



BALTIC EXCHANGE:

A move to Quality 4.0

An in-depth look into how governance, assurance and improvement activities were enhanced through the implementation of Quality 4.0 at maritime and freight market information provider, the Baltic Exchange.



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Representing a global community of shipping interests, the Baltic Exchange provides a framework for its members to commit to high standards of business practice. They are the trusted provider of maritime data for the settlement of physical and derivative contracts.

The Baltic Exchange produces benchmarks and indices for the shipping world, in the maritime, air cargo and container box sectors. Benchmarks are regulated by the financial conduct authority and in 2020 they passed all the regulatory requirements. They are used to settle contracts globally with applications in risk and portfolio management. The Baltic Exchange has a new management system, which has been subject to extensive scrutiny and governance from the industry and regulatory authorities.

They operate under two key models: the first is a panel of independent brokers who submit their price data on a daily basis, and the second is with a partnering agent that looks into transactional data.

Both these models are the basis of data gathering to produce the financial benchmarks for the markets they serve. Digitalisation and Quality 4.0 has been fast-forwarded by the Covid-19 pandemic, and the Baltic Exchange has had to implement the new system remotely, bringing huge positive changes to people through digital working. This case study explores how the Baltic Exchange moved to a digitalised system (Quality 4.0), in which their governance, assurance and improvement activities were achieved with robust methodologies using data science and data analysis.



Rashad Issa, Quality and Business Improvement Lead, Baltic Exchange

Maritime data, regulation and goals



A paradigm change was required to manage large amounts of data from a manual, siloed process with high latency, to a fully interconnected approach, capable of serving data on demand.

With hundreds of benchmarks and indices produced, there were several areas that needed to be covered. Firstly, an error detection method was required to demonstrate the efficacy of the Baltic Exchange's structure to their own external auditors.

Second, the regulation and its requirements needed to be presented as clear key performance indicators (KPIs) that could be operationally assessed and monitored.

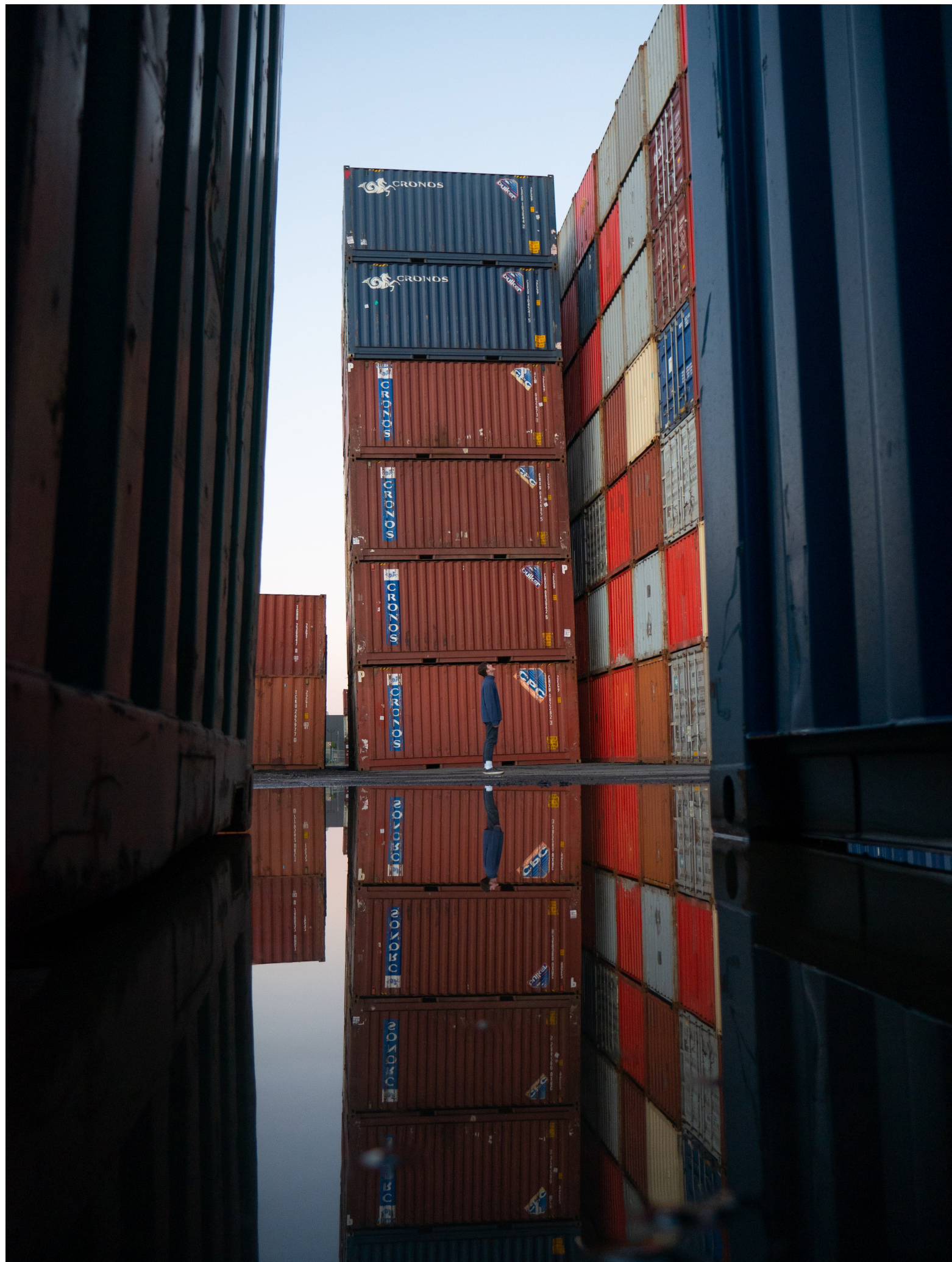
And thirdly, such requirements and their KPIs had to be provided in a structured format under a single audit policy which is understood by all stakeholders (including panellists as well as the entire index production team).

The data management system required a full revamp to introduce enhanced metrics. These metrics detect and identify outlier data and could be highlighted to the respective panel accordingly.

Initial introduction of the system was spear-headed by the chief executive with great buy-in and energy and supported by the chief finance officer. The finance section had a systematic approach to implementation, but that was yet to be replicated in the whole organisation. The new quality and business improvement lead was asked to implement the system metrics introduced in line with regulation, working closely with the benchmark technology architect. This forged a key partnership between the quality professionals and the data scientists, which has proved invaluable to successful implementation.

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System changes

A paradigm change was required to manage large amounts of data from a manual, siloed process with high latency, to a fully interconnected approach, capable of serving data on demand. In the old system, data required for quality management was separated both in time and geographically.

It was proving very complex and labour intensive to implement the various assurance and improvement processes.

For example, the ability to provide operational performance data represented in key timely inputs done by suppliers required a system export, data transformation step, a manual review, and a flag of any issues identified. Such exports used to occur on a time lag and the output was not directly integrated with the key operational system.

Business intelligence was also challenged with the old network of systems

The revamp of the system infrastructure and the massive growth in Application Programming Interfaces (API), providing software intermediaries that allows different applications to talk to each other; now allows the organisation to move data easily from one place to another; including where data was in silos or provided by external sources, such as suppliers. Now, one person sets up a simple key-based interchange, without the worry about security or incompatible systems.

There is increased transparency, and new systems can be developed without the previous incompatibility issues.

Business intelligence was also challenged with the old network of systems, with the lack of integration preventing any unified overview, and limiting user engagement. To support the business, the Baltic Exchange had built a separate system to track all the input data used in the index production and their staff interactions with the data and the suppliers providing it.



As part of their digital transformation, the quality and business improvement lead was able to use a standard business tool to take a prototype of a unified data management network and to innovate. The API interconnectivity of data was critical. Effective ecosystems are now in place managing complex market data and transaction dates. The quality and business improvement lead noted:

“Assurance for quality professionals, not having the level of integration of technology would have made the job impossible. We would have had to look at over 1,000 indices averaging 4,000 distinct data points, to be examined on a daily basis. It would have been impossible to publish daily as required. Quality 4.0 has moved from spotting errors to predicting them.”

This has been made possible by having an easily reproduceable language and software framework that enables hypothesis formation for quality assurance analysis, quality control analysis, and testing to take place. It is no longer an elaborate process to carry out these tests, they can be executed easily, and insights are delivered from clearly defined, theoretically sound and empirically tested methods rather than observation.

The Baltic Exchange deployed agile implementation techniques, using JIRA boards to allow the organisation to quickly define changes that could be built with timely decision-making and sign off. The successful deployment of this change had to involve a robust project management framework, including the engagement with various stakeholders, building user cases and testing with a pilot group before the ‘go live’. On the quality assurance side, it had to ensure that the business does not only respond to incidents and errors after they occur, but also to have the ability to monitor data and obtain trend analysis in a timely manner and address with respective suppliers.

The value of data

The quality and business improvement lead said that the new system has challenges that are consistent with those faced by most big data systems.

The data that is collected is a valuable contextually dependent asset, requiring quality professionals within the organisation to be able to appreciate the technology involved.

The information can be extracted, using the principles of significance testing, so that the insights from the data are not overstated. Within the Baltic Exchange they have highlighted the importance of data analytics as part of their approach to governance, with quality professionals trained to understand the statistical data and to investigate it from different angles before putting forward any recommendations.

As part of the implementation of a new system, quality professionals had to develop and use clear change control processes to manage incremental changes and any unforeseen consequences.



Culture changes

Although the chief executive officer was a key driver in introducing the digital transformation, it was equally important that the whole organisation recognised and responded to the need to make the paradigm shift.

The new quality and business improvement lead was charged with helping the organisation to accept the need for change and supporting management to take people on the change journey. The quality and business improvement lead and benchmark technology architect together developed a business case and implementation plan for the whole business, based on both a theoretical model of change and their personal experiences of implementing change.

The organisation had previously adapted to delivering new products promptly. This adaptation, however, did not include a change to its internal digital structure and systems.

There was resistance to change and leadership by the CEO, which was crucial to the success of this organisational transformation. The chief executive officer joined the Baltic Exchange in 2017 after the organisation had been acquired by the Singapore Exchange. That was symbolic in enabling change to happen.

The benchmark technology architect had built a lot of the required system but, as a data scientist, they lacked the resources to create the broader changes to business processes for them to be effectively put into practice.



The quality and business improvement lead and benchmark technology architect worked together to match the data management and index production processes to the needs of the people using them. They focused on the core elements: the integrity of the auditing assessment, the ability to identify outliers, and the ability to give auditors the validation that all data analysis is correct. There was a focus on how the user would interface with the system, making it easy for them to look into the system controls, and how it would be used to conduct audits and error detection. Training was provided on how to use the statistical models.

The adoption of the new system and overcoming the resistance to change was part of the quality strategy.

The Covid-19 pandemic played a role in successfully addressing the assurance issues and fast tracking the adoption to the new way of working.

As part of the implementation strategy, the system had been piloted, and key staff members became change champions. The pandemic provided an opportunity to accelerate system change. This allowed benefits to be proven and negative perceptions to be overcome. The new system presented tangible changes that allowed users to clearly engage with the data and the system controls, which enabled them to have clear follow ups with various panel members.

The pandemic and the new system enabled the 'voice of the customer' to be heard, which helped staff to see that the new system was beneficial. Building on the success of the pilot, the changes driven by the pandemic have now resulted in the new approach being the norm.

The switch to remote auditing has allowed those quality costs to be redeployed to different areas, including supporting the supply chain through improved relationship management.

Results and benefits
Quality 4.0: Case study series



The use of control metrics

The use of control metrics for the various panels has improved. Previously control metrics followed a more traditional imitation of six sigma methods used in manufacturing to attempt to find objective defects. The new model ensures panellists are dynamically benchmarked against their peers, using methods more suited to survey data. The number of metrics has been iteratively redefined and simplified so that the metrics are meaningful to all stakeholders involved. Because of the new implementation, various panels have improved significantly on the defined KPIs. Inputs are now submitted on time with market comments provided by data inputters against 60-70% of their contributions proactively, compared to around 3-4% in the past.

As a result of measuring and informing staff how the metrics are being used, other metrics have improved too. Before the introduction of the new digitalised system, auditing took place in person, across the world, with all the inherent costs. The switch to remote auditing has allowed those quality costs to be redeployed to different areas, including supporting the supply chain through improved relationship management.

One example of cost redeployment was evidenced in many system enhancements. Audit metrics are no longer accessible to respective panels once a year. They are now embedded within the system and can be accessible on a monthly basis. Such improvement will help implement corrective measures in a prompt and constructive manner; rather than wait for 12 months to address them.

There has been a complete change in the approach to quality within the Baltic Exchange. Policies and procedures were in place but took time to enact. The quality role was viewed as a documentation control role. Now, the role of the quality professionals to enable and support the effective deployment of strategic initiative is appreciated and the concept of the 'quality team as the policemen of the process' has been eliminated. While the understanding of the portfolio of end-to-end processes exists within the organisation, there is still more to be done. Quality professionals will need to continue to develop in order to play a key role in leveraging the technology required to support management systems. It is no longer sufficient to contribute to quality control processes only but requires full support of the change agenda to ensure governance is prominent in the profession.

The Quality 4.0 principles in this case study



Cybernetics

In the Baltic Exchange, the value of network design – horizontal (E2E within the primary unit of processing), vertical (in support of the primary production or operations chain) and end-to-end, which is across the whole product life cycle – is of paramount importance.

The design of these networks has placed new demands on the quality professionals who needed to be part of the team that configured the whole system. It effectively required the redesign of complex integrated networks, 'eco-systems' that enabled data and analytics modelling in order to progressively control (regulate) and improve total system performance. This improvement progressed from diagnosis to prediction to prescription, with models self-refining in order to adjust processing, inputs, and hence outputs.



Data value

The Baltic Exchange regard data as a strategic asset that changes as the context of their business changes. In this case study, data is clearly a very powerful component of the strategic thrusts.

It is about having the right data, in the right place, at the right time and in the right condition to be used effectively and efficiently. It was also a large challenge in the business context and governance aspects of the competence framework.



Transparency and collaboration

In the Baltic Exchange situation at the time of the pandemic, it was essential to think differently about the way things had been done before. The inherent and established business model had to be challenged and re-configured.

The agility of processing required greater transparency of data so that the full potential value could be derived. The quality people needed to be able to conceive of, structure, build and operate new models at pace. In this organisation the quality professionals were equipped to be joint architects of the new models.



Case study takeaways

When asked about the challenges of implementing Quality 4.0 within the Baltic Exchange and possible lessons for other organisations, the following three takeaway messages were identified:

1. **Context** – the most important element for quality professionals is to fully understand the context in which they operate in and to be able to share relevant information to the various stakeholders involved. This includes:
 - understanding the business from 360 degrees or from a helicopter view;
 - being able to take the Quality 4.0 approach and deploy it for business priorities, and within their own business context;
 - translating Quality 4.0 into their own industry;
 - improving, yet singing from the same hymn sheet as the strategy.
2. **Quality** – there needs to be a solid understanding of what the control activities represent, because of the need to adapt to the business context. Understanding the data model available is important in deciding whether you will work with market data that is of limited access, non-transparent data, survey data, etc. Different data models may dictate different control activities to ensure the panels are consistent. Understanding the quality toolkit that is available and the areas it measures, enables the quality model to be flexible and to adapt to changes.
3. **Business improvement** – Quality and business intelligence should interact effectively and have strong collaboration with the technical implementation. For a quality model to be useful, the gap between quality and data professions must be closed. This enables the implementation of a model that is useful, reliable, valid, and adaptable.

Key lessons

- Symbiotic partnerships are needed between quality professionals and data scientists;
- The role of a CEO is crucial in leading change;
- Change management and governance (with a focus on a business model rather than micro quality control) are two critical elements for success;
- Digitalisation and Quality 4.0 have been fast forwarded by the pandemic given the need to implement the changes remotely; it was fast tracked to three months bringing huge positive changes to people in digital work.

The experience of Baltic Exchange provides a detailed case study of an organisation's digital transformation, and key lessons for organisations exploiting the benefit of Quality 4.0. Symbiotic partnerships within organisations and transformation in governance can create both far reaching and intricately detailed improvements within an organisation.

An active and involved chief executive officer leading the way is also crucial, and while this transformation was expedited by the global Covid-19 pandemic, other organisations may also benefit from a faster move to implement Quality 4.0.

About these case studies

Businesses and organisations are continuing to evolve out of necessity, responding to an onslaught of disruption, new business models and technology. This continuous change, including that precipitated by the global coronavirus pandemic, is affecting business operations at all levels, with customers demanding real-time interactions, regulators applying increasing levels of scrutiny and governance and stakeholders requiring assurance in this complex and dynamic risk environment.

The CQI believe that 'Quality 4.0' (Q4.0) and the principles which underpin it will directly affect an organisation's ability to deal with these huge changes in the digital era and, by extension, its ability to successfully uphold the established seven quality management principles. Before this can happen, however, Q4.0 needs to be properly understood, defined, and developed. Consequently, they have funded a research project into the Why, What and How of Q4.0, which has been carried out by the Oakland Institute and Leeds University Business School.

The team have developed and published with the CQI a 'Quality 4.0 Infographic', that shows a short Concept Definition, and eight supporting Core Principles.

The How, or the implementation of Q4.0, has been examined through a series of interviews with practitioners, structured using the CQI Competency Framework elements, to determine which practices, technologies and tools are being used in their organisations. Part of that work has led to the development of a selection of illustrative case studies, of which this is one of the first.

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