Enabling paperless trade

A long, hard slog

NZIER report

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About NZIER

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice.

We undertake and make freely available economic research aimed at promoting a better understanding of New Zealand's important economic challenges.

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We pride ourselves on our reputation for independence and delivering quality analysis in the right form and at the right time. We ensure quality through teamwork on individual projects, critical review at internal seminars, and peer review.

NZIER was established in 1958.

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Key points

NZIER has investigated what is needed to drive and develop a paperless trade environment for government and non-government supply chain participants.

The gains from introducing paperless trade are significant to the point where they potentially match a high-quality trade agreement that delivers benefits year-on-year (NZIER 2021). The gains are driven by the reduction in transaction costs associated with trade documentation, that is, a move from a paper-based system to a paperless system associated with imports and exports. This prize is well worth the re-organisation required to implement the system.

This report sets out the building blocks for a paperless trade international ecosystem, scans New Zealand businesses to understand further details that inform the expected costs and benefits (see Appendix A) and examines what it might take to successfully implement a paperless trade environment. Specifically, it focuses on:

- Doing better. Paperless trade is coming, New Zealand will need to ensure that it is able to capitalise on the benefits and mitigate costs.

- Being proactive. The development of coalition(s) of the willing can demonstrate to the world that paperless trade is workable. This will require a high degree of trust, interoperability, and an alignment of semantics and standards, which have not been seen before. The degree of coordination means that New Zealand is reliant on trade partners to play their part in making paperless trade work.

A degree of 'top-down' encouragement from a 'coalition of the willing' will be required to ensure that 'bottom-up' solutions are developed in a timely fashion. While paperless trade does not have all the characteristics of a disruptive technology, it will create winners and losers including in the public service.

Realising the gains from paperless trade will require political commitment and direction

Piecemeal approaches to electronic infrastructure development may not move New Zealand into a more efficient and effective connection with our trading partners as quickly as desired from a New Zealand Inc. perspective.

This is more likely to be achieved if we follow international best practice:

- UN ESCAP (2018) suggests that a single government agency needs to control and direct the full implementation of paperless trade initiatives.

- Creation of a formal coordinating group of stakeholders to provide feedback on the development of paperless trade developments.

- Utilise other best practice approaches, such as international standards that are already in place.

A broader-based group of trading entities

Paperless trade offers an opportunity to make exporting easier for all who wish to participate. Most firms in New Zealand are micro, small and medium-sized businesses and small and medium-sized entities.

Encouraging more export participation from these entities will diversify New Zealand's trade offering, create conditions for further innovation, and lead to a broader increase in economic well-being.

As a trader with the world, distant from markets and lacking in scale, New Zealand needs to use all the advantages of its people to generate wealth. Paperless trade is one way of making the trading process easier.

Paperless trade does, however, require the re-organisation of a firm's back office and some capital investment. For small and medium-sized firms, this is a large cost.

Taking this approach unlocks the benefits

The benefits of paperless trade are well known. International (UNCTAD 2020a; ESCAP, n.d.; ICC 2023a) and domestic; New Zealand Customs Service 2022) studies point to the significant gains from paperless trade. With trade agreement prospects constrained by the current international situation, getting more out of existing trade agreements is one way to sustain economic growth over the long term.

The benefits of paperless trade can be as much as 20% of the logistics costs and have the potential to drive innovation, particularly but not exclusively in perishable products. These benefits are akin to a high-quality free trade agreement.

We have a choice: do it ourselves or have it done to us

After some halting steps, the advent of COVID has spurred international logistics companies to get their logistical act together. Major shippers have created an independent organisation to drive paperless trade. As part of this process, they aim to have 50% of the Bills of Lading (the critical trade document needed for goods to be moved) in electronic form within five years. In 10 years, they aim to have 100% of Bills of Lading in electronic form.

New Zealand will need to be able to connect to this electronic infrastructure seamlessly without it adding to costs for New Zealand entities.

It should be emphasised that much of the technology is not new. The risks of investing are reducing – there is less of a danger of making the wrong choices.

Implement international best practice

The implementation of paperless trade is a wicked problem that the government is required to take the lead on for it to be successful. The obstacles are numerous, and some government bureaucracies internationally are retreating from electronic approaches introduced during COVID-19. A proactive approach is required. The next steps for New Zealand could involve:

- Securing a high-level commitment to advance paperless trade and ensuring that those who have the responsibility to advance paperless trade have the necessary tools to do
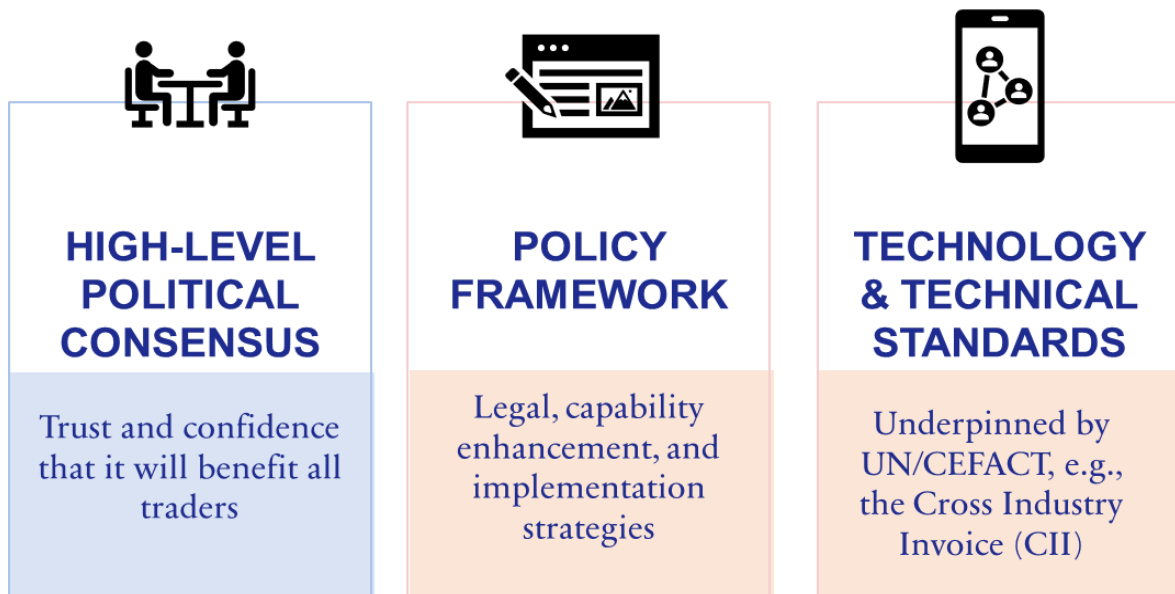
the job (possibly the responsibility should rest with the Department of Prime Minister and Cabinet).

- Ensuring that the technologies being developed are consistent with international standards and semantics and that any technological investments/developments in New Zealand are consistent with a whole of government approach.

- Considering the policy frameworks that will be needed to underpin paperless trade. This includes legal steps towards improving capability and looking at how implementation strategies will be advanced.

The necessary building blocks for paperless trade are set out below (see Figure 1).

Figure 1 The pillars of digital trade

HIGH-LEVEL POLITICAL CONSENSUS

Trust and confidence that it will benefit all traders

POLICY FRAMEWORK

Legal, capability enhancement, and implementation strategies

TECHNOLOGY & TECHNICAL STANDARDS

Underpinned by UN/CEFACT, e.g., the Cross Industry Invoice (CII)

Source: NZIER

Wider context: many labour-intensive industries face similar challenges

The need to substitute capital for some labour-intensive businesses is ongoing and relentless. It is important that we take opportunities for capital-labour substitution when they present themselves. Baumol first drew attention to 'cost disease', in the 1960s,[1] suggesting that the labour-intensive sectors (such as health, education, arts and culture, and public service activities) have fewer opportunities for productivity gains than other sectors, such as agriculture and manufacturing, due to constraints on labour-capital substitutability.

Labour costs in these sectors nevertheless keep pace with labour costs in sectors that make more significant productivity gains, resulting in rising prices or unit costs. The theory predicts that public service expenditure per capita will rise relentlessly, even with all else remaining constant. The introduction of paperless trade may assist in improving productivity in the public sector and help drive efficiencies.

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[1] See for example Towse (1997)

Contents

Appendices

Figures

Tables

"We tend to over-estimate the impact of technology in the short run and underestimate its impact in the long run."

Amara's Law

"… It is not the strongest species that survived, nor the most intelligent, but that most adaptable to change."

Charles Darwin

1 Paperless trade will require behavioural change

With the prospects of further trade agreements reducing, attention has turned to new ways of extracting more out of New Zealand's existing trade agreements and, at the same time, improving the productivity of operating those trade agreements as they become more expensive relative to other parts of the economy (Towse 1997).

One area that shows real potential is paperless trade. But how real is that potential, and how might we practically implement such a significant change to supply chain operations?

1.1 What is the problem?

When goods and services are exported and imported, packages of documents are required for all sorts of regulatory and commercial reasons up and down the supply chain. At a practical level, a single shipment could pass through 30 different organisations, with up to 200 communications about that shipment. These communications may require all of the documentation/information associated with the consignment for speedy transit, e.g. pieces of paper with the appropriate wet stamp or signature. If a form is missing or there is a problem with some information, then delays and other inefficiencies are inevitable.[2]

The following diagram sums up the problem. The diagram shows the complexity of cross-border trade with many different entities across different sectors requiring consignment information, many exchanges of that information, and many siloed systems operated by the various entities.

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[2] Comment made at an APEC Paperless Trade seminar, 18th June Wellington 2021.

Figure 2 The complexity of paper cross-border trade
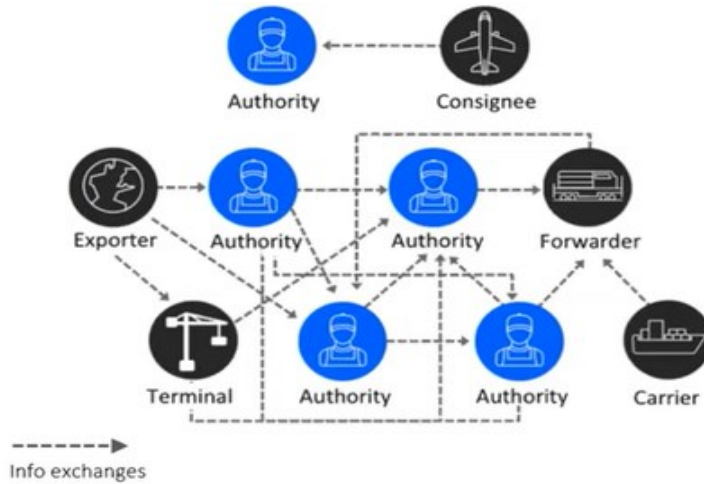
Source: Adapted from Webinar 10[3]

1.2   What is paperless trade?

Digital trade chapters are included in modern trade agreements and encompass a large number of mainly service-based trades, but the development of paperless trade is gaining the most economic attention.

Paperless trade eliminates the need for paper documents and physical signatures: so-called 'wet' documents and signatures. What electronic commerce takes place and how it occurs is viewed differently by different parties depending on the capabilities of the parties involved and the ambition of those parties, e.g. it spans, at a basic level, the emailing of PDF documents to the electronic transfer of data.

The coordination required for data electronic exchange is non-trivial. Making it operate requires electronic coordination across borders between government agencies, border-facing agencies, customers, logistics companies, producing firms, freight forwarders, and a host of other supply chain participants. It also requires legal support (specifically law changes to ensure equivalence between paper and paperless trade) and trust between supply chain participants.

There is strong support from international agencies to assist with this transition. United Nations (UN) agencies, standards-setting organisations (such as the International Chamber of Commerce (ICC)), the World Customs Organisation (WCO), and trade agreements are all striving to establish the governance structures necessary for paperless trading.

New Zealand is willing to trade with most countries (we are traders with the world) and should aim to operate both a range of paperless and paper services, but the gold standard is data transfer across borders. The ability to transfer data seamlessly is the standard that will improve efficiency, security and trade resilience the most.

1.3   How does paperless trade work?

Engaging in paperless trade requires understanding what it means to the supply chain participants. For example, exchanging PDFs by email bilaterally between supply chain

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[3]   https://service.unece.org/trade/uncefact/publication/TransportandLogestics/CIM-SMGSConsignmentNote/HTML/001.htm

participants does not require a lot of infrastructure and maybe the start of a paperless trade journey for some regions. However, the real gains are made with electronic data transfers. This is what international agencies and those with supply chain interests are focused on.

Data transfer will secure the most benefits. Individual data elements are sent through a data interface. The type of interface varies, depending on the systems used. Ideally, these paperless trade transactions are conducted using fully electronic formats that are assisted by application-programming interface programmes. Blockchain may or may not be used to increase security.

To achieve electronic data transfers requires all information to be clearly defined and unambiguous. The semantics and syntax need to be agreed upon by all parties who want to transfer data. Further, the meaning of each data element needs to be agreed upon in the same way. This is true for all participants in the supply chain: governments, product and service producers, those involved in logistics, importers and other permissioned parties.

Other issues that need to be addressed or considered include:

- A standardised data dictionary. If a typical transaction involves up to 30 entities, then a standardised data dictionary is required.

- The mechanics of ordering and processing documents. As orders are processed, a system configured to use electronic messages can prepare all documentation, repackaging the base information/data into various forms/formats for different uses (e.g. packing lists, delivery notes, invoices, customs declarations, etc.). It may also manage reordering, transport services needed, request certification and other services.

- Codification of electronic messages. Any information that can be codified (i.e. bills of lading, certificates of origin, food safety status, etc.) should be to avoid misunderstanding. Any codified description of the product or how it is transported provides certainty for supply chain participants.

UN agencies have recognised the technical challenges of paperless trade since the early 1960s and have been at the forefront of developing the needed paperless trade infrastructure. They know that the more countries adopt standardised approaches to paperless trade, the bigger the benefits for all participants.

There is a very important general lesson here that applies to many service trades. Developing your own approach to electronic data transfer without reference to established international practice is likely to be an extremely costly process. It will require renegotiating all electronic protocols to ensure interoperability and could take years.

Trade policy and border regulation are truly whole-of-government operations. Paperless trade will allow permissioned parties to communicate information to show what is happening reliably (the status of the specific consignment) – from the viewpoint of Customs (shipping, tax, potential for illegal entry, etc.) and the Ministry for Primary Industries (biosecurity, food safety). Other government entities are also involved, including MBIE, MfE, MFAT, MOH and Statistics New Zealand. Therefore, the verified information/data on exports/imports gives certainty and assurance to all permissioned parties and the final customer.

1.4 The benefits of moving to a paperless trade environment

It is universally recognised that digital trade has significant benefits. These benefits go beyond cost savings and speed to market and are ongoing.

There are a number of reasons (see NZIER 2021) for the development of paperless trade initiatives:

- Connectivity gains: the more connectivity between supply chain partners, the increased chances that more trade will occur as:
  - Those involved in current trade see increased ease of trade as the connections improve (trade begets trade – see Developing Trade Consultants (2016)).
  - The simplicity of trade increases. This provides a demonstration effect for others to become involved.
- Productivity gains:
  - The increased speed of trade provides an opportunity to increase the throughput of trade by developing more outlets and lowering per-unit costs.
  - It reduces the need to use highly skilled staff to check details of export documents to eliminate mistakes. Staff can then focus on other, more pressing matters.
  - Increasing efficiency that increases trade can also open up other trading opportunities (potentially in new products) in existing or new markets.
- Visibility (transparency) gains: ensuring that there is 'one source of truth' that can be accessed by all permissioned parties cuts down on confusion and increases transparency in the supply chain.
- Predictability: paperless trade generates more focused data for participants at lower costs. Its relevance to the consignments being shifted means it can be utilised to identify bottlenecks and transport inefficiencies and potentially make better predictions for specific products.
- Inclusiveness gains: making trading simpler and breaking down the complexities of exporting may encourage more smaller firms to export.

It is no surprise to those working in the supply chain that the cost reductions through the various effects are significant. There are a lot of examples (see New Zealand Customs Service 2022). For example, one of the practical benefits is the reduction in the number of couriers used. This can amount to thousands of dollars a month or millions per annum in big firms.

1.5 The challenges to moving to a paperless trade environment

If the benefits are significant, why has progress been so slow towards moving to a paperless environment? Why do we have so-called 'digital islands'? This has been on the radar for many years.

1.5.1 The fixed costs fall proportionately more heavily on smaller players

The costs associated with moving to a paperless environment are not trivial, but they are outweighed by the benefits by a considerable margin. Set-up costs and a lack of understanding can prevent the transition to using less paper. Businesses and governments

can be reluctant to incur additional costs unless they see an immediate benefit or believe it is beyond them (the reverse of Amara's Law).

For governments, the challenges are significant. They include:

- The costs of setting up systems and creating an environment of trust (technical, legal and achieving a political consensus).

- The need to coordinate government agency activities on paperless trade domestically. Government agencies around the world tend to act independently, and this is encouraged by politicians who drive the policy objectives.

- The need to increase cross-border cooperation between government agencies.

It is unclear how paperless trade will shift responsibilities from one part of government to another, but we do know that paperless trade will maximise the chances of more efficient trade (see Towse 1997). The details and how efficient paperless trade will be is dependent on how the rules and regulations are set up and how trade develops in response to a paperless trade environment.

For businesses, the costs can be broken down into the fixed costs of putting systems in place and the variable costs of maintaining the systems. Importantly, the fixed costs have distributional consequences. Smaller firms could struggle with the fixed costs of paperless set-up since they represent a greater proportion of the revenue generated by the firm relative to bigger firms.

Therefore, costs are significant barriers to country and business uptake, and we will examine them in more detail in the case studies later in this paper. In brief, this problem can be mitigated by:

- An outreach programme to micro, small and medium-sized businesses (MSMEs), indigenous firms/entities and women-led firms by regulatory authorities detailing how to approach a paperless interface.

- Demonstrating – possibly using MSME case studies – the value add for all stakeholders of increasing paperless trade. This is necessary since many small companies have preconceived fears of exporting. There is a need to dispel those fears and demonstrate how they can navigate the hurdles in practice.

Small, lower-income nations are also likely to struggle with the fixed and variable costs of paperless trade. A further issue may be maintaining the capability to drive a paperless environment. How the international community continues to respond to these challenges for small countries will be critical.

In many cases, paperless and paper-based systems will run side by side. This will add complexity and extra cost for governments.

1.5.2 Like many sweeping policy changes, paperless trade will create winners and losers

Introducing paperless trade will shift responsibilities from one part of the government to another. Some are likely to resist this in an attempt to maintain the status quo. Some firms are also likely to resist the change since they have done well and continue to do well out of paper trade.

The institutional and firm-based reticence to engage in paperless trade negatively impacts the transition. How this plays out is also uncertain since what people/organisations say (i.e. their stated preference) is unlikely to match what they do (revealed preference).

There are also legitimate reasons for slowing down the introduction of paperless trade since governments, and businesses are typically sensitive to anything that has to do with new ways of governing the shifting of goods and services across borders, e.g. in New Zealand, the importance of biosecurity – relative to a country like Singapore – means that care is required.

1.6 The focus of this scoping study

This report:

- Sets out the building blocks for a paperless trade international ecosystem.

- Develops an understanding of businesses that further details and informs the type of costs and benefits expected (see Appendix A).

- Examines what it might take to implement a paperless trade environment successfully.

We have drawn on international studies in peer-reviewed journals, international webinars – particularly those sponsored by UN ESCAP, case studies, information from practitioners using paperless procedures, perceptions of those implementing paperless procedures, past assessments, and other sources. We have also had the benefit of participation in APEC and ERIA forums.

The analysis is intended to inform and support progress towards increasing paperless trade by understanding the building blocks of paperless trade in greater detail. As such, the depth of the analysis reflects the scoping nature of the assessment, which is in line with good policy practice.

It should also be realised that the technology, attitudes, and understanding of what can be done are moving quickly, although actual progress towards concrete actions is slow. This is not untypical in the trade policy space.

2 Approach to paperless trade

2.1 Paperless trade touches all parts of the supply chain

Enabling paperless trade is one way the government can drive the economy forward by making trade more effective and efficient. This has become more pressing and urgent given:

- COVID-19 has allowed countries to kick start the digital agenda; but we have seen backsliding as some revert to paper.

- The appetite for further trade agreements is diminishing. It, therefore, makes logical sense to get more out of the trade agreements we have already signed.

How we approach paperless trade is set out in the figure below. By applying this approach, we hope to further understand how paperless trade procedures can be advanced. In particular, we are focused on the architecture required and how a firm might view the costs and benefits of moving towards a paperless trade strategy.

The approach described has been deliberately kept simple. To do this, we have abstracted from the full details of the actions required. That is, the analysis contains sufficient detail with enough complexity and reality to capture and illustrate the important issues.

Figure 3 Framework for understanding the efficiency of paperless trade
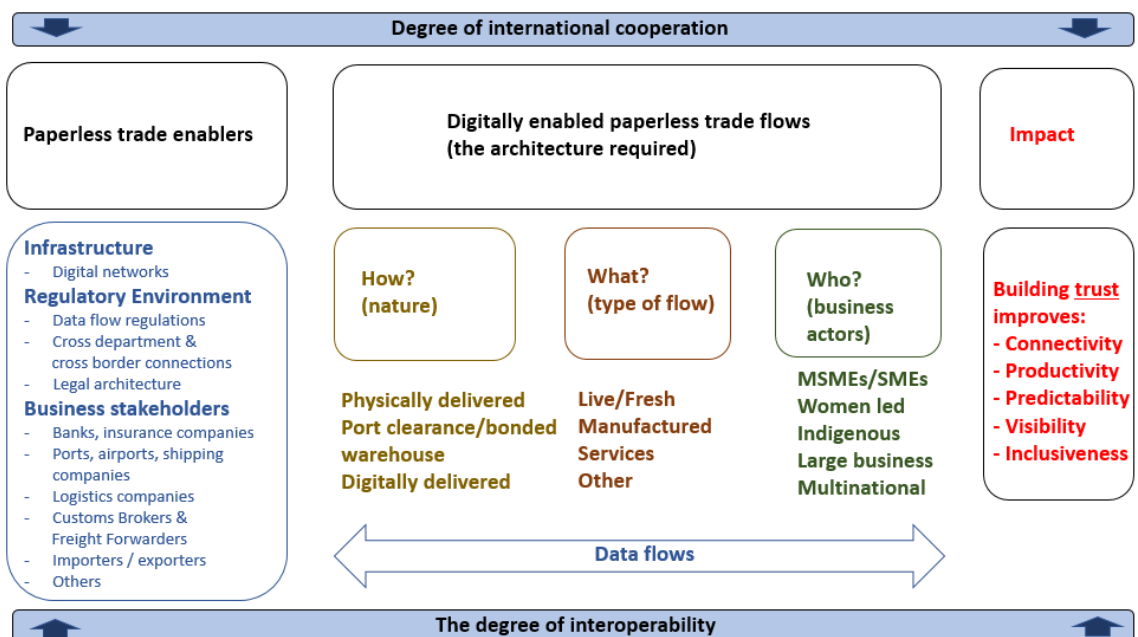
Source: Adapted from OECD (2019a), González and Jouanjean (2017)

This approach concentrates on the interaction between the enablers (infrastructure, policies and regulation) and the practical physical flows: the how (a product moves), the what (type of product or service), and the who (the entities that move the product). These activities are constrained or enabled by the degree of international cooperation and the degree of interoperability that drives the connections.

How far we can move along the paperless trade track depends on the readiness of:

- Countries to develop cross-border paperless trade relationships between Customs agencies and other government departments.
- Internal government entities to facilitate the development of paperless trade arrangements between industry, importers, Customs agencies and other government agencies and between government agencies.

Therefore, willingness to cooperate and the degree of cooperation significantly impact building trust and the durability of paperless trade initiatives.

2.2 What are we striving for?

The following target actions will be required to fully accrue paperless trade benefits. Through paperless trade, we aim to:

- Facilitate seamless end-to-end paperless trade. This requires:
  - A domestic electronic transactions framework.
  - Paperless trade facilitation and operation.
  - Fulfilment of NZ Customs and Ministry for Primary Industries border checks and duties.
  - Equal treatment of paper and paperless trade.
- Enable open and secure data flows, which need to include:
  - Cross-border data flows that support goods and services.
  - Data protection protocols are in place. Without data protection, the system is compromised.
  - Conscious decisions made on the location of cloud computing facilities.
- Building trust and confidence in paperless trade systems by:
  - Securing the source code.
  - Ensuring that spam is dealt with effectively.
  - Developing principles on access and use of the E-commerce system.
  - Ensuring trusted authentication.
  - Increasing cybersecurity cooperation domestically and internationally.
  - Ensuring that customers and consumers are protected.

2.3 The size of the prize

Paperless trade benefits are quite clear. So much so that major shipping companies have formed an independent organisation to make it happen in their industry (DCSA 2023); this is likely to have a major impact on supply chains since shipping is a critical logistics component for many regions. What has made major shipping companies confident? It has been realised that "… *paper-based processes are time-consuming, expensive and environmentally unsustainable for stakeholders along complex supply chains*" (DCSA 2023).

The benefits include:

- Costs are significantly reduced. Benefits range between 15% and 45% in logistics cost savings depending on the country (United Nations 2014; UNCTAD 2020; Duval 2017; WTO 2015).

- Trade increases. With lower barriers to trade, revenue will increase for traders and governments (United Nations 2017).

- Security, transparency, and efficiency in supply chains are enhanced (Ha and Lim 2014)

- Fewer mistakes. Manual paper-based trade is subject to frequent errors that hold up and stall the movement of goods (APEC 2010).

- Border clearance wait times will be reduced (United Nations 2014; APEC 2010).

- Reduction in complexity and increased accountability, which strengthens governance (United Nations Economic Commission for Europe 2006).

- Cost reductions and simplification are highest for smaller shipments and perishable goods (OECD 2019c).

- Electronic trade produces data that is suited to risk analysis, which helps prevent fraud and non-compliance (United Nations Economic Commission for Europe 2006).

- Paperless trade increases productivity gains (OECD 2019b). It also improves decision making with better data (OECD 2019b).

The challenge is to realise the benefits and put in place the building blocks needed to make it a reality.

3 Setting the scene: talk has not translated into sustained paperless trade action

3.1 What is the implementation problem?

If the impact of paperless trade is substantial, why is uptake slow? We face a chicken-and-egg situation regarding paperless trade implementation. The benefits and costs are relatively well understood, but a playbook for moving forward is unclear.

International organisations are endeavouring to 'kick start' the process by developing 'model laws for digital trade', developing the semantics and standards necessary, setting up digital trade courses, giving advice, running seminars, etc. Of particular note is the United Nations ESCAP series of webinars (see ESCAP, n.d.).

This is complicated by the cross-border nature of trade and the difficulty in getting political agreement on trade issues (internally and externally). It is also clear that some actors (both in the private and government sectors) benefit from the status quo.

This requires the introduction of new legislation, capability building, and modification of practices and procedures, all of which are non-trivial. This is not unusual for new innovations; however, it becomes more complicated when cross-border cooperation is required.

It is also clear that different parties (both firms and governments) will work at different speeds based on their political will and capabilities. Some parties see paperless trade as being able to transfer PDFs only, while others have greater ambition and are focused on data transfer. These are completely different technologies which require differing capabilities (and, as a result, have differing costs and benefits).

In summing up, the problem has the following characteristics:

- International organisations understand that the benefits of paperless trade far exceed the costs. There are costs involved for both government and business, and these are not insubstantial but are dwarfed by the efficiency, resilience and security benefits. These costs include:
  - The cost of equipment and training when firms have limited human resources to deal with a significant back-office redesign.
  - Complexity, which will lead to costs for the government to maintain a spectrum of paper and paperless trade capabilities.
- There are established international approaches to the legal and physical architecture for enabling paperless trade. Specifically, this means:
  - Legal harmonisation. Providing legal validation for electronic documents and compliance with internationally accepted practices (e.g. conforming with the UN's MLETR (Model Law on Electronic Transferable Records)).
  - Standards development. Adoption of international standards that have been developed specifically for electronic trade.

- Accreditation framework. Ensure that technical solutions comply with the law.

- Software solutions. A set of open-source software solutions that can be integrated throughout the supply chain. The easier it is to connect, the greater the benefits for all parties throughout the trading world.

- The reluctance by some, both in the business community and government (in New Zealand and overseas), to embrace a paperless trade environment.

A further issue is that international businesses are starting to get their act together because the gains from digital trade to their business are obvious (see DCSA 2023).

Without a coherent paperless strategy that can seamlessly link in with these international efforts, New Zealand will struggle to develop a paperless implementation strategy that works first and foremost for New Zealand firms and supply chains.

3.2 The slow pace of adoption is a significant issue

The results have been disappointing, given the size of the benefit prize. What we see around the Asia Pacific are 'digital islands'. Surveys report that 39% of countries have made concrete steps towards implementing paperless trade initiatives (United Nations 2019).

This means that:

- The onset of COVID-19 exposed huge 'holes' in New Zealand's systems since paper documentation[4] could not be matched to the consignments already at their destination.

- Data can be siloed. Data is typically stored in standalone systems that are often incompatible with other data sets. They can be hard to access. In New Zealand, at a practical level, workarounds have been developed:

  - Data can be transferred from commercial systems relatively easily.

  - Data is available from officials in a timely fashion.

- Information is exchanged between pairs. In traditional systems, information is exchanged between one party and another. This is inefficient since the information may be required by more than one other permissioned party. The ability of these parties to access the 'single source of truth' is a major benefit, reducing time and costs. From experience, an approach adopted by officials is to establish a working model of digital trade arrangements between two countries. This has the impact of highlighting the benefits of this approach and leads to:

  - Other countries joining in (because of the demonstration effect).

  - The established arrangements act as a basis for a wider group or regional model. Especially important if the arrangements overcome common challenges.

- While many are investigating how they might implement paperless trade, most international transactions are still paper-based. Some trades have to be traded using paper, e.g. The Kimberley Process Certification Scheme (KPCS) is the process

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[4] Documents are typically couriered to the ports by air freight in passenger planes. Many of these planes were grounded as COVID-19 took hold.
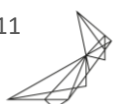
established in 2003 to prevent 'conflict diamonds' from entering the mainstream rough diamond market by United Nations General Assembly Resolution 55/56.

- Disputes, hold-ups and reconciliations are commonplace. The missing document problem means delays are inevitable (NZIER 2021).

- With many different systems in place, varying technology, and the inability to access resources and talent to maintain electronic systems, it is clear that paper-based trade will not go away anytime soon.

New Zealand is not at the forefront of paperless trade and does have some work to do to meet its IT ambitions. Fortunately, the government has agreed to upgrade IT systems as proposed by MPI (Ministry for Primary Industries 2022).

Internationally, a Trade Single Window (TSW) has been identified as best practice (United Nations 2018); the upgrades proposed by MPI will not fully align with a TSW but are a step in the right direction.

4 Grasping the opportunity and its implications

4.1 What do we need to work on?

As signalled in section 1.2, international agencies have been working on standardising digital processes since the 1960s. Organisations such as the World Bank, ICC, WCO, international shippers, and many national and international players are also making a concerted effort to develop paperless trade.

To illustrate the scope of what is required, we look at three areas where action needs to be progressed:

1. Politically. Politics always comes first. In any area requiring major changes to regulatory settings, the politics decide the economic and social impacts. Paperless trade is no different from any other regulatory setting. The rhetoric of the Digital Economic Partnership Agreement (DEPA) needs to be converted into domestic administrative action.

Many documents have illustrated the benefits of paperless trade (United Nations 2014; UNCTAD 2020; Duval 2017; WTO 2015). NZIER (2021) has likened the benefit gains to a high-quality FTA. A critical factor for ensuring that paperless trade has a high level of political support.

2. A policy framework that allows for equal treatment of paper and paperless trade. Given that New Zealand is a trader with the world, it is very unlikely that all jurisdictions will be able or willing to engage in paperless trade. To bring paperless trade to the same level as paper trade requires:

    – The development of a legal framework that allows for legal validation of electronic documents and complies with the UN's MLETR.[5]

    – The building of coordination and capability within New Zealand provides policy back-up to the development over time of a TSW approach.

    – Using international models such as those developed by the World Customs Organisation (WCO). The WCO has developed a data model with the aim of providing a universal language for cross-border data exchange, enabling the implementation of Single Window systems and supporting Data Analytics (WCO, n.d.)

Seven countries have fully adopted the MLETR. The MLETR is central to the paperless trade process since it aims to enable the legal use of electronic transferable records both domestically and across borders.

As part of its Digital Standards Initiative, the ICC has set up a progress report for UN member states (ICC 2023a). It shows which countries have fully adopted the MLETR and the progress of other members.

A successful paperless trade environment will require cross-government coordination. If high-level political support is forthcoming, then the resources will be available to underpin a whole-of-government approach.

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[5]   https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_transferable_records

Specifically, this means developing software solutions and using international accreditation frameworks that drive interoperability of paperless trade (see Figure 4). This includes the technical infrastructure, cross-domain interoperability, and domain-specific standards development that allows for seamless domestic and international connection of permissioned parties.

3. Possibly the least difficult part of the paperless trade environment is the choice of technical solutions. Almost all those interviewed in the industry for this project suggested that the technology was available, and for some parts of the paperless trade environment, it had been available for some time.

According to the ICC (2023b), the key elements for the paperless environment are:

- Making systems and platforms compatible by design: Electronic data interchange systems must work with at least one major recognised standard and ideally with multiple standards.

- Aligning to best practice definitions of key data elements: Organisations issuing and accepting data, as well as relevant regulators, should align to best practice definitions to ensure interoperability.

- Using existing agreements to adapt to a changing environment: Regulators need to explore ways to collaborate on new trade standards for emerging digital trade issues like smart contracts.

- Pursuing a 'digital by default' strategy: Organisations should aim adopt a 100% paperless document issuing process, eliminating paper documents and wet stamps from the outset.

We need to stress that we are technology-neutral. We are not advocating any particular approach or technology. The key prerequisites are ensuring the security of data and interoperability to stimulate confidence in the system and data accessibility.

Figure 4 The pillars of digital trade

HIGH-LEVEL POLITICAL CONSENSUS	POLICY FRAMEWORK	TECHNOLOGY & TECHNICAL STANDARDS
Trust and confidence that it will benefit all traders	Legal, capability enhancement, and implementation strategies	Underpinned by UN/CEFACT, e.g., the Cross Industry Invoice (CII)
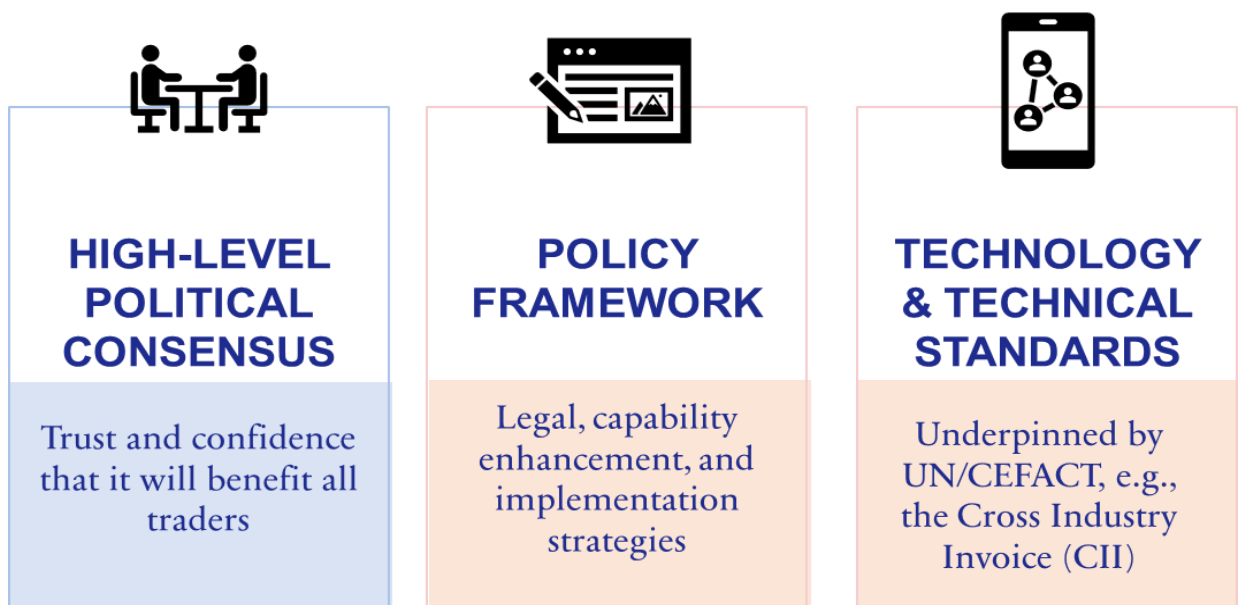
Source: NZIER

4.2 What are we trying to do? The aims

Paperless trade has the potential to invigorate New Zealand's trade further and sustain it as traders capitalise on the opportunities for more efficient and effective trading. Anything that improves connectivity with trading partners is likely to significantly benefit New Zealand regardless of what is being traded.

Further, the opportunity exists on our trading doorstep: the Asia Pacific. While other nations are pushing hard (notably the United Kingdom), the Asia Pacific is where the paperless trade 'action' is being promoted. Countries like Singapore, an entrepot for the region, are furthest along the paperless trade track.

The aim for New Zealand should be to move along the paperless trade track 'as fast as it can' given that it needs to:

- Ensure that the New Zealand regulatory environment and wider business community are brought along with the paperless trade process, particularly smaller exporters.

- Influence others in the region to do the same.

Architecture is required to be flexible since:

- New Zealand will have to conform to international standards that govern paperless trade. We cannot reinvent the wheel since this could disrupt our supply chains. New Zealand is not at the forefront of paperless trade development, so we need to avoid playing catchup or, worse, having data standards imposed upon us that disrupt our supply chains or are costly to comply with relative to our competitors.

- Each nation will have different views and priorities around paperless trade. Paperless trade will be adopted at different speeds, meaning paper and paperless trade will exist side by side for the foreseeable future (short to medium term).

- Each nation will have different technologies (internally and externally) that will need to be 'joined up'. The ability to be interoperable will be critical. However, we know that some companies are using translation tools to overcome interoperability issues.

4.3 To understand the opportunities, we need to understand the gaps in our current situation

Governments have important roles in supporting the beneficial diffusion and use of digital technologies. To understand what is needed, a good place to start is the joint publication between the New Zealand and Australian Productivity Commissions' (The Australian Productivity Commission and The New Zealand Productivity Commission 2019). In their executive summary, two important issues are raised:

- Fit-for-purpose digital regulation, particularly since most firms are small to medium size. This is important for New Zealand since we are attempting to increase the export exposure of MSMEs and SMEs.

- Transformation of government services. Digital provision has the capacity to transform government delivery. This is both a challenge and an opportunity for government.

Given the importance of the trans-Tasman relationship, the digital opportunity exists to improve the efficiency and integration of the two economies. Also, what we do digitally with Australia needs to be seamless with how we approach the rest of the world. Getting

our digital approach right with Australia (or Singapore, the United Kingdom, etc.) has huge ramifications for our overall approach to paperless trade.

Any paperless trade connection New Zealand could make with a target country is highly dependent on the progress that the country makes towards their new single window environment and related trade facilitation moves.

4.4 This is hard, and New Zealand officials have been progressing paperless trade

New Zealand officials have been engaged with and have been actively attempting to progress paperless trade for some time. Of particular importance was the formation of the Digital Economic Partnership Agreement (DEPA) between Chile, Singapore and New Zealand.

The DEPA, signed in 2020, acts as a way of considering all aspects of the digital economy (not just paperless trade) and builds on the work being done internationally (through APEC, OECD, WTO, and UN ESCAP). The South Koreans have joined the DEPA, and a number of other countries have signalled their strong interest.

What this means is that we have a trade policy vehicle in which we could drive paperless trade with a coalition of the willing. This is a good start.

New Zealand also has a Trade Single Window, which New Zealand is committed to under the WTO Trade Facilitation Agreement (TFA). While it has not quite reached an ideal standard for all documents/data for imports, exports, and transit goods for all government agencies, they are moving towards that and meeting TFA standards.

Experience from the front line of paperless trade include:

- The significant challenges in data alignment and standardisation. There are a myriad of issues around tariff classifications, entity identification, and accurate cargo valuations. For example, experience with WCO Data Model 3 shows there are still definitional issues. WCO version 4 has now been released, and we expect that improvements have been made in what is a dynamic process (WCO 2023).

- Paper-based systems are entrenched. In the post-COVID period, we are seeing backsliding from countries on electronic processes. During the pandemic, they were accepting electronic documents, but now they will only accept paper forms.

- Privacy remains the number one priority. All benefits of paperless trade are negated if privacy is compromised. The Maersk-IBM blockchain approach used for the TradeLens Platform was discontinued in 2022, reportedly because of privacy concerns. The go-it-alone approach by Maersk has been replaced with nine of the world's largest shippers getting together to drive digitised trade.

- The roles of the private sector and government are being blurred with paperless trade. Many of the innovations will come from the private sector; in fact, most technology has been available for a number of years. However, the cross-border nature of the trade means that implementing government systems, ensuring the systems cannot be compromised, upgrading legacy systems, and overall oversight of goods crossing the border will be the responsibility of governments.

- Possession (of goods and services) is one of the critical legal issues that will need to be made more transparent. Understanding where possession takes place and what standing the information/data has at particular points in the supply chain will need to be sorted out. The role of trust in a repeat game may be come crucial in accessing the benefits of paperless trade.

- The approach will have to start with a small group of core countries (or one country) where trust in systems and approaches is high. The aim will be to demonstrate that it works overtime. The demonstration effect of a successful paperless trade system will have a powerful impact on those nations that aspire to trade-led growth.

- There are risks which will have to be ironed out over time. There are significant examples of failure, particularly around IT systems, but the benefits are also significant.

Throughout the development of paperless trade, trust will be a significant part of the supply chain process that leads to successful paperless outcomes. Without trust between countries that form a 'coalition of the willing' on paperless trade, it is difficult to see a way forward.

5   Implementation coordination is the key

What might an action plan do to enable a paperless trade environment? Below, we look at possible actions. **The government needs to be at the forefront of any paperless trade action**. A high-level political commitment to driving paperless trade solutions is required since paperless trade requires changing how the government organises the border. This is particularly the case for New Zealand, a small open trader, who in March/April 2020 had consignments stuck in ports all over the Asia Pacific since many of the planes – which carried the documentation for these consignments – had stopped flying because of COVID-19 regulation.

The approach set out below is based on the United Nations Economic and Social Commission for Asia and Pacific (UN ESCAP) blueprint. As a policy taker, there is no point in New Zealand developing its own criteria. By adopting international approaches (such as the UN ESCAP approach), New Zealand will be in sync with the 'international paperless trade language' being developed to assist New Zealand's trading partners. UN ESCAP is a strong advocate for paperless trade, emphasising the need to:

- Adopt international standards and harmonise legal frameworks, as well as promote public-private sector cooperation.

- Develop and test legal and technical solutions for cross-border paperless trade.

Further, investing in digital infrastructure remains one of the central planks to enabling seamless data transmission. Encouraging interoperability is key to enabling consistent data flows powering the paperless approach. By aligning data collection and data-sharing processes, governments can significantly increase how much information can be shared cross-border.

Table 1 Actions required to move paperless trade forward
UN ESCAP approach based on international best practice

Issues that need to be addressed	Status quo	Action required
Institutional and governance approach		
Domestic/international arrangements are required to enable the development of electronic transferable records (see Appendix B for more detail)	New Zealand has two steps out of eight completed.	New Zealand is behind other nations, such as Singapore, which has signed the DEPA. To underpin paperless trade the other six steps to legally underpin paperless trade.
Create a coordinating group of stakeholders	As yet, New Zealand has a loose set of stakeholders with no coordinating functions.	A process that regularly brings together all stakeholders is required.
Designate a lead agency	Required.	With no lead agency, the risks increase that a seamless domestic and international approach could flounder. New Zealand needs to designate a lead agency with enough authority.
Automation		

Issues that need to be addressed	Status quo	Action required
Make the regulatory agencies ICT-enabled	MPI is moving to a trade certification system, and all exporters will be using the system by 2025. Currently, most imports are cleared within 30 seconds of lodgement.	How all imports and exports are dealt with requires a coherent and coordinated approach. MPI's new trade certification system assists this process and is a major step forward.
Level of automation	We have seen increasing levels of automation. A critical point is that these systems are developed with the ability to connect domestic and international permissioned parties (interoperability).	New systems, such as MPI's trade certification system, are required to interconnect with domestic and international data flows.
Capacity building	Interoperability should be mandatory for IT investments.	Countries are developing systems relatively quickly, and New Zealand needs to be aware of international progress. AI may also accelerate this process.
Development of Single Window or similar environment	New Zealand has developed a TSW.	Improvements will be necessary, given the importance of the TSW and the WTO's TFA.
ICT Infrastructure for paperless trade		
A strategic plan is required to ensure ICT continuity	MPI and Customs have articulated the need for a paperless trade environment.	New Zealand needs to set out a strategic plan to show how its ICT comes together in a seamless approach over time.
Ensure that systems are in place that allow for data harmonisation domestically and internationally	As has yet not been addressed, there is a recognition that paper and paperless trade will need to co-exist.	Paperless trade is required to be the default position.
Awareness and capacity building		
Build awareness and capacity on paperless trade for stakeholders	COVID-19 demonstrated the importance of paperless trade.	There needs to be a general agreement that paperless trade is the right approach.
Efforts to raise awareness	Governments, not-for-profits and businesses are starting to understand the potential efficiency gains.	Further resources are needed to raise awareness.
Efforts to build capacity	MPI is bidding for resources to build a new cloud-based system.	We must ensure that a TSW is the long-term goal.
Ensure ongoing resources are available for ICT budgets	There is an awareness that paperless trade will change the way that departments respond to trade.	Paperless trade will be a significant commitment and require ongoing resources and capabilities to connect with our trading partners (which they will expect).
Facilitation of cross-border electronic data exchange		
Ensure systems are relevant for domestic and cross-border paperless trade	This is happening in a piecemeal way.	This is a critical challenge that will need to be met.

Issues that need to be addressed	Status quo	Action required
Participation in regional, subregional and bilateral initiatives on cross-border trade	This is happening with trading partners. New Zealand is participating in a number of pilot paperless trade operations.	While several pilot projects are being run, New Zealand needs to understand the costs and benefits associated with each pilot. New Zealand also needs to be clear about how these pilot projects fit into the bigger picture of advancing paperless trade.
Join international transit regimes	The development of a transit regime has not been required because of New Zealand's position in the supply chain.	It may be possible for New Zealand to develop/join a transit regime if a business case shows a viable regime can be developed.
Participation in joint inspection programmes	New Zealand has been very proactive in joining these types of programmes.	Ensure documentation of these activities.
Introduce Authorised Economic Operator (AEO)	These programmes began in New Zealand in the 1990s.	Vital building blocks that foster the repeat games required in the supply chain to build trust.

Source: Adapted from UN ESCAP blueprint

5.1 The legal basis for the operation of a paperless trade system

The operational aspects of paperless trade will require legal underpinnings. Of critical importance is document equivalence. The laws governing paper and paperless trade are required to be functionally equivalent. This assists with the cross-border legal recognition of transactions and documents.

New Zealand has yet to produce the legal mechanisms required to introduce paperless trade. The critical issue is possession. You cannot possess a stream of electrons. What is the status of supply chain information at any given point in the supply chain, i.e. when does that information/data become legally enforceable?

With the aim of paperless trade to have similar effects and functionality as its paper equivalent, ways must be found to ensure workability. One way to do this is to set out gateway criteria. These consist of criteria that set out:

- Content requirements – what do documents/data need to say to make them operational/enforceable?

- The reliability requirements of the underlying digital system that is producing the documents/data.

- The integrity of an electronic trade document (originality and authenticity).

- Who has access and control of the information/data to ensure that the documents remain unaltered over time.

- How divesting of that control can occur (if at all).

- How reliable is the information/data identification of the persons in control of a document at any time?

As yet, we are unclear how this will work in practice. However, New Zealand is not at the forefront of developing and applying the legal underpinnings of paperless trade. We need to learn from other regions that are further ahead in this process.

In the following table, we set out the types of issues that need legal consideration.

Table 2 Legal recognition, international guidelines, and good practice

Legal issue	International guidance and good practice	Action required
Legal recognition	Required to enact a paperless trade environment.	
Accepting electronic forms of selected documents	Some international agreements guide the alignment and legal recognition of paperless transactions. These include treaties dealing with customs details (e.g. the WTO's TFA) and treaties dealing with the transport of goods (e.g. Customs Convention on the International Transport of Goods under the TIR Convention).	Understanding how New Zealand can integrate international best practice into legislation and regulations requires serious consideration.
Giving legal recognition for digital transfer	Some international agreements provide obligations of the parties to a contract and, by doing so, give legal recognition to electronic communications. These include treaties dealing with commercial contracts (e.g. the United Nations Convention on the Use of Electronic Communications in International Contracts) and international agreements dealing with trade by sea (e.g. UN conventions on goods carriage by sea).	New Zealand needs to pursue and implement international agreements that actively support paperless trade.
Models for harmonised law	Use of national-level models to harmonise the law across jurisdictions. For example, the UNCITRAL Model Law on Electronic Commerce provides jurisdictions with internationally acceptable rules for forming electronic contracts. Guidelines are also available to provide criteria to facilitate the use and acceptance of electronic certificates (see ESCAP Legal Readiness Assessment Guide and Checklist).	Implementing paperless trade requires equivalence. Legislation in New Zealand is required along the lines of the Model Law on Electronic Commerce.
Trust in trade	Trust services assure the quality of the data.	
Conventions and treaties	Typically, they contain best endeavours or mandatory clauses on trust in trade (e.g. the United Nations Convention on the Use of Electronic Communications in International Contracts for electronic signatures used in commercial exchanges).	New Zealand will need to trust and continue to trust official data sources from importing/exporting partners. Negotiations setting out the basis of that trust are required.
Regional and international mutual recognition schemes	Mutual recognition agreements can provide specific approaches that recognise conditions for the use of electronic communications (e.g. around electronic signatures).	Nuts and bolts issues such as the status of electronic signatures are at the heart of paperless trade. These issues will need to be pursued in parallel with the introduction of a model law.
Model laws and guidelines	Supports legal harmonisation efforts, e.g. the UNCITRAL Model Law on Electronic Signatures.	New Zealand needs to take an active interest and pursue it.
Contractual frameworks	Private sector organisations can provide cross-recognition/certification agreements that enable electronic exchange, e.g. the Pan Asian E-Commerce Alliance Mutual Recognition Framework.	Work is required in New Zealand to ensure the seamless delivery of services across agencies and the private sector.

Legal issue	International guidance and good practice	Action required
Data governance	Ensuring that only permissioned parties have access to the data. Compromising data confidentiality, privacy, and security will erode the benefits of electronic exchange.	Work is required as part of a package. Without security in place, the system is compromised, and benefits are eroded significantly.
Liability and dispute settlement	Legal systems tend to require people whose fault causes harm to others to repair the harm or to make up for their losses, i.e. the goods traded do not live up to a specified standard in domestic law. The same principle should be applied to cross-border paperless trade (to ensure equivalence with other economic activity).	Work is required to ensure the equivalence of paper and paperless trade.

Source: Adapted from UN ESCAP blueprint

5.1.1 Other issues critical to enabling a paperless environment

Other critical issues around data security, types of payments, types of messages that can be sent, etc., need to be clearly established prior to setting up a paperless trade environment that will run parallel to a paper environment.

These issues are set out in the next table. Action will be required in all of these areas.

Table 3 Critical issues that need to be addressed

Other critical issues	International guidance and good practice
Digital identity	Identifies who is sending data to whom.
Identification of legal entities	Identification of supply chain participants is essential (these are the permissioned parties).
Identification of objects	These include products and containers, ships, planes, etc.
Electronic payments	The ability to make payments and the various forms of transactions are required to be identified. These can be B2G (fees and duties), fees for logistics (B2B) and purchases (B2B and C2B).
Data models, standards, and semantics	Unambiguous messages must be used. Data compatibility is one of the main issues that needs to be addressed to solve interoperability challenges. UN/CEFACT and WCO have developed libraries of semantics and data models to standardise electronic processes. The standards are detailed in the WTO/ICC toolkit (2022).
Communications protocols	Protocols are the rules that govern the way a system functions to enable communication. The rules define the semantics and syntax required.
Connectivity	How permissioned parties connect with networks. Lack of a secure connection, proper speed and high cost will impede the paperless trade system.
Data security	Specific technical measures are necessary to underpin security, confidentiality, and privacy. These measures will underpin the users' confidence in the supply chain electronic communication.

Source: Adapted from UN ESCAP blueprint

6   Conclusions

6.1   The benefits are clear; the focus should be on the costs and the implementation pathway

The benefits of moving to a paperless trade approach for the supply chain are significant. They are akin to a high-quality trade agreement. And just like other plurilateral and multilateral agreements, the more countries that join, the more likely it is that benefits will increase for all participating nations.

The issue is not the benefits but how we develop an intervention logic that sets out the pathway for New Zealand and also encourages other nations to participate. Paperless trade will also incur upfront costs and behavioural change.

6.2   What has been done and what needs to be done

From the interviews, webinars and literature reviews, the following points can be made:

- The United Nations has been working on paperless trade initiatives since the 1960s, and they have recognised that they can provide significant benefits for all nations. This is why they have either funded or been very supportive of the following:

  - Development of standards. The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) has developed and is developing harmonised international standards to promote seamless business transactions through the promotion of harmonised standards.

  - The development of legal frameworks. For example, the UN's MLETR is a model law on transferring goods and a model law on electronic signatures (UNCITRAL MLES). These model law frameworks allow for the use of transferable documents and instruments in electronic form. Transferable documents and instruments typically include bills of lading, warehouse receipts, bills of exchange, promissory notes and cheques. National law qualifies a document or instrument as transferable.

This is important since it develops an 'international language of paperless trade', which assists in ensuring interoperability. There are still issues to be sorted through – particularly the legal standing of goods before they reach official sources (such as Customs). However, given goodwill and experience, these issues can be overcome.

The critical point for New Zealand to take advantage of paperless trade advances is to ensure that it has its own house in order as we move forward into a paperless environment. We must ensure that we follow through on our commitments in the DEPA. Over time, we need to:

- Move forward with a whole of government approach to paperless trade. Coordination is the key component for success. This requires someone to be in charge of the process, preferably in the Prime Minister's office. The significant gains from paperless trade warrant a 'full court press' to make it happen over the medium term.

- Examine the pace of change in paperless trade in like-minded nations and take steps to move the process forward in New Zealand. There are detailed plans available for New

Zealand to follow internationally, and progress towards goals is being monitored internationally.

- Build the capability required to maintain a paperless trade system (both public and private). This will be a challenge since IT capability will continue to be scarce, and the need for IT will increase.

- Facilitate cross-border trade. Establishing a workable and durable approach with paperless trade as the default system will not only require willing partners but also trust that the systems will operate efficiently and effectively.

- Incorporate legal recognition, which is at the heart of the paperless trade system. New Zealand will need to establish who has possession of consignments at any particular point in the supply chain, how sanctions are applied to transgressors, and how to treat paper and paperless trade equally.

- Understand how we deal with critical issues such as the nature of the interoperability challenge and how New Zealand will connect with international efforts to generate electronic data transfers.

6.3   The challenges faced

Technology to enable paperless trade, whether from a government or business perspective, is not the constraining factor. Moreover, some of the technology has been available for ten to twenty years and has been applied successfully in domestic settings.

As part of this process, the ultimate objective is to ensure that we arrive – over time – at a fully functioning TSW. This is the best international practice. We also need to remember that the risks of this type of technology are starting to reduce. We now have well-established international practices being developed on paperless trade.

As international logistics companies set out their strategies and implement their processes, policy in New Zealand must ensure that we are not forced into ways of working that are not optimal for New Zealand. Therefore, New Zealand's challenge is ensuring that we have the training and skills necessary to operate the system required and the IT and capital investment needed.

7   References

APEC. 2010. "Assessment and Best Practices on Paperless Trading to Facilitate Cross Border Trade in the APEC Regi." APEC#209-CT-01.11. https://www.apec.org/Publications/2010/06/Assessment-and-Best-Practices-on-Paperless-Trading-to-Facilitate-Cross-Border-Trade-in-the-APEC-Regi.

DCSA. 2023. "DCSA's Member Carriers Commit to a Fully Standardised, Electronic Bill of Lading by 2030." DCSA. 2023. https://dcsa.org/newsroom/resources/dcsas-member-carriers-commit-to-a-fully-standardised-electronic-bill-of-lading-by-2030/.

Developing Trade Consultants. 2016. "Value of Air Cargo: Air Transport and Global Value Chains." Commissioned by IATA.

Duval, Yann. 2017. "Digital Trade Facilitation: Paperless Trade in Regional Trade Agreements." *ADBI Working Paper Series*, 42.

ESCAP. 2018. "Draft Road Map for the Implementation of the Substantive Provisions in the Framework Agreement on Facilitation of Cross-Border Paperless Trade in Asia and the Pacific.".

———. n.d. "Webinar Series on Accelerating Cross-Border Paperless Trade Facilitation." https://www.unescap.org/event-series/paperless-trade-2022.

González, Javier López, and Marie-Agnes Jouanjean. 2017. "Digital Trade: Developing a Framework for Analysis." 205. *OECD Trade Policy Papers*. OECD Trade Policy Papers. OECD Publishing. https://ideas.repec.org/p/oec/traaab/205-en.html.

Ha, Sung Heun, and Sang Won Lim. 2014. "The Progress of Paperless Trade in Asia and the Pacific: Enabling International Supply Chain Integration," 45.

ICC. 2023. "Digital Standards Initiative." 2023. https://www.dsi.iccwbo.org/_files/ugd/8e49a6_3b277f4444f04ffcaef2b16f667ef6e4.pdf.

Ministry for Primary Industries. 2022. "Investing in the Future of Certification to Support Trade of Primary Exports and Imports." Cabinet Paper.

New Zealand Customs Service. 2022. "Analysis and Pathway for Paperless Trade Report." APEC Project SCCP 02 2021S. https://www.apec.org/docs/default-source/publications/2022/3/analysis-and-pathway-for-paperless-trade-report/222_sccp_analysis-and-pathway-for-paperless-trade-report.pdf?sfvrsn=fdd43e59_2.

NZIER. 2021. "Digital Trade Is the Way Forward for New Zealand." Report to TradeWindow.

OECD. 2019a. "Digital Trade." Trade Policy Brief. https://www.wita.org/wp-content/uploads/2020/06/Digital20trade.pdf.

———. 2019b. "Seizing the Productive Potential of Digital Change | OECD Economic Surveys: Estonia 2019 | OECD iLibrary." 2019. https://www.oecd-ilibrary.org/sites/af0dffc7-en/index.html?itemId=/content/component/af0dffc7-en.

———. 2019c. "The Critical Role of Trade Facilitation in Supporting Economic Diversification and Structural Reforms." In *Aid for Trade at a Glance 2019: Economic Diversification and Empowerment*. Paris: OECD Publishing. https://www.oecd-ilibrary.org/development/aid-for-trade-at-a-glance-2019_f57c8757-en;jsessionid=cBMbBOCOW43skaVtfLno1QIy.ip-10-240-5-35.

The Australian Productivity Commission, and The New Zealand Productivity Commission. 2019. "Growing the Digital Economy in Australia and New Zealand." Joint Report. https://www.productivity.govt.nz/assets/Research/b32acca009/Growing-the-digital-economy-in-Australia-and-New-Zealand_Final-Report.pdf.

Towse, R, ed. 1997. *Baumol's Cost Disease: The Arts and Other Victims*. Edward Elgar.

UNCTAD. 2020a. "Paperless Trade Facilitation in 2019: Global and Asia-Pacific State of Play." 2020. https://unctad.org/news/paperless-trade-facilitation-2019-global-and-asia-pacific-state-play.

———. 2020b. "Paperless Trade Facilitation in 2019: Global and Asia-Pacific State of Play." 2020. https://unctad.org/news/paperless-trade-facilitation-2019-global-and-asia-pacific-state-play.

UNESCAP, and ICC. n.d. "Cross-Border Paperless Trade Database." ICC Digital Standards Initiative. Accessed November 4, 2024. https://www.digitalizetrade.org/mletr.

United Nations. 2014. "Estimating the Benefits of Cross-Border Paperless Trade," 36.

———. 2017. "Paperless Trading: How Does It Impact the Trade System?" United Nations. http://www3.weforum.org/docs/WEF_36073_Paperless_Trading_How_Does_It_Impact_the_Trade_System.pdf.

———. 2018. "Single Window for Trade Facilitation: Regional Best Practices and Future Development." Policy Brief. https://www.unescap.org/resources/single-window-trade-facilitation-regional-best-practices-and-future-development.

———. 2019. "Digital and Sustainable Trade Facilitation: Global Report 2019." https://www.unescap.org/resources/digital-and-sustainable-trade-facilitation-global-report-2019.

United Nations Economic Commission for Europe. 2006. "A Roadmap towards Paperless Trade." ECE/TRADE/371. https://unece.org/fileadmin/DAM/cefact/publica/ece_trd_371e.pdf.

WCO. 2023. "Release of Version 4 of the WCO Data Model." World Customs Organization. 2023.

———. n.d. "WCO Data Model." World Customs Organisation. https://www.wcoomd.org/DataModel.

WTO. 2015. "World Trade Report 2015 Speeding up Trade: Benefits and Challenges of Implementing the WTO Trade Facilitation Agreement." https://www.wto.org/english/res_e/publications_e/wtr15_e.htm.

Appendix A How business is approaching paperless trade

Companies involved in trade are reticent to volunteer information on paperless trade since it tends to be core to their own business practice. This is a good thing since it is likely that the gains from paperless trade will be significant once they have overcome the hurdle of putting it in place. As an indication, the immediate savings on couriers can be as much as $30,000 per annum for a medium-sized export-oriented company and much higher for bigger companies.[6]

This is before the important efficiency gains that drive the motivations for paperless trade are realised.

A.1 Introduction to the companies

The early adopters of paperless trade technology are typically medium to large companies/entities with an export focus. Most are involved in land and sea-based exports, but not all, e.g. Air New Zealand, have a keen interest in paperless trade transactions. Companies like Fonterra have been on the paperless trade "journey" since the early 2000s.

A casual glance at the TradeWindow website[7], which hosts the bulk of companies using paperless trade products, confirms that food and beverage companies are heavily represented. While paperless trade provides benefits for all companies, it is particularly important for food companies since hold-ups anywhere along the marketing chain can potentially spoil or adversely impact the price points in the market. It also improves the flexibility for products such as coffee, e.g. the provision of consistent labels, multiple languages for content, counterfeit protection, and critical information for resellers.

Other companies are still coming to grips with the paperless approach they will take. They are closely watching how their supply chain partners are approaching and/or embracing new technologies and attempting to work out where they 'fit'. For example, one company commented on the variable use of paperless trade when dealing with perishable goods. Some countries use electronic health certificates, while others do not. This meant they were taking a wait-and-see approach before investing heavily in a digital approach:

"… *in the end, the markets will decide where we go on paperless trade*." (Interviewee).

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[6] Communication with interviewee.

[7] https://tradewindow.io/your-industry/

Table 4 Categories set out on the TradeWindow website

TradeWindow website accessed 15/11/2023

Sectors and industries	Selected companies
Coffee	Mercanta, S&D, Mastercol
Dairy	Open Country, Mataura Valley Milk, Westland Milk Products, Synlait
Forestry	AVATimber, Ernslaw One Limited, LumberLink, Pan Pac, PFP Group, Red Stag, Sequal
Honey	The House of Honey, Barkman Honey
Horticulture	Cedenco, Freshco, T&G
Seafood	Moana, Prepared Foods, Sealord, Markwell Foods, Independent Fisheries
Meat	ANZCO, Farmlands Mathias International, Greenlea, Kereru Foods, Wilson Hellaby
Seed & Grain	Carrfields, Townsend Seeds International
Manufacturing	Altus, Framecad
Speciality	Eagle
Wine	New South Wales Wine
Other	Bremworth, Jacklinks, Jomawool, Michell, Waste Management, Whittaker's

Source: NZIER

A.2 Why paperless trade

It needs to be emphasised that all firms thinking about or using paperless trade systems will have to utilise the full range of paper and paperless trade systems since some countries will take time to develop the technology. Dual systems will be required.

Despite this, the logic of paperless trade is inescapable. For a large entity such as Fonterra, which deals with 140 countries and has approximately 50,000 transactions per annum (each transaction could be one container or 1,000 containers), digitising trade and having a deliberate strategy to digitise trade processes is critical.

The approximately 50,000 transactions per annum that Fonterra is involved with produce a further 190,000 sets of documents, i.e. one set goes to the bank, another to the customer, and another to the import broker, etc. There are multiple potential scenarios off the back of this, generating more paper.

The approach that Fonterra has taken is gradual. They have steadily put in the building blocks to improve the ability to take advantage of a paperless environment. The aims that Fonterra are pursuing include:

- Mitigating risk both from a customer and from a trade compliance perspective.

- Creating a good experience (probably a repeat game) for supply chain participants.

- Cost-effectiveness is maximised (i.e. reducing costs per unit and moving resources to where they are most needed).

- Encouraging innovation.

- Keeping up with how our customers and supply chain partners are operating.

Smaller companies are driven by what is happening in their markets. They tend to be less proactive about paperless trade (since they face higher fixed costs relative to bigger companies and the lack of capability to re-organise their back office). Still, they will embrace change if the changes are happening in the marketplace.

A.3   The mechanics of paperless trade

The range of strategies used by companies differs depending on volume, price, and product destination. Anecdotally, some companies are taking a gradual approach while others are waiting to see how their supply chain partners react/participate.

Air New Zealand is interested in how it might convert its paper-based systems into digitised systems in a situation where the benefits of paperless trade depend on an industry-wide approach.

In the first instance, a target for digitisation is air cargo processes; these are largely paper-based (see as outlined below by IATA, Figure 5). What is needed is a mixture of government and commercial documents to become paperless. Currently, the focus is on:

- Digitalisation of air cargo documents, including the processes involved:

  - Air cargo has 12 core documents (in red, Figure 5). Making these transactions paperless would support air cargo efficiency and business continuity plans.

  - Many countries in our region have been focusing on paperless documents for exports but have not started on import processes, or they have implemented full paperless trade, but on the ground, the paper document is still required by some of the agencies. Dual systems will be needed.

- Digitalisation of other trade documents:

  - Full paperless trade can be realised only when no paper documents are required, and these would include documents for various government agencies for tariff exemption and safety and security reasons.

  - This would include a security status declaration (17 on the diagram), dangerous goods declaration and the remaining trade facilitation documents such as COO, CITES, phytosanitary certs, etc.

- The importance of a common message exchange standard:

  - More regulators are requesting advance cargo information and some preloading advance cargo information (PLACI) with the EU and UAE

  - Customs globally use different messaging standards, resulting in airlines having to pay hefty costs to translate these standards to adapt to the customs standards. Besides costs, this has resulted in message truncation or losing part of the content, and airlines have reverted back to manual processes to avoid penalties or cargo stoppage.

  - A common message standard would help the industry save costs and be compliant. IATA has been promoting Cargo XML standards and the next-generation message standards – ONE Record and recommends using these standards to improve airline compliance and achieve cost savings. Creating enforceable disciplines within IPEF could prove useful.

Figure 5 e-Freight, possible scope

Source: Air New Zealand, IATA

A.4 Costs and benefits

Companies point to the benefits of paperless trade as the main reason for driving down a paperless route. A typical 'vision' for a firm is to eliminate as much of the paper as possible and continue to meet and comply with all regulatory and supply chain partners' standards. In this way, a firm can drive:

- A reduction in price per item shipped. Managing paper is time-consuming and creates a series of manual processes (requires printers, increased paper storage, couriers and coordination costs). Paperless trade brings operational efficiency through the reduction of costs and time saved.

- Innovation, standardisation of rules and reduced barriers to trade. These are key building blocks for the development of new services and solutions.

- Improvements to the accuracy and data quality, e.g. through the use of auto-checks and mandatory fields.

- Improvements to regulatory compliance since electronic documentation facilitates compliance with international and local regulations.

- Facilitate ease of passage through the supply chain by avoiding detention and demurrage. Very important for perishable goods.

- Easier crime and fraud detection. By having a digital process with better controls and encryptions, digital signatures, and authentication, firms can mitigate the pain of fraud or mistakes made.

- More efficient use of working capital. For example, it can take 7 to 9 days to get to a bank in China, with possibly a site payment. If you can get those site documents to the bank faster (through electronic transactions), then we can have better finance utilisation.

- Further ease of business with no letters of indemnity, no lost bills, and it makes it easier to replace documents.

According to firms, the costs of paperless trade for firms (and government) are around funding a re-organisation of their back office, managing that transition, and having the capability to operate the various systems in a way that the benefits are captured. In particular, there are:

- Being able to cope with and see past the initial costs of back-office re-organisation.

- Having the right skills to evaluate and work the systems that need to be implemented both in government and businesses.

- Ensuring that data security is paramount. Without data security, there are no benefits.

- Having the right mindset since paperless trade requires a fundamental rethink of the back-office and how you operate.

Further, the government will need to ensure they:

- Have the necessary legal regulation in place and be able to deal with the technical complexity.

- Can build the necessary trust in the system, particularly between border-facing institutions in the importing and exporting countries.

A.5 Implications: firms involved in paperless trade see the benefits

Firms engaged in paperless trade activities understand many of the challenges that must be overcome for a more complete approach to paperless trade. Not the least of these is a revamp of existing laws to reflect the realities of paperless trade.

Those at the forefront of paperless trade have represented their views to the government on what needs to be done and how approaches must change. They are also aware that:

- It is necessary to build consensus around paperless trade in the wider business community. A coalition of the willing is required to ensure that paperless trade works for medium and small players.

- Cooperation between firms and the government is necessary. This is not an area to compete in.

- Having a vision helps to bind the enabling strategy and tactics needed to make it happen. That is:

  - Every decision you make needs to be sheeted back to advancing the vision

  - Be supportive by bringing ecosystem partners on the paperless mission

  - Demonstrate how value can be delivered for supply chain partners – carriers, customers, etc.
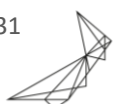
> – Don't believe the hype; keep experimenting, and do not deviate from international standards.

A.6 The challenges that firms and the government face

Fonterra has set itself a number of challenges involving cooperation with both government, internal change, and the wider business community. These challenges mirror the sentiment from other firms interviewed as part of this project:

- New Zealand needs a timelier e-health certification process (government) and the ability to use an e-bill of lading (the critical industry document for trade).

- Investigation of new technology, such as blockchain or other competing technologies, which may provide similar results.

- Technology is not going to hold back the development of a paperless trade environment, but the ability to develop intra and inter-government digital connections requires a proactive mindset.

- A TSW is a fundamental premise of a certification programme. We need to ensure that, over the longer run, this is front and centre.

- Best practice means not just developing a better technical suite that is doing things in the same way as we do today. New Zealand Inc. needs to ensure that we are looking forward and that systems deliver the benefits.

Appendix B New Zealand's progress on electronic trade

UN ESCAP and ICC have developed a MLETR Tracker to illustrate what is needed to develop a legal framework that supports an electronic transferable record (UNESCAP and ICC, n.d.).

There are eight stages associated with the tracker:

- MLETR Socialisation: MLETR information has been conveyed and socialised with relevant policymakers within the government, and ownership of MLETR as an issue has been established within the government.

- Political support: Jurisdiction has committed to adopt or align to MLETR through (i) public statements; (ii) political declarations (e.g. G20 communique, G7 ministerial statements, etc.); or (iii) trade agreements.

- Domestic analysis: Jurisdiction has identified gaps in legal frameworks relevant to electronic transferable records.

- Readiness assessment: Jurisdiction has undertaken or received through technical assistance an assessment of laws requiring amendment.

- Stakeholder consultation: Jurisdiction has consulted with stakeholders, including industry.

- Legislative Drafting: Jurisdiction has drafted legislation to adopt or align with MLETR.

- Passage of Legislation: Draft legislation has passed through relevant parliamentary or executive processes to become law.

- Entry into Force: Relevant law has entered into force.

New Zealand has completed two of the eight requirements, while Australia have completed four, and Singapore has completed all eight requirements along with the United Kingdom.

ICC and UNESCAP do make the point that this is the latest information they have. Countries are making considerable progress, and updates are coming in all the time.

It also should be noted that this is just one building block on the path to paperless trade. Other requirements – such as the degree of coordination and ICT readiness – are just as important.