The convergence of quality and sustainability in the 21st Century – A personal perspective

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Abstract: The relationship between quality and sustainability is not obvious, yet the two share fundamental synergies that are becoming clearer and more important in the third decade of this challenging century.

Keywords: Quality, sustainability, synergy, ESG, infrastructure, construction

Wordcount: 1340

I've been fortunate to witness the rise of three important movements during my career – the quality movement of the 80's, the environment movement of the 90's and the sustainability movement in the 2000's. That's not to say these important concepts didn't exist previously – far from it – but they each have gone through a phase of sudden growth, awareness and absorption across industry, business and broader society. Their enduring relevance into the 21st Century underscores their ongoing relevance and fundamental importance. Together they resonate throughout business today, underpinning strategies, goals, values and culture.

Sustainability is coming to be seen as a new 'pillar' of quality. As Vince Desmond, the CEO of the Chartered Quality Institute has noted, "A quality product or service must be sustainable as well as economically viable, useful, available and safe". This is around quality and sustainability sharing aspects related to fitness for purpose and responding to society's changing expectations and norms around acceptability. Desmond goes beyond the product itself and also speaks to the manufacturer or provider of that product "Equally, a quality organisation is one where sustainability is truly critical to its processes, from ethical supply to environmental impact"[1].

Sustainability also adds a temporal element to quality. The quality of a product speaks to satisfying current or near-term requirements, while adding in the consideration of sustainability amplifies that as an ongoing expectation into the foreseeable future. The sustainability of a business or organisation likewise embraces the notion that its practices and externalities are mindful of avoiding harm and enriching the wellbeing of society or the environment. The Quality Gurus[2] capture this idea particularly well, "Sustainability is about the long-term health of an organization. It involves understanding how the company will survive and thrive in the future….the quality of not being harmful to the environment or depleting natural resources, and thereby supporting long-term ecological balance".

[1] *Why sustainability is important in quality management* Vince Desmond, CEO, Chartered Quality Institute, https://www.quality.org/blog/why-sustainability-important-quality-management

[2] *Relationship Between Quality and Sustainability,* Sandeep Kumar, Blog, Quality Gurus https://www.qualitygurus.com/relationship-between-quality-and-sustainability

The definition of quality is itself acquiring a social impact flavour. N. Ramanathan & Willy Vandenbrande, 2019[3] speak to this through the idea of 'societal quality' as "Not only satisfying customer needs, but also societal needs and the needs of future generations". This speaks directly to the Brundtland definition of sustainability, still widely considered as the best articulation of that often-elusive concept.

In addition to the infiltration of sustainability into the concept of quality, we are seeing how quality practices can beneficially impact sustainability endeavours. A good example has been how integrating sustainability and Total Quality Management (TQM) can potentate the impacts of each. A 2020 study highlighted the synergistic association between TQM and corporate sustainability[4]. The results found that TQM has a significant and positive impact on sustainability.

To best illustrate the above perspectives and how sustainability and quality interact to deliver positive outcomes in the 21st century, we need look no further than the infrastructure sector here in Australia. Infrastructure has a unique set of characteristics that distinguish it from other things humans create. It has longevity, scale, impact and functionality that other types of structures don't. Rail lines can expect to operate for 120+ years - airports, bridges, roads and other utilities somewhat less. Current transport projects can be massive in scale - $8 billion rails projects involving multiple stations, tunnels, bridges, maintenance and stabling facilities and associated rolling stock covering tens of kilometres.

In terms of impacts, infrastructure during its lifecycle can consume massive quantities of materials, energy, and water, and release tonnes of greenhouse gas emissions and waste into the environment. And, from a functionality point of view, infrastructure is subject to ongoing intensive maintenance from its day-to-day operations, from environment impacts, and from keeping up with changing user demands.

We don't build infrastructure the way we used to in the 19th and 20th centuries. The brute force, labour intensive, protracted delivery approach of the past is no longer either viable or acceptable. Today we look to be as efficient and cost-effective as possible to meet tight deadlines and even tighter budgets. We also now have strict engineering, quality, environmental, health and safety standards that allow little tolerance of deviation, plus a myriad of expectations from a multitude of stakeholder that must be satisfied in the delivery and operation phases. It is in this environment that sustainability and quality come together to provide solutions and support innovation in infrastructure design and delivery.

Sustainability is increasing being welded into infrastructure delivery and operation contracts by state agencies and other proponents. In terms of quality control, the suitability and durability of components and materials is crucial to reducing maintenance, increasing reliability, managing costs and meeting customer and community expectations. New materials are constantly being introduced into today's infrastructure delivery process. Some of the most desired attributes for these new materials are 'less is more', durability, low carbon content, high recycled content, and environmental

[3] *How Companies Can Apply Quality to Address Planet Earth Concerns* N. Ramanathan & Willy Vandenbrande Quality in Planet Earth Concerns Think Tank (QiPECTT), IAQ October 2019 http://files.builder.misssite.com/bb/58/bb58d9de-35ca-4510-9236-ad2f22197bd9.pdf

[4] *Impact of total quality management on corporate sustainability through the mediating effect of knowledge management* Jawad Abbas Journal of Cleaner Production Volume 244, 20 January 2020 Impact of total quality management on corporate sustainability through the mediating effect of knowledge management - ScienceDirect

friendliness. Reducing the amount of materials (both consumed and wasted) has both cost, quality, time and sustainability benefits – one example being the 'kit of parts' approach now seen on many projects. Low carbon concrete, recycled steel and asphalt, rail sleepers and noise walls made from plastic waste, sand from quarry by products – all are becoming more common and more accepted across infrastructure projects.

However, new materials and new ways of building, desirable from a sustainability perspective, add uncertainty to the mix. Designers and engineers are rightly conservative around risk and are reluctant to approve or apply innovative approaches where the risk cannot be quantified through quality assurance. Novel materials must be demonstrably fit for purpose and durable, particularly given the longevity of infrastructure and the predicted impacts of a changing climate. Their acceptability and useability on projects are highly dependent on demonstrating these qualities through rigorous and ongoing quality control in development and production. Some promising materials are still not there yet, even though their use has the potential to significantly reduce costs, waste, and maintenance. But those that have crossed the acceptance line are being picked up in the sector in significant volumes and demonstrating their suitability across a wide variety of infrastructure.

Chain of custody and quality assurance are also key considerations for some materials that are highly desirable for infrastructure from a sustainability perspective, such as sustainably sourced timber, natural stone and textiles.

A sound quality management system can also help infrastructure address one the of most important social and ethical sustainability issues of our time, that of modern slavery. Infrastructure supply chains are both long, complex and tortuous, often stretching into countries that are known to have a high risk of slavery practices. It is still uncomfortably easy for some suppliers, which are several tiers down the chain, to engage in these practices without the construction contractor having any visibility. Good quality management can embed supplier screening practices such as audits, third-party certifications and other mechanisms that lessen the likelihood of these abhorrent and pernicious practices going undiscovered.

Here in Australia, we have come a long way in how we approach the building and operation of infrastructure, but we still have a long way to go in doing things in a truly sustainable way. Yet we are making considerable progress - what was considered innovation five years ago has now become business as usual. But we can only measure this progress and maintain its momentum by supporting sustainable approaches with sound quality management. If we don't, then the credibility of the claims we make around better, more sustainable infrastructure comes under increasing scrutiny and potentially undermines the gains we have made in recent years.