – negotiating and reconciling important differences – and the resulting choices that we make. Since digitalisation and human performance are inseparable, we need to come together to try to do the right things right. In the words of acclaimed transoceanic solo sailor Francis C. Stokes Jr., *"In the end, the sea finds out everything you did wrong."* ⑤

References

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