Interoperability of Electronic Invoicing Systems in the APEC Region

APEC Committee on Trade and Investment

February 2025

Asia-Pacific
Economic Cooperation

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Contents

Glossary **iv**

Executive summary **vi**

1 Introduction **11**

1.1 Background and context 11

1.2 The *'Principles for the Interoperability of Electronic Invoicing Systems in the APEC Region'* 11

1.3 Purpose of this review 11

1.4 Data Sources and methodology 12

1.4.1 Data Limitation 12

2 Trade and invoicing in APEC **13**

2.1 Trade value and trends 13

2.2 The growth of eInvoicing in APEC 13

2.2.1 Digital maturity of businesses 14

2.2.2 Other considerations relating to trade across APEC 15

3 eInvoicing state of play **16**

3.1 What is eInvoicing? 16

3.2 eInvoicing models 16

3.2.1 Interoperability 16

3.2.2 Continuous Transaction Control (CTC) Models 17

3.3 Comparison and compatibility between different models 18

3.4 Current state of eInvoicing across APEC 19

3.4.1 Australia 19

3.4.2 Brunei Darussalam 20

3.4.3 Canada 20

3.4.4 Chile 21

3.4.5 People's Republic of China 21

3.4.6 Hong Kong, China 21

3.4.7 Indonesia 22

3.4.8 Japan 22

3.4.9 Republic of Korea 23

3.4.10 Malaysia 23

3.4.11 Mexico 24

3.4.12 New Zealand 24

3.4.13 Papua New Guinea 24

3.4.14 Peru 24

3.4.15 The Philippines 25

3.4.16 The Russian Federation 25

3.4.17 Singapore 26

3.4.18 Chinese Taipei 26

3.4.19 Thailand 27

3.4.20 The United States 28

3.4.21 Viet Nam 28

4 Interoperability of eInvoicing systems **30**

4.1 Agreements promoting interoperability in digital trade 30

4.1.1 Chile; Korea; New Zealand; and Singapore 30

4.1.2 E-commerce Agreement 30

4.1.3 Australia and Singapore 31

4.1.4 United States (US) and the European Union (EU) 31

4.2 Examples of cross border interoperability in practice 31

4.2.1 Australia and New Zealand: 31

4.2.2 The European Union and VAT in the Digital Age 32

4.2.3 Italy and San Marino 32

4.2.3 Italy and San Marino 32
4.3 Challenges and key factors for achieving interoperability 33
4.3.1 Technical Interoperability 33
4.3.2 Regulatory and compliance considerations 36
4.3.3 Cost and resource constraints 36
4.3.4 Security measures and data privacy 37
4.3.5 Resistance to change 37
4.3.6 Complex business networks 37
4.3.7 Region-specific technical barriers 37
4.3.8 Stakeholder Engagement and Collaboration 37
5 Potential economic gains from enhancing interoperability 39
5.1 Economic benefits of interoperable eInvoicing systems 39
5.2 Quantifying the productivity gains and costs savings from greater adoption of eInvoicing in cross border trade 39
5.2.1 Data and methodological approach 39
5.2.2 Productivity benefit and cost savings 40
5.2.3 Economic impact of eInvoicing adoption 41
5.3 Other economic benefits of eInvoicing 44
5.3.1 Reduced cyber security risks 44
5.3.2 Improved accuracy and data quality 45
5.3.3 Enhanced transparency and visibility 45
5.3.4 Procure-to-Pay (P2P) Digitisation 46
5.3.5 Faster payment processing 46
5.3.6 Increased integrity and reduced tax evasion 46
5.3.7 Compliance and regulatory alignment 46
5.3.8 Potential impacts on the environment 46
5.3.9 Enhanced business relationships 47
5.3.10 Scalability and global reach 47
5.3.11 Stimulated economic growth 47
5.4 Summary of eInvoicing benefits 48
5.5 Costs of implementation 48
5.6 Costs and benefits and the impact of interoperability 50
6 Recommendations for implementing eInvoicing across APEC 51
6.1 Proposed recommendations for interoperability 51
6.2 Recommendations for economies based on eInvoicing maturity 53
6.3 Specific economy recommendations 54
A1. Appendix 1: Economy Summary 57
A2. Appendix 2: File Format Protocols and Data Exchange Formats 60
A3. Appendix 3: Economic modelling steps and key assumptions 62
A3.1 Overview of economic modelling for eInvoicing 62
A3.2 Identifying the value of bilateral trade flows between APEC economies and average transaction value 62
A3.2.1 International trade value across APEC economies 62
A3.2.2 Average transaction value and adjustment for bilateral trade relationships 63
A3.2.4 Calculating the number of bilateral transactions between APEC economies 64
A3.3 Evaluate productivity gains and cost savings per invoice 64
A3.3.1 Productivity metrics and cost saving assumptions 64
A3.3.2 Assumptions and data considerations 65
A3.4 Assessing potential economic benefits by economy at varying adoption rates 65
A3.4.2 Scenario analysis for adoption rates 66
A3.5 Caveats and limitations 67
A3.5.1 Range of results and scenario variability (Best case vs. Worst case) 67
Limitation of our work 68
General use restriction 68
Endnotes 69

Charts

Chart 2.1: Projected market value of electronic Invoicing (Billion USD), 2024 to 2028 14
Chart 5.1: Projected productivity benefits for APEC trade vs eInvoicing adoption rates (Billion USD) * 42
Chart 5.2: Annual APEC Economies' Productivity gains from eInvoicing (Billion USD) 43
Chart 5.3: Total eInvoicing benefit per transaction vs eInvoicing adoption levels (USD) 44
Chart 5.4: Simulated risk outcomes: Event probability, revenue loss, and exposure risk for key cybersecurity threats 45
Chart 5.5: Average overall cost to start using eInvoicing, by business size 49

Tables

Table 1.1: Potential annual productivity gains for APEC members at 50% of eInvoicing adoption levels* viii
Table 4.1: File Formats 35
Table 5.1: Potential annual productivity gains for APEC members at 50% of eInvoicing adoption levels* 42
Table 5.2: Electronic Invoicing costs assessment for multinational corporations* 49
Table 6.1: Recommendations for economies 53

Figures

Figure 3.1: Interoperability Diagram 16
Figure 3.2: Centralised model 17
Figure 3.3: Clearance (Pre/Post)model 18
Figure 3.4: RTR model 18
Figure 4.1: Agreements and practical examples of interoperability in digital trade 30
Figure 4.2: Agreements and practical examples of interoperability in digital trade 33
Figure 5.1: Key benefits of improving interoperability of eInvoicing systems 39

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- Sovos
- Tickstar
- Valta Technology Group

Glossary

Acronym	Full name
ABAC	APEC Business Advisory Council
ABS	Australian Bureau of Statistics
ANZ	Australia and New Zealand
APAC	Asia Pacific
APEC	Asia-Pacific Economic Cooperation
ASNs	Advance shipping notices
ATO	Australian Taxation Office
B2B	Business-to-business
B2C	Business to consumer
B2G	Business to government
BIR	Bureau of Internal Revenue
BIS	Peppol Business Interoperability Specifications
BPC	Business Payments Coalition
CFD	Comprobante Fiscal Digital
CII	Cross Industry Invoice
CIUS	Core Invoice Usage Specification
CPE	Electronic Payment Receipts
CRA	Canadian Revenue Agency
CTC	Continuous Transaction Controls
DAJ	Digital Agency, Government of Japan
DBNAlliance	Digital Business Networks Alliance
DEPA	Digital Economy Partnership Agreement
DFAT	The Department of Foreign Affairs and Trade
DJP	Direktorat Jenderal Pajak
DTE	Documento Tributario Electrónico
EAEU	Eurasian Economic Union
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration, Commerce, and Transport
eGUI	Electronic Government Uniform Invoice
eInvoicing	Electronic invoicing
EIPA	eInvoice Promotion Association
ERP	Enterprise Resource Planning
ETDA	Electronic Transactions Development Agency
ETO	Electronic Transactions Ordinance
GDP	Gross domestic product
GDT	General Department of Taxation
HTTP	Hypertext Transfer Protocol

HTTPS	Hypertext Transfer Protocol Secure
IMDA	Info-Communications Media Development Authority
IRAS	Inland Revenue Authority of Singapore
IRB	Inland Revenue Board
IRS	Internal Revenue Service
JCT	Japanese Consumption Tax
JSON	JavaScript Object Notation
LHDNM	Lembaga Hasil Dalam Negri Malaysia
LTS	Large Taxpayers Service
MBIE	Ministry of Business Innovation and Employment
MDEC	Malaysia Digital Economy Corporation
MSME	Micro-Small & Medium Enterprises
NTS	National Tax Service
OSS	One stop shop
P2P	Procure to pay
PDF	Portable Document Format
PINT	Peppol International Invoice
PKI	Public key infrastructure
REST	Representational State Transfer
RTIR	e-Tax Invoice & e-Receipt system
RTR	Real-Time Reporting
SAML	Security Assertion Markup Language
SAT	Servicio de Administración Tributaria
SdI	Sistema di Interscambio
SEE	Electronic Issuance System
SII	Servicio de Impuestos Internos
SMEs	Small and Medium Enterprises
SOAP	Simple Object Access Protocol
STA	State Taxation and Administration
SUNAT	Superintendency of the National Tax Administration
TAFIS	Treasury Accounting and Financial Information System
TTC	U.S.-EU Joint Trade and Technology Council
UBL	Universal Business Language
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
VAT	Value added tax
ViDA	VAT in the Digital Age
WTO	World Trade Organization
XML	eXtensible Markup Language

Executive summary

The project "Interoperability of Electronic Invoicing Systems in the APEC Region," led by the Department of Foreign Affairs and Trade **(DFAT)**, aims to build on the 2023 'Principles for the Interoperability of Electronic Invoicing Systems in the APEC Region' and responds to the APEC Business Advisory Council (ABAC) 2022 report, which emphasised eInvoicing as a fundamental component of digital supply chain finance and efficiency for Micro-Small & Medium Enterprises **(MSMEs)**.

Key Drivers and Objectives

The primary drivers of the project include fostering a better understanding of eInvoicing policies, infrastructure, and processes within the APEC region, and facilitating the effective implementation of the Principles across APEC economies. The project aims to overcome barriers to compatibility and integration of eInvoicing frameworks, thereby achieving the following objectives, to:

- Promote seamless connectivity for digital transactions across borders.
- Strengthen trust through reliable and secure digital transactions.
- Grant electronic invoices the same legal status as paper invoices.
- Align measures with global standards and recommendations.
- Implement policies and infrastructure for secure document exchange.
- Encourage the use of standardised protocols for interoperability.
- Exchange best practices to build understanding and confidence.
- Support the development and adoption of interoperable eInvoicing systems.

Vision

The vision of this project is to create a cohesive and efficient eInvoicing environment across the APEC region. This vision aims to bolster regional economic recovery, improve tax administration, and build the capacity of all APEC economies to benefit from interoperable eInvoicing systems. To achieve this, the project will promote best practices and identify and address barriers. The following goals outline the key aspects of this vision:

1. **Enhance Interoperability of eInvoicing Systems:**
Promote the global adoption of interoperable eInvoicing systems within the APEC region. Make interoperable the technical standards, legal frameworks, and business processes to promote seamless eInvoice exchange across different economies. This will reduce processing time and costs, minimise errors, and improve the security, efficiency, and reliability of cross-border trade transactions.

2. **Support Regional Economic Recovery:**
Enable businesses to trade efficiently, supporting regional economic recovery. Recognise the role of digital trade, including e-commerce and related technologies, in expanding existing markets and creating new trade possibilities. By improving the efficiency of business processes through interoperable eInvoicing, contribute to the economic recovery and growth of the APEC region.

3. **Improve Tax Administration Processes:**
Enhance tax administration processes by promoting eInvoicing systems. Provide tax authorities with real-time access to transaction data, improving tax compliance and reducing tax evasion. Facilitate better tax administration to increase government revenues and support public services.

4. **Build Capacity and Provide Technical Assistance:**
Build the capacity of APEC economies to effectively implement and use eInvoicing systems. Provide technical assistance, training, and resources to help economies develop the necessary infrastructure, legal frameworks, and business processes. Ensure all APEC economies can benefit from interoperable eInvoicing systems.

5. Promote Best Practices and Identify Barriers:

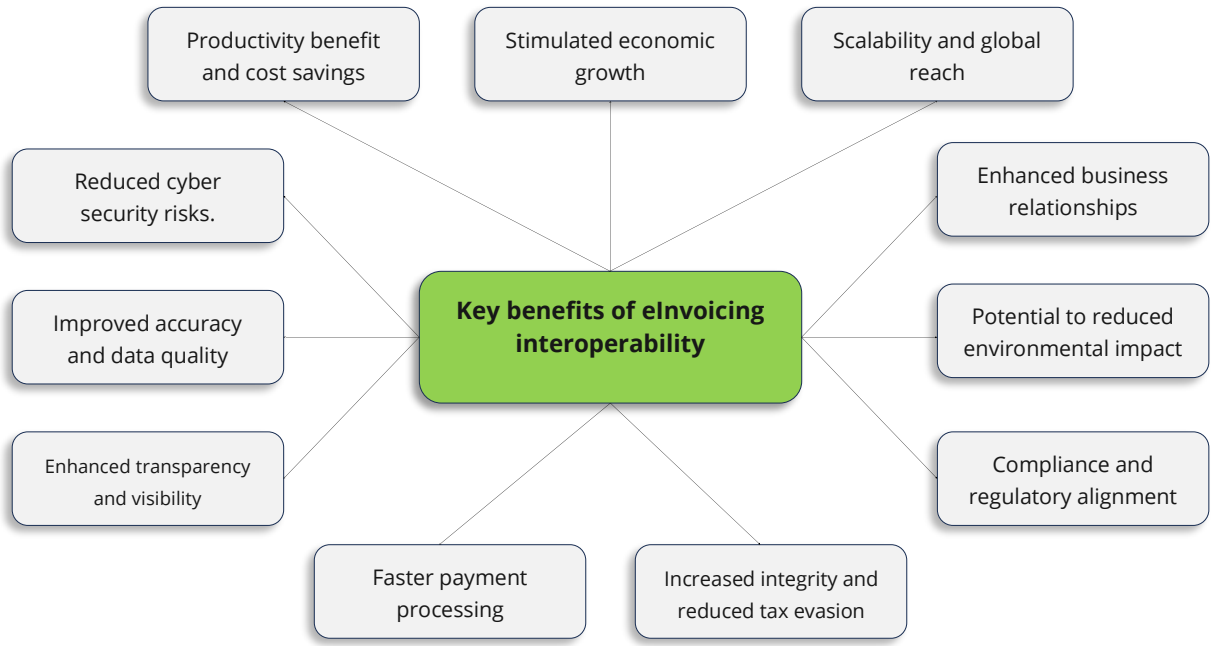
Identify potential barriers to eInvoicing interoperability and promote best practices. Conduct research to understand current eInvoicing policies, infrastructure, and processes in the APEC region, and identify areas for further technical assistance and capacity building. By promoting best practices and addressing barriers, facilitate the effective implementation of interoperable eInvoicing systems.

Benefits of eInvoicing and broader economic impacts

The APEC region facilitates USD 22 trillion in trade annually across 21 diverse economies, each operating with distinct invoicing systems, technologies, and standards. The lack of compatibility between these systems introduces inefficiencies, delays, and increased costs for businesses. By fostering interoperability in electronic invoicing systems, APEC economies have the potential to streamline cross-border transactions, reduce compliance costs, and unlock significant economic benefits. This harmonisation of eInvoicing processes can enhance productivity, improve trade efficiency, and support the region's broader economic growth, particularly as digital transformation accelerates globally.

The key benefits of improving interoperability of eInvoicing are set out in section five, Potential economic gains from enhancing interoperability. See Figure i.

Figure i: Key benefits of improving interoperability of eInvoicing systems



Source: Deloitte Access Economics (2024)

eInvoicing can result in significant productivity and economic benefits for businesses across APEC. Deloitte Access Economics estimates the productivity benefits per invoice at USD 14.84, with accounts payable capturing 60% (USD 8.90) and accounts receivable 40% (USD 5.94) of the benefits. These productivity gains align with findings from a 2024 European Commission study, highlighting efficiency improvements in public procurement.

The broader economic impact is tied to eInvoicing adoption rates. At a 50% adoption level, the annual gains from productivity and trade efficiencies could reach USD 5 billion, split between USD 3 billion for importers and USD 2 billion for exporters. Even with a 10% adoption rate, the annual benefits are estimated at USD 1 billion. Higher gross domestic product **(GDP)** per capita economies, such as the United States, are expected to realise greater savings due to higher labour costs—USD 442 million at a 10% adoption rate, increasing to USD 2.2 billion at 50% adoption. (See Table 1.1)

Table 1.1: Potential annual productivity gains for APEC members at 50% of eInvoicing adoption levels*

APEC members	Annual productivity value (Millions, USD)
Australia	88
Brunei Darussalam	14
Canada	927
Chile	25
The People's Republic of China	151
Hong Kong, China	552
Indonesia	10
Japan	190
The Republic of Korea	167
Malaysia	27
Mexico	61
New Zealand	39
Papua New Guinea	1
Peru	9
The Republic of the Philippines	6
The Russian Federation	31
Singapore	319
Chinese Taipei	176
Thailand	10
The United States	2.2 billion
Viet Nam	9
Total	**5.025 billion**

*The analysis considers only productivity benefit generated from international trade, not internal economy benefits.
Source: Deloitte Access Economics (2024)

Automating invoicing in these markets leads to greater cost savings and productivity improvements, as the opportunity cost of manual processes is higher.

In terms of cost, large enterprises face initial expenses when implementing eInvoicing systems, including setup fees, training, and hardware and software purchases, which can collectively amount to over USD 20,000.

Approximately 79% of respondents reported that implementation costs met or exceeded their anticipated budget, indicating that expenses were as high as or higher than expected. However, many businesses reported positive experiences once the initial hurdles were overcome. Additionally, ongoing international efforts to align technical standards are expected to lower long-term costs through improved interoperability and reduced administrative burdens.

The long-term benefits of eInvoicing, including enhanced compliance, security, and real-time tracking capabilities, offer compelling reasons for wider adoption, especially as businesses seek to streamline operations and expand into new markets. Faster processing times also have a positive impact on cash flow management, with studies showing that electronic invoices are settled 5 to 7 days more quickly than traditional methods. There could be some positive environmental impacts from a shift away from paper invoices- although in practice most invoices are likely to be exchanged by PDF. At the same time a shift to eInvoicing may increase energy consumption and demand for data centers.

As more businesses transition to eInvoicing, the potential for economic gains across the APEC region becomes increasingly apparent, reinforcing the importance of reaching critical adoption levels to maximise

productivity and trade efficiency gains.

The model's results should be seen as a range of potential outcomes rather than definitive forecasts. This analysis provides a "what-if" scenario assessment, estimating the potential benefits if APEC economies achieve specific adoption levels and progress in unison towards interoperability in eInvoicing. The benefits depend on coordinated take up: as more economies adopt the system, the potential for cumulative productivity gains increases. However, this interdependence means that the realised benefits will vary based on the coordinated adoption rates among economies. Disparities in adoption can lead to differences in overall productivity and cost savings, highlighting the importance of alignment in take-up across the region.

If some economies adopt eInvoicing more rapidly than others, the distribution of gains may become uneven. Early adopters may face costs related to implementation without realising the expected benefits, especially if other economies do not adopt complementary international components. This scenario can lead to a situation where the advantages of early adoption are diminished. Therefore, for APEC to fully unlock the economic benefits of eInvoicing, a coordinated and harmonised approach would be most effective, highlighting the importance of collective action across member economies.

Scope of Review

The review focuses on:

1. **Trade and Invoicing in APEC:** Examines factors influencing the cross-border invoicing environment, trade value and trends, growth of eInvoicing, digital maturity of businesses, and other trade considerations in the APEC region.
2. **An eInvoicing state of play:** Provides an overview of eInvoicing, distinguishing it from digital invoicing, and discusses the state of eInvoicing in each member economy.
3. **Interoperability of eInvoicing Systems:** Identifies obstacles impeding interoperability and outlines critical areas for facilitating smoother, more cost-effective cross-border trade.
4. **Potential economic gains:** It provides a framework for understanding the economic impact of eInvoicing and quantifies some of the important benefits, under different take- up rates.

Methodology and Data Sources

The project used a combination of qualitative and quantitative research methods, drawing from various data sources, including:

- **Literature Review**: Extensive research into the legal status, infrastructure, and policies of eInvoices in each APEC economy.
- **Consultations**: Engaged with technology providers and representatives from APEC economies to understand the eInvoicing landscape, standards, security, cost impacts, and the roadmap for achieving interoperability.
- **Internal Subject Matter Experts:** Deloitte's internal subject matter experts validated findings and provided insights into the technical and regulatory aspects of eInvoicing.
- **Targeted Consultation**: Consultation with one eInvoicing regulator provided regulatory insights and compliance requirements across jurisdictions.

Key Findings

The project identified several barriers to eInvoicing interoperability, including:

- Diverse technical standards and formats across regions and industries.
- Varied legal and regulatory frameworks related to electronic invoicing and data protection.
- Significant investments needed for technology infrastructure, software integration, and staff training.
- Ensuring data security and protecting sensitive information during cross-border exchanges.
- Resistance to change from traditional paper-based invoicing to electronic systems.
- Interoperability challenges due to multiple stakeholders with varying systems and processes.

Recommendations

Overarching recommendations

To achieve eInvoicing interoperability across APEC economies, the project recommends:

1. Legal and Regulatory Recognition
2. Adoption of Common Standards, Technical Specifications and Protocols
3. Development of Secure Infrastructure
4. Capacity Building, Knowledge Sharing
5. Funding assistance
6. Public-Private Partnerships
7. Ownership and Responsibility

Further detail on the recommendations is provided in the body of the report.

Recommendations based on eInvoicing maturity level

The maturity of eInvoicing systems varies across economies, influenced by technology, regulations, government support, and readiness for digital transformation. Economies are categorised into high, medium, and low maturity levels, each reflecting different adoption and integration stages.

- **High Maturity:** Established systems, advanced infrastructure, strong regulatory support.
  - **Recommendations:** Promote further adoption and align with international standards. Integrate existing systems into APEC frameworks and update them for interoperability. Increase subject matter expert participation and share best practices with less mature economies.
- **Medium Maturity:** Developing systems, growing infrastructure, moderate compliance, and support.
  - **Recommendations:** Strengthen and harmonise regulatory frameworks. Foster public-private collaboration and increase subject matter expert awareness and training. Invest in systems that align with common standards.
- **Low Maturity:** Limited systems, underdeveloped infrastructure, and insufficient regulatory frameworks and support.
  - **Recommendations:** Define strategic objectives and develop an eInvoicing roadmap. Establish clear regulations and ensure adequate funding. Develop domestic frameworks compatible with APEC economies and invest in necessary infrastructure. Align with international standards and collaborate with more mature economies for insights.

Education and awareness campaigns alone are unlikely to drive widespread adoption of e- Invoicing across APEC economies. To promote uptake and achieve interoperability, more direct measures are essential. Key interventions include establishing a central governing body, establishing usage policies, developing comprehensive legal and regulatory frameworks, and launching programs to test interoperability. These efforts, supported by public-private collaboration and sufficient funding, will help businesses recognise the broader advantages of eInvoicing beyond tax compliance, encouraging long-term adoption and engagement.

The project seeks to deliver a detailed assessment of eInvoicing interoperability across the APEC region, with a focus on identifying core challenges and providing actionable recommendations. By encouraging greater efficiency, reducing transactional costs, and enabling smoother cross-border trade, the project aligns with APEC's overarching objective to advance digital transformation and deepen economic integration across member economies.

1 Introduction

1.1 Background and context

APEC economies are working collectively to enhance eInvoicing interoperability, building on the 2023 'Principles for the Interoperability of Electronic Invoicing Systems in the APEC Region' ("**the Principles**").

This initiative aims to foster a better understanding of eInvoicing policies, infrastructure, and processes within the APEC region and to facilitate more effective and efficient implementation of the Principles across APEC economies. This initiative aims to foster a better understanding of eInvoicing policies, infrastructure, and processes within the APEC region and to facilitate more effective and efficient implementation of the Principles across APEC economies.

1.2 The 'Principles for the Interoperability of Electronic Invoicing Systems in the APEC Region'

The Principles were developed by the APEC Committee on Trade and Investment, in collaboration with the APEC Digital Economy Steering Group.[i] This initiative was in response to the **ABAC** 2022 report to leaders, and other contributing factors, which emphasised eInvoicing as a fundamental component of digital supply chain finance and increasing efficiency for **MSME**s.[ii]

The Principles provide a comprehensive framework to address the interoperability challenges of eInvoicing systems, thereby supporting the project's objectives and desired outcomes. By adopting and adhering to these Principles, APEC economies can achieve seamless connectivity, build trust in digital transactions, and improve the efficiency and reliability of cross-border trade.[iii]

Objectives of The Principles:

- **Promote Seamless Connectivity:** Facilitate smoother digital transactions across borders.
- **Strengthen Trust:** Enhance confidence in digital transactions by ensuring reliability and security.

The recommendations for APEC Economies:

- **Legal Equivalence:** Grant electronic invoices the same legal status as paper invoices.
- **International Standards:** Align measures with global standards, guidelines, or recommendations.
- **Supportive Policies and Infrastructure:** Implement policies and build infrastructure to secure document exchange.
- **Common Standards:** Encourage the use of standardised protocols for interoperability.
- **Best Practices Sharing:** Exchange best practices to foster understanding and confidence.
- **Support for Initiatives:** Endorse efforts to develop and adopt interoperable electronic invoicing systems.

These Principles underpin this report as they provide the foundation for evaluating and enhancing eInvoicing interoperability across APEC, ensuring consistency, efficiency, and mutual recognition among member economies.

1.3 Purpose of this review

DFAT has engaged Deloitte to produce a report on implementing the Principles for the interoperability of eInvoicing Systems in the APEC Region.

This report aims to provide a comprehensive analysis of the issues surrounding eInvoicing interoperability from an APEC economy perspective. It examines the existing eInvoicing frameworks across different APEC economies and analyses the legal recognition and status of eInvoices in various regions. Additionally, the report identifies and discusses the barriers preventing compatibility and seamless integration of eInvoicing frameworks.

By addressing these areas, the report seeks to provide recommendations for achieving greater interoperability of eInvoicing systems across the APEC region.

The scope of this review encompasses:

- Chapter 2: Trade and invoicing in APEC
- Chapter 3: eInvoicing state of play
- Chapter 4: Interoperability of eInvoicing systems
- Chapter 5: Potential economic gains from enhancing interoperability
- Chapter 6: Recommendations for implementing eInvoicing across APEC

1.4 Data Sources and methodology

To investigate the interoperability of electronic invoicing systems in the APEC region, we employed a combination of qualitative and quantitative research methods. Our approach leveraged diverse data sources to ensure a thorough analysis.

Our literature review encompassed over 100 sources and involved extensive desktop research into the legal status of eInvoices, associated infrastructure, and policies for each APEC member economy. We began the research phase with a thorough review of open-source literature and existing research on eInvoicing policies and legal frameworks, building upon our initial knowledge base. This review aimed to explore potential interoperability issues by drawing on previous APEC research and broader studies focused on barriers to cross-border eInvoicing within the APEC region. The goal was to identify key challenges and barriers to interoperability while pinpointing potential solutions.

We conducted six consultations with leading technology providers, which offered valuable insights into the current eInvoicing landscape. These discussions covered technological standards, technical considerations, security and data confidentiality, cost impacts and the roadmap for achieving interoperability, providing a solid foundation for our understanding of eInvoicing across the APEC region from a technology providers perspective.

Additionally, we engaged in 23 consultations with representatives from various APEC economies and Deloitte's internal subject matter experts. These interactions were necessary to gain their extensive knowledge and understand mandates, implementation timelines (where applicable), technology challenges and considerations, key drivers impacting eInvoicing adoption, and barriers. The insights gained from these consultations helped us capture a holistic view of the diverse regulatory environments across the APEC region.

Lastly, a targeted consultation with one eInvoicing regulator was carried out to provide specific regulatory insights and to understand compliance requirements across different jurisdictions.

By integrating these diverse data sources, our methodology ensured a balanced approach that captured both broad trends and specific nuances. This mixed-method strategy enabled cross-validation of findings, enhanced reliability, and delivered a comprehensive analysis of eInvoicing interoperability within the APEC region.

1.4.1 Data Limitation

This report draws upon regulatory insights, and it recognises the need for more perspectives from businesses and end-users to fully capture the practical challenges they may encounter in eInvoicing. Furthermore, given the rapid pace of legal and technological advancements, there is an inherent risk of data becoming outdated. This necessitates frequent updates to ensure that the analysis reflects the latest regulatory changes, technological standards, and industry practices across APEC economies. The literature review also faced limitations due to restricted access to proprietary studies and other non-publicly available data. Expanding access to up-to-date research, particularly recent studies, and insights from tax authorities, would further enrich the findings and enhance the analysis of interoperability challenges.

The data limitation, assumptions and caveats underlying the economic analysis presented in this report are detailed in Chapter 5.

2 Trade and invoicing in APEC

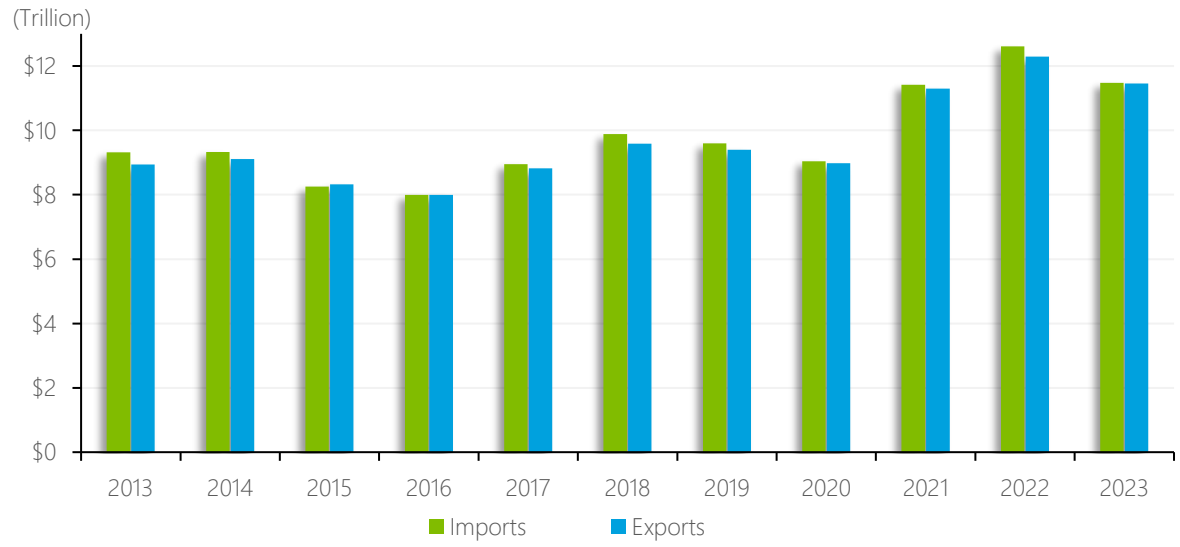
This chapter examines key factors influencing the cross-border invoicing environment across APEC focusing on trade value and trends, growth of eInvoicing in APEC, digital maturity of businesses, and other considerations affecting trade in the APEC region.

2.1 Trade value and trends

APEC is a major contributor to global trade, representing 54% of global international trade value, with trade value in the region growing at an average rate of 2.5% over the past decade.[iv] In 2023, the total value of APEC's international trade transactions, encompassing both imports and exports, was estimated at nearly USD 22.3 trillion. This represents approximately 22% of global GDP.[v]

Chart 2.1 shows the value of APEC trade since 2013. The overall trend points to progressive growth in APEC trade over time. Trade fell in 2020 where the pandemic-induced contraction saw exports decline by 4.7%, while imports fell by 6%. This downturn was countered by a robust recovery in 2021, with exports surging by 26.3% and imports increasing by 26.4%. However, this growth moderated in the subsequent years, with export growth slowing to 9.9% in 2022 and projected to decline by 6.0% in 2023. Imports exhibited a similar pattern, with imports growing by 10.4% in 2022 and a projected decline of 6.7% in 2023.[vi]

Chart 2.1: APEC aggregated value of merchandise traded to the world (USD), 2013 to 2023*



*The APEC trade values for 2022 and 2023 are based on estimates, as data from smaller APEC member economies was incomplete.
Source: Deloitte Access Economics, ComTrade database (2024)

2.2 The growth of eInvoicing in APEC

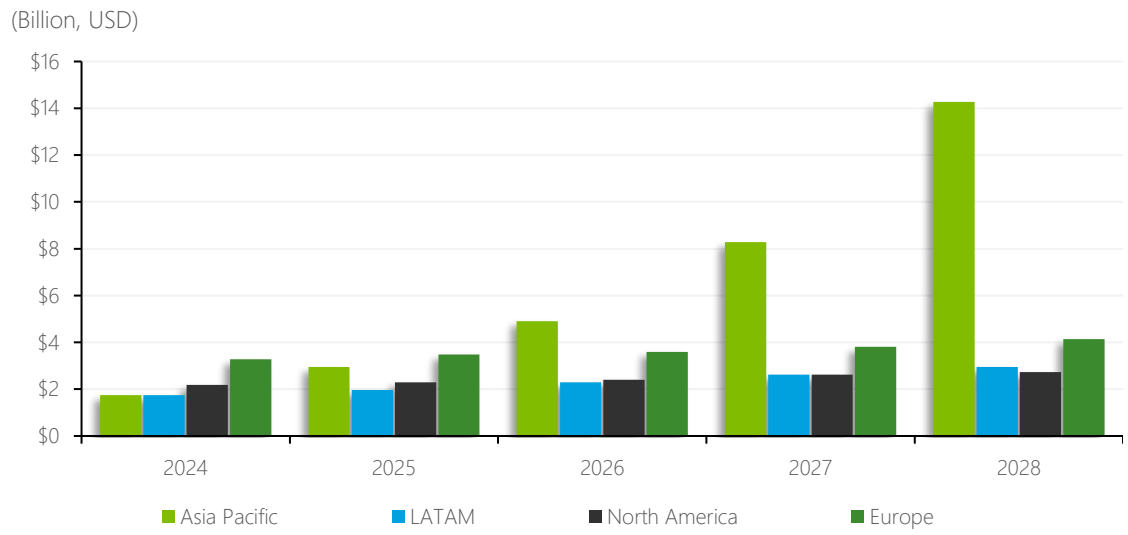
Despite the recent moderation in trade growth, the APEC region's dynamic trade landscape presents significant opportunities for enhancing interoperability. By streamlining trade processes and reducing barriers to cross-border trade, APEC members can further unlock the potential of their economic relationships and drive sustainable growth.

The projected growth of eInvoicing (Chart 2.2) plays a key role in this estimation, as it represents a significant shift towards digitalisation, promising to streamline trade processes, reduce transaction costs, and enhance overall efficiency. There will be significant growth in the Asia-Pacific market such that it will

become the largest market by 2026 with market value growing by a factor of seven over the next four years.[iv] The Asia-Pacific market will cover a lot of APEC but some of the economies will be classified under North America or Latin America.

The Asia-Pacific region has strong growth prospects in the eInvoicing market due to the integration of Continuous Transaction Controls **(CTC)** systems, primarily aimed at reducing tax evasion and enhancing value-added tax **(VAT)** compliance. This system, which mandates real- time reporting of invoices and transaction data to tax authorities, is increasingly being adopted by nations like India, Indonesia, and China, driving the rapid expansion of eInvoicing. Additionally, the growing implementation of e-receipts and digital invoicing in the business to consumer **(B2C)** sector supports this trend, aligning with broader government initiatives for digitisation and economic transparency. Consequently, the Asia Pacific's growth is projected to outpace other regions, benefiting from high number of transactions and an evolving regulatory environment.[vii]

Chart 2.1: Projected market value of electronic Invoicing (Billion USD), 2024 to 2028



Source: Billentis, The global eInvoicing and tax compliance report: Watch the tornado! (April 2024)

2.2.1 Digital maturity of businesses

The digital maturity of businesses across APEC economies is a critical factor in achieving seamless eInvoicing interoperability. While many economies within APEC have made significant strides in adopting digital technologies, there remains considerable variation in the level of digital integration across businesses, particularly among Small and Medium Enterprises (**SME**). In economies such as Australia; Japan; and Singapore, mature digital ecosystems have enabled more widespread eInvoicing adoption, whereas other economies lag behind due to insufficient infrastructure and digital literacy gaps. [v]

This uneven digital maturity poses challenges for harmonising eInvoicing standards across APEC. Economies with higher digital maturity are better positioned to realise the full benefits of eInvoicing—such as cost reductions, improved efficiency, and enhanced trade transparency. In contrast, businesses in less digitally mature economies may face difficulties in integrating cross-border invoicing processes, thereby limiting interoperability.[vi]

We note that in some instances, businesses with lower levels of digital maturity may face a smoother path to the adoption of interoperable eInvoicing systems because they do not face some of the transition costs digitally mature businesses encounter switching from existing systems.

Addressing digital maturity disparities will require targeted investment in digital infrastructure, capacity building, and regulatory alignment across APEC. For instance, evidence from the APEC Digital Prosperity Checklist

highlights the importance of tailored digital policy frameworks that support both advanced and developing economies in accelerating eInvoicing adoption and overcoming barriers to interoperability.[vii]

2.2.2 Other considerations relating to trade across APEC

Several additional factors impact trade across APEC economies, including the regulatory environment for eInvoicing and the broader implications of tariff and non-tariff measures. High tariffs on digital products can impede e-commerce growth and increase costs for cross-border transactions. [viii]

Similarly, non-tariff measures, such as data privacy and cybersecurity regulations, influence eInvoicing system implementation. Addressing these challenges requires a mutual effort to harmonise regulatory frameworks and promote interoperability.[ix]

APEC has taken steps towards improving eInvoicing interoperability, including the adoption of The Principles for the Interoperability of Electronic Invoicing Systems as highlighted in the introduction of this report. Initiatives such as training programs, knowledge sharing, and technical assistance aim to support the adoption of eInvoicing across member economies. [x]

Further, SMEs are key to APEC trade activities. The adoption of eInvoicing can streamline their processes, reduce costs, and enhance competitiveness. However, barriers such as limited access to technology and data security concerns must be addressed to fully leverage the benefits of digital trade. Benefits and challenges of eInvoicing interoperability are further discussed in chapter four of this report. [xi]

3 eInvoicing state of play

3.1 What is eInvoicing?

eInvoicing is the process of automating the digital exchange of invoice data between the accounting systems of a buyer and a supplier. eInvoicing eliminates the need for paper-based, Portable Document Format **(PDF)** invoices, or emails with invoices to be sent from a supplier to a customer.

An eInvoice should not be confused with a digital invoice. While the terms are often used interchangeably, there are distinct and important differences between the two:

- Digital invoices can be viewed and processed digitally but feature unstructured and untraceable data.
- eInvoices feature structured data, are machine-readable and can be automated.

For the purpose of this review, we are looking only at eInvoices.

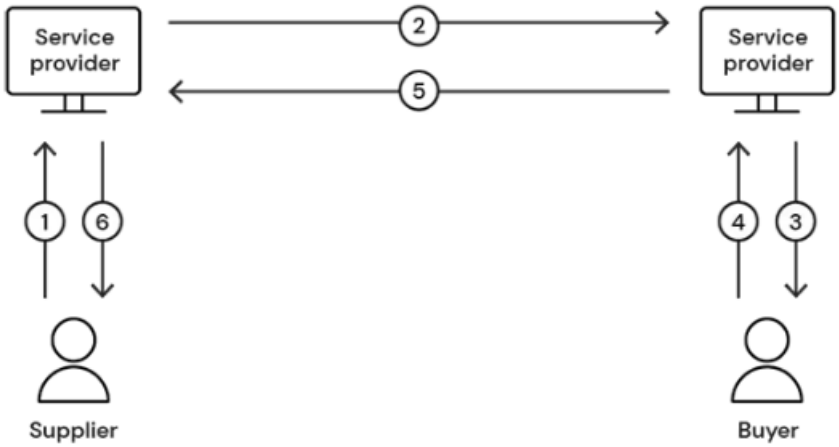
3.2 eInvoicing models

3.2.1 Interoperability

The interoperability model involves a set of standards and protocols that dictate how information is exchanged. This standardised framework allows for the seamless transmission of data between parties, regardless of the network they use.[xii]

The main particularity of interoperability is the use of service providers to exchange eInvoices. Service providers agree amongst themselves which formats to exchange, resulting in open networks with many interoperable formats and service providers.[xiii]

Figure 3.1: Interoperability Diagram



Source: Pagero (2024)

3.2.2 Continuous Transaction Control (CTC) Models

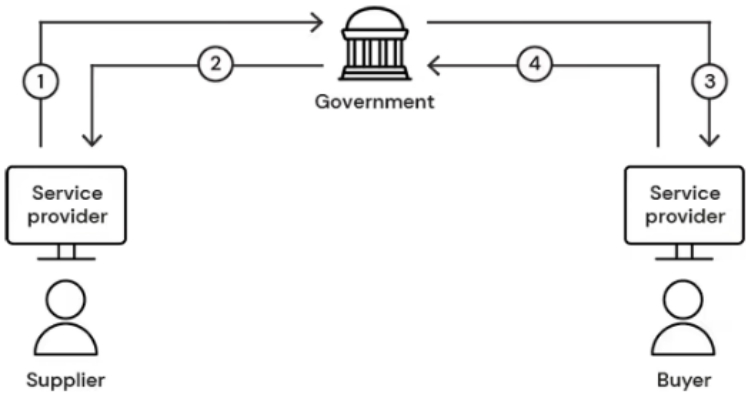
Control and oversight of transactions have become essential for ensuring compliance and operational efficiency. The Continuous Transaction Control method includes several electronic invoicing models with distinct processes.

CTC models enables authorities to collect real-time data on business activities, either directly from commercial transaction exchanges or from company management systems. This strategy mitigates the inefficiencies of post-audit models, such as the interoperability model, where retrospective audits provide transaction information long after completion.[xiv]

3.2.2.1 Centralised

In the centralised model, electronic invoices are transmitted in real-time to the domestic platform, which handles the receipt and processing of these documents. The central platform then forwards the invoice to the recipient.[xv]

Figure 3.2: Centralised model



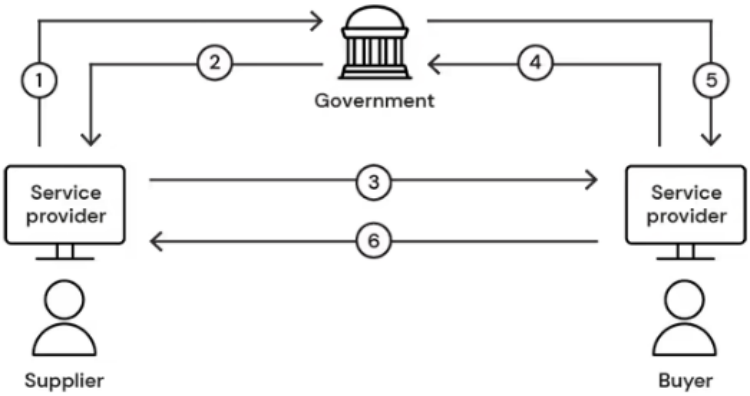
Source: Pagero (2024)

3.2.2.2 Clearance (Pre/Post)

The Clearance model mandates that each electronic invoice must be validated or approved by the tax authority before being sent to the recipient. Invoices are submitted in real-time to the domestic government platform, which then assigns unique identifiers and QR codes to each document.[xvi]

Pre-clearance or hard clearance models require invoices to be cleared through local government agencies before sending them to the buyer. Post-clearance or soft clearance models allow taxpayers to distribute tax invoices to the buyer before sending them to the tax authority for clearance shortly afterwards. [xvii] This approach ensures efficient and precise management of tax information, minimising the necessity for retroactive audits.[xviii]

Figure 3.3: Clearance (Pre/Post)model

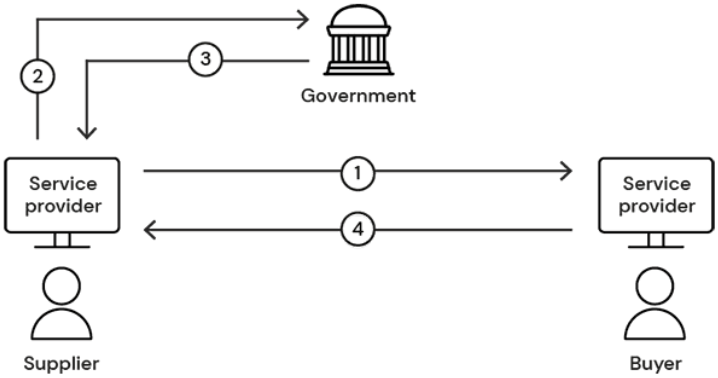


Source: Pagero (2024)

3.2.2.3 Real-Time Reporting (RTR)

RTIR is a model implemented in Hungary and Korea, where there are no regulations for invoice exchange. However, the supplier is required to report a subset of the invoice to their tax authority in real-time after sending it to the buyer. The eInvoice must adhere to the mandatory format and include specific data such as document type, the names and VAT numbers of the trading parties, and VAT amounts.[xix]

Figure 3.4: RTR model



Source: Pagero (2024)

3.3 Comparison and compatibility between different models

Interoperability, clearance, and centralised eInvoice models each offer unique approaches to eInvoicing, with varying degrees of complexity and regulatory involvement.

The interoperability model focuses on enabling seamless communication between different systems and platforms, ensuring that eInvoices can be exchanged and processed regardless of the underlying technology. This model promotes flexibility and broad adoption across diverse business environments.

In contrast, the clearance model requires validation or approval from tax authorities before an invoice can be sent to the recipient. This real-time verification process enhances tax compliance and reduces the need for retroactive audits, but it may introduce delays and require more robust infrastructure.

The centralised model involves sending eInvoices to a domestic platform that processes and forwards them to recipients. This approach centralises control and simplifies compliance with domestic regulations but may limit

flexibility and increase dependency on the central system's reliability. While each model has its strengths, their compatibility depends on the specific regulatory, technological, and business requirements of the implementing region or organisation.

While interoperability, clearance, and centralised eInvoice models each offer unique benefits, their compatibility and effectiveness depend on the specific regulatory, technological, and business contexts in which they are implemented. A thorough assessment of these factors is essential for selecting the most suitable model for a given environment.

The ability to send eInvoices between different models depends on the system setup. Firstly, the eInvoice standards and data formats must align; otherwise, the eInvoice will be rejected as invalid. Secondly, the communication protocols must be compatible to ensure successful transmission.

Even when economies adopt a common framework like Peppol, cross-border invoices can still be rejected due to differing invoice requirements in each economy. This challenge persists unless specialised software with middleware capabilities is utilised to adapt and translate the data to meet each economy's specific standards.

Peppol PINT is an advanced specification developed by Open Peppol, intended to establish globally interoperable invoice standards. Currently, Peppol PINT is being adopted by Australia; Malaysia; New Zealand; and Singapore all with their own variations with the exception being Australia and New Zealand **(ANZ)** as they both adopt the same standard format PINT A-NZ.[xx]

The Peppol PINT rules are a set of guidelines established to ensure the integrity, reliability, and interoperability of electronic invoices across different regions and systems worldwide. These rules are pivotal in creating a uniform standard that facilitates seamless cross-border transactions within the Peppol network. The rules mandate the inclusion of all essential details in the invoice such as the buyer's and seller's information, invoice date, item descriptions, quantities, and prices with a particular specification.[xxi]

The Peppol PINT rules ensure that all required details are included in the invoice, confirm that the information remains unchanged since its creation, verify that neither party can deny sending or receiving the invoice, and ensure that invoices are sent and received in a timely manner.

The rules are specific for an economy's invoices and shall be applied by all senders who are creating invoices that are only applied by receiver who have a receiving capability for that economies invoice. Overseas receivers who are receiving invoices from the sending economy but do not have a specific receiving capability for those will only apply the shared PINT rules and ignore not the economy specific rules.

3.4 Current state of eInvoicing across APEC

The following is a list of the current state of eInvoicing across APEC as of September 2024.[1]

Refer to A1 for a summary of the following.

3.4.1 Australia

3.4.1.1 Model/Infrastructure

- Australia uses the Peppol framework for eInvoicing.[xxii]
- The Australian Taxation Office **(ATO)** is the Peppol Authority.[xxiii]

3.4.1.2 Mandates

- Federal agencies were mandated to be able to receive eInvoices by 1 July 2022.[xxiv] There is no corresponding mandate for companies to use this channel.

[1] Due to the ever-evolving nature of eInvoicing, there may be changes after the finalisation of this report. Current as of November 2024.

- New South Wales agencies were mandated to adopt eInvoicing by 1 January 2022.[xxv]

3.4.1.3 Tax Invoice/invoice requirements

- Australia's tax invoice requirements are detailed in section 29.70 of the A New Tax System (Goods and Services Tax) Act 1999.[xxvi]
- According to Public Ruling GSTR 2013/1, Electronic Tax invoices are an approved form of tax invoices.[xxvii]
- Where entities are not registered for GST, there are no mandated invoice requirements.
- From 15 November 2024, mandatory business documents Peppol service providers must be able to process include: [xxviii]
    - PINT A-NZ invoice (mandatory)
    - PINT A-NZ credit note (mandatory)
    - PINT A-NZ self-billing (optional)
    - PINT A-NZ self-billing credit note (optional)

3.4.1.4 Other considerations

- The Australian Government promotes eInvoicing as an opportunity to deliver efficiency gains, increase productivity levels, and contribute towards digitalisation benefits for businesses as opposed to combating the shadow economy.[xxix]
- To try to encourage eInvoicing adoption five-day payment terms were introduced for businesses who use the channel with the Commonwealth government and meet the terms outlined in the payment policy Resource Management Guide 417.[xxx]

3.4.2 Brunei Darussalam

- There is no current model or announcements about economy wide eInvoicing however Brunei Darussalam has a Government Vendor Portal, the Treasury Accounting and Financial Information System (TAFIS) which uses SAP Ariba. [xxxi]

3.4.3 Canada

3.4.3.1 Model/Infrastructure

- There is currently no mandatory model or infrastructure for tax purposes. [xxxii]
- The Canadian Revenue Agency **(CRA)** is the Tax Authority managing eInvoicing. [xxxiii]

3.4.3.2 Mandates

- eInvoicing is permitted but not mandatory. [xxxiv]
- In 2018, the government announced that all public body providers should be able to receive eInvoices, but it is not mandatory.[xxxv]

3.4.3.3 Tax Invoice/Invoice Requirements

- There is no required format [xxxvi]
- For GST/HST purposes, standard archiving period is 6 years after the end of the year to which they relate. [xxxvii]

3.4.3.4 Other Considerations

- While not mandatory, the Canadian government encourages public bodies to accept eInvoices, aiming to evaluate the potential benefits for businesses. [xxxviii]
- Canada Revenue Agency is an observer member of Peppol. [xxxix]

3.4.4 Chile

3.4.4.1 Model/Infrastructure

- Chile uses the Pre-Clearance model for eInvoicing. [xl]
- Chile uses the Electronic Tax Document - Documento Tributario Electrónico **(DTE)**. [xli]
- Electronic invoicing is regulated by the Servicio de Impuestos Internos **(SII)**, which is the entity responsible for accrediting taxpayers as issuers and receivers of DTE. [xlii]

3.4.4.2 Mandates

- The DTE eInvoicing model has been operating in Chile since 2003 and has been mandatory for all Chilean taxpayers as of 2018. [xliii]

3.4.4.3 Tax Invoice/Invoice Requirements

- The required format is eXtensible Markup Language **(XML)**, and it must be digitally signed prior to clearance by the SII. [xliv]
- The archiving period is 6 years for both issuers and receivers. [xlv]
- The most relevant mandatory DTEs include:[xlvi]
    - Invoices,
    - Non-Affected or Exempt Invoices,
    - Purchase Invoices,
    - Invoice Settlements,
    - Debit Notes,
    - Credit Notes,
    - Dispatch Guides,
    - Export Invoices,
    - Export Credit Notes, and
    - Export Debit Notes.

3.4.5 People's Republic of China

3.4.5.1 Model/Infrastructure

- China has built a nationally unified e-fapiao service platform, providing taxpayers with 24-hour online free one-stop services for the issuance, distribution and verification of digital e-fapiao.[xlvii]
- Taxpayers can use the National platform to issue, distribute, and verify e-fapiao instead of multiple platforms.[xlviii]
- The State Taxation and Administration **(STA)** is the Tax Authority managing eInvoicing.[xlix]

3.4.5.2 Mandates

- eInvoicing is promoted on a voluntary basis.[l]

3.4.5.3 Tax Invoice/Invoice Requirements

- The required format is local XML.[li]
- After electronic invoices are generated, they are stored in the form of electronic data within the tax authorities' information systems. Tax authorities establish a tax digital account for each taxpayer and a personal ticket folder for individuals, enabling automatic delivery, collection, and storage of invoices. The entire process is online, leaving a traceable record, eliminating the need for taxpayers to set up a fixed location for invoice storage.

3.4.6 Hong Kong, China

3.4.6.1 Model/Infrastructure

- The eInvoicing model in Hong Kong, China is post-audit. [lii]
- For B2B transactions, there is no designated infrastructure for sending eInvoices. Companies can either send eInvoices directly or use their chosen electronic invoicing system (such as ERP or a service provider).[liii]

- For business to government **(B2G)** transactions, companies can upload or create eInvoices through the government's e-procurement system.[liv]

3.4.6.2 Mandates

- There is no mandatory requirement to use eInvoices in Hong Kong, China.[lv]
- For B2B transactions, companies must seek consent before sending eInvoices.[lvi]

3.4.6.3 Tax Invoice/Invoice Requirements

- Acceptable formats under the government's e-procurement system include PDF, .doc, .docx, .xls, and .xlsx, with an archiving period of at least 7 years.[lvii]
- To submit eInvoices to government departments, companies can manually input the eInvoice data into the system via the web form or perform batch upload of Zip files containing the eInvoice data in XML format under the government's e-procurement system.[lviii]
- The Electronic Transactions Ordinance **(ETO)** (Cap. 553) provides the legal requirements for electronic transactions applicable under the legislation. The legislation recognises electronic records as the same as paper records and signatures.[lix]
- The Inland Revenue Ordinance (IRO) (Cap. 112) requires every person carrying on a trade, profession or business in Hong Kong, China to keep sufficient records in the English or Chinese language of his income and expenditure to enable the assessable profits to be readily ascertained. Such records shall be retained for a period of not less than 7 years. There is no explicit requirement on the form of records (whether in paper or electronic form) to be kept.

3.4.7 Indonesia

3.4.7.1 Model/Infrastructure

- Indonesia uses the e-Faktur Pajak system for eInvoicing which is a Pre-clearance model.[lx]
- The Direktorat Jenderal Pajak **(DJP)** is the Tax Authority managing eInvoicing.[lxi]

3.4.7.2 Mandates

- Since 2016, it has been mandatory that all VAT registered taxpayers whose sales exceed IDR 4.7 billion per year must issue send their invoices through the e-Faktur system.[lxii]
- This is only applicable for standard tax invoices in relation to local VAT administration in Indonesia (not applicable for ESS VAT).[lxiii]

3.4.7.3 Tax Invoice/Invoice Requirements

- The required format is XML, and the archiving period is 10 years.[lxiv]
- The issuer sends the electronic invoices to the DJP who will validate and approve the invoice content via a QR code to be included on the invoice.[lxv]

3.4.7.4 Other Considerations

- The main objectives of the Indonesian government implementing eInvoicing are to prevent tax fraud and improve trade efficiency.[lxvi]

3.4.8 Japan

3.4.8.1 Model/Infrastructure

- Japan recommends and promotes the Peppol framework for eInvoicing.[lxvii]
- The Digital Agency, Government of Japan **(DAJ)** is the Peppol authority.[lxviii]

3.4.8.2 Mandates

- There are no mandates requiring the use of eInvoicing in Japan.[lxix]

3.4.8.3 Tax Invoice/Invoice Requirements

- The required format in Japan is PINT (Peppol International Invoice).

- There are three specifications (JP PINT) that are compliant to the Qualified Invoice based Method.
- For the purpose of input tax credit, business is required to archive electronic invoice received in accordance with laws and regulations for 7 years (in the usual case).

3.4.9 Republic of Korea

3.4.9.1 Model/Infrastructure

- Korea uses a CTC model with RTR, where invoices are pre-cleared by the Tax Authority, National Tax Service **(NTS)**. This system enables both the monitoring of transaction data by tax authorities and the enforcement of tax regulations efficiently across businesses. [lxx]
- Korea has implemented a centralised model with a government-established platform called 'Hometax' for exchanging electronic invoices between buyers and sellers. This central platform automatically validates transactions, ensuring efficiency and accuracy.[lxxi]

3.4.9.2 Mandates

- eInvoicing is partially mandatory, required for businesses meeting certain criteria. From July 2023, any taxpayer whose yearly revenue exceeds KRW 100 million will be required to submit electronic invoices for clearance.[lxxii]

3.4.9.3 Tax Invoice/Invoice Requirements

- The required format is XML, with an archiving period of 5 years (10 years for immovable property).[lxxiii]

3.4.9.4 Other Considerations

- From July 2023, any taxpayer whose yearly revenue exceeds KRW 100 million will be required to submit electronic invoices for clearance.[lxxiv]
- This mandate also applies to taxpayers with VAT registration, and for non-established individuals, eInvoicing is compulsory if the total supply value (including tax-exempt supplies) of goods or services in the preceding year is at least KRW 100 million.[lxxv]

3.4.10 Malaysia

3.4.10.1 Model/Infrastructure

- Malaysia's MY-PINT standard is an extension of Peppol BIS Billing 3.0, meaning it is compatible with the global Peppol network while also incorporating local specifications.[lxxvi]
- The Malaysian tax authority is the Inland Revenue Board **(IRB)** or Lembaga Hasil Dalam Negri Malaysia **(LHDNM)**.[lxxvii]
- Peppol authority is the Malaysia Digital Economy Corporation **(MDEC)**.[lxxviii]

3.4.10.2 Mandates

- eInvoicing is partially mandated, with a planned implementation as follows:
    - 01/08/2024: Electronic invoicing for taxpayers with an annual turnover of MYR 100 million or more.
    - 01/01/2025: Mandatory electronic invoicing for taxpayers with an annual turnover of more than MYR 25 million and up to MYR 100 million.
    - 01/07/2025: Mandatory electronic invoicing for all other taxpayers.[lxxix]

3.4.10.3 Tax Invoice/Invoice Requirements

- Acceptable formats include XML or JavaScript Object Notation **(JSON)**, with an archiving period of 7 years.[lxxx]

3.4.10.4 Other Considerations

- Each phase will target a specific business group according to their annual turnover.[lxxxi]

3.4.11 Mexico

3.4.11.1 Model/Infrastructure

- Mexico uses the pre-clearance model for eInvoicing. [lxxxii]
- In Mexico, the digital tax invoice scheme, Comprobante Fiscal Digital **(CFD)**, should use the internet digital tax invoice scheme to issue electronic invoices.[lxxxiii]
- Servicio de Administración Tributaria **(SAT)** is the Tax Authority in Mexico.[lxxxiv]

3.4.11.2 Mandates

- The Mexican Government set that the use of CDFI (Digital Tax Receipts over the Internet), in its new version (4.0) is mandatory from 1 April 2023 for all buyers and suppliers.[lxxxv]

3.4.11.3 Tax Invoice/Invoice Requirements

- The required format is CFDI XML.[lxxxvi]
- eInvoices must be archived for five years for both issuers and recipients. Documents must be archived according to NOM151 which gives legal guarantees to stored electronic documents.[lxxxvii]

3.4.12 New Zealand

3.4.12.1 Model/Infrastructure

- New Zealand has adopted the Peppol eInvoicing Network as the common standard for eInvoicing.[lxxxviii]
- Peppol authority is Ministry of Business Innovation and Employment **(MBIE)**.[lxxxix]

3.4.12.2 Mandates

- New Zealand currently has no eInvoicing mandate. However, from 31 March 2022, central public entities must be able to receive eInvoicing if their supplier chooses to using them.[xc]
- New Zealand announced new eInvoicing Rules will Impact Government Agencies and Businesses on 5 November 2024. [xci]
- The update mandates that by 1 January 2026, a larger network of government agencies must have the capability to issue and receive eInvoices. [xcii]

3.4.12.3 Tax Invoice/Invoice Requirements

- The required format is Peppol BIS Billing 3.0, with an archiving period of 7 years.[xciii]
- It is expected that New Zealand will move to PINT A-NZ as their required format.[xciv]

3.4.13 Papua New Guinea

- The Papua New Guinea government does not have any current or future plans to regulate e- Invoicing systems.[xcv]

3.4.14 Peru

3.4.14.1 Model/Infrastructure

- Peru uses the post-clearance model for eInvoicing.[xcvi]
- Peru's eInvoicing system is known as CPE (Electronic Payment Receipts) and is regulated by the Electronic Issuance System **(SEE)**.[xcvii]

3.4.14.2 Mandates

- eInvoicing is mandatory in Peru for all companies and taxpayers are required to issue electronic invoices for both issuance and reception.[xcviii]

3.4.14.3 Tax Invoice/Invoice Requirements

- The required format is XML, which uses UBL V2.1, with an archiving period of five years.[xcix]
- After generating a UBL 2.1 document, you must add a digital signature that ensures confidentiality and authenticity. Anyone registered and using the SUNAT portal receives a unique digital signature.[c]

3.4.14.4 Other Considerations

- The Superintendency of the National Tax Administration (**SUNAT**) is responsible for digitising the economy in Peru aiming for a more transparent market.[ci]

3.4.15 The Philippines

3.4.15.1 Model/Infrastructure

- The Philippines uses the Post-audit model for eInvoicing. [cii]
- The Philippines uses the EIS program, requiring near real-time invoice reporting.[ciii]

3.4.15.2 Mandates

- As per sections 237 and 237-A of the Tax Code of 1997, as amended, the following taxpayers are required to issue electronic receipts or sales or commercial invoices and to electronically report their sales data to the Bureau of Internal Revenue (BIR), if applicable:[civ]

    1. Taxpayers engaged in the export of goods and/or services;
    2. Taxpayers engaged in eCommerce; and
    3. Taxpayers under the jurisdiction of the Large Taxpayers Service **(LTS)**.

3.4.15.3 Tax Invoice/Invoice Requirements

- The data is required to be transmitted to the EIS in JSON format.[cv]
- Issuance and transmission can be done via the EIS portal or API connection.[cvi]
- The archiving period is 10 years.
- eInvoices must contain is:[cvii]
    - Document number
    - Date of issue
    - Unique Identification Number: this is linked to the Document Number to prevent the taxpayer from rejecting or claiming that it is a different sales transaction.
    - Seller Information
    - Buyer's information
    - Details of items/nature of service sold
    - Amount of the sale
    - VAT
    - Discounts

3.4.16 The Russian Federation

3.4.16.1 Model/Infrastructure

- Russia uses the Post Audit model for eInvoicing. [cviii]
- Russian eInvoices must be generated as structured XML file with tags in Russian and regulated by the tax authority.[cix]
- Companies must use the services of an authorised EDI provider and must obtain a certificate issued by a Russian certification authority.[cx]

3.4.16.2 Mandates

- Federal Law No. 371-FZ, taxpayers selling certain traceable goods imported to Russia and the Eurasian Economic Union **(EAEU)** are obligated to issue eInvoices.[cxi]

- Since 2012 companies are able to use eInvoicing voluntarily. This requires an agreement between the issuer and the recipient.[cxii]

3.4.16.3 Tax Invoice/invoice requirements

- The required format is XML, with an archiving period of four years.[cxiii]
- All invoices must be signed by a certificate issued by a Russian certification authority, and a proprietary digital signature generation system.[cxiv]

3.4.16.4 Other considerations

- Since January 2017, Russia mandates e-accounting data to allow tax authorities to cross-check data between taxpayers, including scanned and digitally signed invoices.[cxv]
- By the end of 2024, Russia aims for 95% of invoices and 70% of transport and goods waybills to be issued in electronic form.[cxvi]

3.4.17 Singapore

3.4.17.1 Model/Infrastructure

- The Peppol authority in Singapore is Info-Communications Media Development Authority **(IMDA)**. [cxix]
- In January 2019 IMDA, as the Peppol authority in Singapore launched the Peppol network which eventually was renamed as InvoiceNow domestically.[cxviii] IMDA collaborates closely with the Inland Revenue Authority of Singapore **(IRAS)**, which is the tax authority, to support tax reporting requirements tapping on the Peppol network.

3.4.17.2 Mandates

- Whilst eInvoicing is not mandated the IMDA strongly promotes the use of Peppol e- Invoicing in B2B and B2G environments.[cxx]
- In April 2024, the IRAS announced a phased introduction of eInvoice mandate for tax reporting prompting businesses to adjust to the new system for invoice submission via the InvoiceNow network.[cxvii]
    1. Starting from 1 May 2025, a soft launch will allow existing GST-registered businesses to voluntarily begin transmitting invoice data to the IRAS using InvoiceNow.
    2. By 1 November 2025, newly incorporated companies that voluntarily register for GST will be required to transmit invoice data to IRAS using InvoiceNow.
    3. From 1 April 2026, all new voluntary GST registrants must use InvoiceNow to transmit invoice data to IRAS.

3.4.17.3 Tax Invoice/Invoice Requirements

- The required format is SG Peppol BIS Billing 3.0.[cxviii]
- Singapore is transitioning to PINT and IMDA has made this data standard available in early 2024 and currently in the process of enhancing the network and participating systems to fully support PINT within 2 years. [cxix]

3.4.17.4 Other Considerations

- In Singapore, businesses face challenges such as inefficiencies in invoicing methods arising from different invoicing methods dictated by trading partners creating operational challenges for businesses.[cxx]

3.4.18 Chinese Taipei

3.4.18.1 Model/Infrastructure

- Chinese Taipei uses the clearance model with the features of centralized invoicing. [cxxi]

- Business entities issuing electronic uniform invoices upload the information for the electronic uniform invoices to the EInvoice Platform of the Ministry of Finance in Chinese Taipei (instead of eGUI) within the stipulated time.

3.4.18.2 Mandates

- There are various mandates for invoicing in Chinese Taipei, including the Value-added and Non-value-added Business Tax Act and Regulations Governing the Use of Uniform Invoices. Among other things, business entities selling goods or services shall issue uniform invoices to purchasers within the stipulated time. However, exported goods, services related to exports, or services provided within the territory but used in foreign economies are exempted from the use or issuance of uniform invoices, both in paper and electronic forms.

3.4.18.3 Tax Invoice/Invoice Requirements

- The current required format for uploading electronic uniform invoices to EInvoice Platform is MIG4, based on XML language.
- The uniform invoices must follow government specifications, with an archiving period of minimum 5 years.

3.4.18.4 Other Considerations

- The implementation of eInvoicing aims to eliminate the use of paper invoices after three years of phased adoption.[cxxii]
- Unless stipulated by other laws involving specific cases, it is not fully mandatory to issue eInvoices in Chinese Taipei, nor are there any sunset clauses for the use of paper invoices.

3.4.19 Thailand

3.4.19.1 Model/Infrastructure

- Thailand uses the Electronic Transactions Development Agency **(ETDA)** system for eInvoicing via the e-Tax Invoice & e-Receipt system **(RTIR)**.[cxxiii]
- e-Tax Invoice can also be sent through the e-mail system that allows eInvoices to be emailed to recipients and the tax authorities (only for small companies with annual turnover < THB 30 million).[cxxiv]
- The system is not a full clearing model as only eInvoice data is transferred to the ETDA; the invoices are sent directly from the seller to the recipient.[cxxv]

3.4.19.2 Mandates

- eInvoicing in Thailand has been voluntary since 2012. Given its non-mandatory nature, the consent of the buyer is required to issue/send electronic invoices.[cxxvi]
- Whist the eInvoicing roadmap was introduced it has not been updated despite the passing of the original timelines. However, several supplementary laws have been enacted to outline the requirements for eInvoicing.[cxxvii]

3.4.19.3 Tax Invoice/Invoice Requirements

- Required format: XML with a five-year archiving period.[cxxviii]
- eInvoices must be digitally signed, have an electronic timestamp, and include defined information. Data is submitted to the Thai tax authority by the 15th of each month.[cxxix]

3.4.19.4 Other Considerations

- Part of the "Thailand 4.0" initiative to transform Thailand into a digital economy and an advanced economy by 2032.[cxxx]
- The ETDA promotes eInvoicing to support electronic transactions.[cxxxi]

- A three-year tax deduction incentive was introduced in 2019 and extended to 2025 to encourage eInvoicing adoption. Eligible deductions include investments in electronic systems, equipment, and service provider fees.[cxxxii]

3.4.20 The United States

3.4.20.1 Model/Infrastructure

- The USA's four corners exchange network model, similar to Peppol, allows users to send and receive eInvoices via secure AS2/AS4 channels through Access Points.[cxxxiii]
- Federal Reserve and the Business Payments Coalition **(BPC)** are piloting a standardised B2B electronic document exchange system.[cxxxiv]
- BPC eInvoice Exchange Market Pilot participants launched the Digital Business Networks Alliance **(DBNAlliance)** to oversee the new electronic exchange network, responsible for defining policies, standards, security mechanisms, and other rules.[cxxxv]
- The Exchange Network is based on open, non-proprietary standards, supporting various companies in securely exchanging electronic documents.[cxxxvi]

3.4.20.2 Mandates

- There is no eInvoicing mandate at any level.[cxxxvii]
- The absence of a nationwide mandate for eInvoicing is primarily due to tax complexities and the absence of a centralised authority. The lack of a federal VAT or GST system, input tax credit mechanisms, and formal tax invoice regulations in most states contribute to this.[cxxxviii]

3.4.20.3 Tax Invoice/Invoice Requirements

- eInvoices are processed electronically in either Structured invoice format or Hybrid invoice format, determining how invoices are sent, viewed, and accepted (by EDI or XML).[cxxxix]
- Archiving period is seven years from filing of the tax return.[cxl]
- Invoicing regulations in the United States are not governed by a single regulatory body but are influenced by Internal Revenue Service (IRS) guidelines, state laws, and specific industry standards.[cxli]

3.4.20.4 Other Considerations

- US government's Paperwork Elimination Act mandates that all federal agencies and their suppliers must have an option to submit an electronic invoice.[cxlii]
- Implementing a nationwide eInvoicing mandate is not yet possible since most states do not have a VAT system or input tax credit mechanisms.[cxliii]

3.4.21 Viet Nam

3.4.21.1 Model/Infrastructure

- Viet Nam uses the clearance model for eInvoicing. [cxliv]
- Taxpayers must transmit data in eInvoices to tax authorities either directly or through an authorised service provider. [cxlv]

3.4.21.2 Mandates

- On 19 October 2020, the Vietnamese government issued Decree 123/2020/ND-CP mandating eInvoicing.
- As of 1 July 2022, eInvoicing is mandatory. All enterprises, business households and individuals, except for special cases, must issue invoices electronically.[cxlvi]

3.4.21.3 Tax Invoice/invoice requirements

- The Law 20/2023/QH15 allows digital messages (i.e., eInvoices) to be considered valid regardless of method of receipt.[cxlvii]

- eInvoices in Viet Nam must be in XML format, have a digital signature and be archived securely for a period of 10 years.[cxlviii]

3.4.21.4 Other considerations

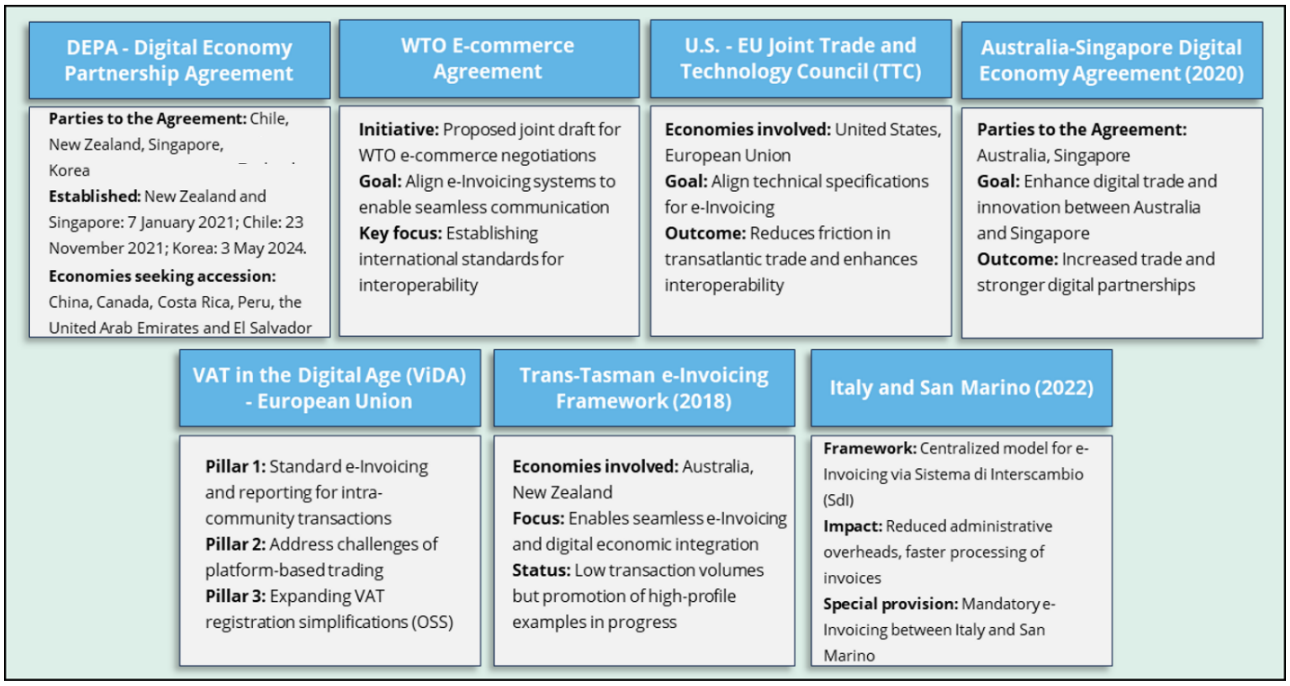
- Viet Nam's mandate was aimed at combating VAT fraud and reducing the VAT gap.[cxlix]

4 Interoperability of eInvoicing systems

4.1 Agreements promoting interoperability in digital trade

In an increasingly interconnected global economy, effective digital trade interoperability agreements which consider eInvoicing are critical for seamless cross-border transactions. Several leading economies have developed robust agreements that exemplify best practices in achieving interoperability and digital integration. The following examples highlight pioneering efforts in this domain noting this is just a selection of the agreements.

Figure 4.1: Agreements and practical examples of interoperability in digital trade



4.1.1 Chile; Korea; New Zealand; and Singapore

The Digital Economy Partnership Agreement (**DEPA**) between these members provides an example of best practices for building electronic invoice interoperability through trade agreements. DEPA recognises the importance of eInvoices and emphasises the need for supporting their use at home and ensuring interoperability globally.[cl] DEPA entered into force on 23 November 2021 with Korea formally joining on 3 May 2024. Canada, Costa Rica, and El Salvador have also expressed interest in being members of DEPA however accession has not been completed.[cli]

4.1.2 E-commerce Agreement

The Agreement on Electronic Commerce is a multilateral effort that aims to enhance interoperability in digital trade. It encourages the use of interoperable electronic authentication and mutual recognition of electronic signatures, supports cross-border electronic invoicing frameworks by adopting international standards, and promotes paperless trading through the use of electronic formats for import/export documents. The Agreement also advocates for single windows for electronic submission of trade documentation, aligning with international standards like the World Customs Organization Data Model. Additionally, it outlines the importance of developing safe, efficient, and interoperable electronic payment systems by fostering internationally accepted standards and encouraging innovation and competition. These measures collectively facilitate a seamless and secure digital trade environment, benefiting particularly MSMEs and fostering global electronic commerce growth. [clii]

4.1.3 Australia and Singapore

The Australia-Singapore Digital Economy Agreement (DEA) entered into force on 8 December 2020. The DEA is a high ambition agreement, setting global benchmarks for digital trade rules and a range of practical cooperation initiatives to reduce barriers to digital trade and build an environment in which Australian businesses, investors and consumers are able to participate in and benefit from the digitalisation of the economy. As part of a range of initiative it introduced the MoU on Cooperation for Electronic Invoicing. The focus of the MoU is on cooperation to expand eInvoicing interoperability in the region, based on the Peppol international framework. [cliii]

4.1.4 United States (US) and the European Union (EU)

The U.S.-EU Joint Trade and Technology Council (**TTC**) has made meaningful strides towards enhancing the interoperability of eInvoicing between the United States and the European Union. By fostering cooperation, the TTC has driven the alignment of technical specifications, thereby reducing friction in cross-market transactions, and delivering cost efficiencies for businesses engaged in transatlantic trade. While differences in the eInvoicing frameworks of both regions persist, these efforts are geared toward narrowing gaps in business and technical interoperability, yielding gains in efficiency and facilitating smoother trade flows.[cliv]

This initiative is part of a broader strategic objective to deepen digital trade interoperability across key global markets. The TTC has been instrumental in the establishment of mutually recognised standards for critical digital infrastructure and emerging technologies. This harmonisation not only simplifies digital transactions but also serves to support sustainability goals by promoting a streamlined, less resource-intensive approach to business practices. In the context of eInvoicing, the collaboration reduces administrative burdens and promotes a more decarbonised economy through the adoption of efficient, interoperable digital systems.[clv]

Key agreements, including the joint declaration appended to the most recent TTC communiqué, reflect a shared commitment to ongoing progress in this domain. These agreements highlight the strategic importance of aligning business processes and technical standards to enhance the capabilities of digital trade tools.
Additionally, they emphasise the collaborative nature of this effort, which will be critical in addressing future challenges in global interoperability, thus ensuring that digital trade systems remain robust and adaptive to evolving economic demands.[clvi]

4.2 Examples of cross border interoperability in practice

While the goal is to achieve interoperability across the APEC region, there are only a few examples globally where economies have successfully accomplished this, or where technology facilitates this. VAT in the Digital Age (**ViDA**) is the most documented eInvoicing initiative with high success. This is due to its unified standard for digital invoice processing across the EU.[clvii] Additionally, the Trans-Tasman eInvoicing Interoperability Framework between Australia and New Zealand serves as a model for cooperation on eInvoices and closer digital economic integration.

Lastly, Italy and San Marino are cross-border interoperable due to the size and proximity of San Marino to Italy. While achieving one universal standard for eInvoicing may be challenging due to the diversity of systems and requirements across economies, the focus should be on promoting interoperability among different hubs.[clviii]

4.2.1 Australia and New Zealand:

The Trans-Tasman eInvoicing Interoperability Framework was developed by Australia and New Zealand in 2019 and it serves as a model approach to cooperation on eInvoices and closer digital economic integration. This framework enables seamless electronic invoicing between the two regions, showcasing cross-border interoperability.[clix] The interoperability is simplified due to both economies having very similar laws and legislations, therefore by committing to using the same eInvoicing framework they have ensured cross border digital trade is possible. Although transaction volume is currently very low, they are looking to promote some high-profile examples.

4.2.2 The European Union and VAT in the Digital Age

The EU has been a leader in promoting electronic invoicing interoperability through initiatives like the European eInvoicing Directive (Directive 2014/55/EU) which officially came into force on 16 April 2019.[clx] This mandates that EU public administrations receive and process all electronic invoices. The cornerstone of this directive is EN 16931, which standardises electronic invoicing for public procurement across member states. This unified semantic data model ensures interoperability and mutual understanding of invoice content regardless of the systems used, supporting syntaxes like UBL and UN/CEFACT CII.[clxi]

Compliance with EN 16931 requires businesses to adhere to structured rules at three levels:[clxii]

1. **Invoice Document**: Every electronic invoice must follow the core invoice rules or the relevant Core Invoice Usage Specification (**CIUS**). This includes mandatory information, structured data, accurate calculations, and permitted values.
2. **Implementation**: Both senders and receivers of electronic invoices must comply. Receivers must accept and process all invoices that meet the EN 16931 core data model or any applicable CIUS. Senders must create invoices conforming to these standards.
3. **Specification**: Any CIUS must not deviate from the core rules to ensure compatibility with the full core.

In December 2022, the ViDA reforms were announced to amend the EU VAT system in response to digitalisation challenges.[clxiii] ViDA's three pillars are:

- Introducing standard digital reporting requirements and eInvoicing for intra-community transactions.
- Addressing the challenges of trading on platforms, such as short-term accommodation rentals and passenger transport.
- Reducing VAT registration requirements in the EU by expanding the One Stop Shop **(OSS)** and the reverse charge for B2B trade.

ViDA aims to ensure interoperability by establishing a European standard for electronic invoicing, mandating that all contracting authorities can receive and process EN 16931-compliant eInvoices. [clxiv] It also aims to reduce the administrative burden on businesses, facilitate real-time VAT reporting, and streamline domestic transaction processes.[clxv] Adoption of ViDA eInvoicing is crucial for SME's, e-commerce businesses, and digital service providers engaged in cross-border trade, simplifying VAT registration, and reducing administrative burdens.

Tax authorities in EU member states are encouraged to invest in modern technology to handle increased data volumes and improve fraud detection.[clxvi] ViDA introduces a real-time reporting regime for cross-border transactions, replacing the current EC Sales Lists requirement. Transactional reporting will be done to each member state, which will then report to a central European Commission database.[clxvii]

ViDA represents a critical step towards achieving interoperability within the EU, creating a more integrated and efficient digital VAT reporting system.

4.2.3 Italy and San Marino

Since 1 July 2022, eInvoicing has been mandatory between Italy and San Marino. The technical specifications in Italy were updated to include special provisions to facilitate the exchange of eInvoices between the two economies.[clxviii]

The centralised model is used for eInvoicing between the two economies, with the mandatory file format and B2G requirements being HUB SM, with an archiving period of 10 years. [clxxiii] eInvoicing between the two economies will be facilitated via the Sistema di Interscambio **(SdI).** The San Marino tax office will validate invoices received via the SdI and, if compliant, transmit these to San Marino customers.[clxix]

San Marino's small size and close economic ties with Italy facilitated this agreement. These unique circumstances made it easier to align legal and technical frameworks. The economies' geographic proximity allows for more straightforward integration. [clxx] Strong economic ties mean that businesses on both sides benefit from reduced administrative overheads and faster transaction processing.[clxxi]

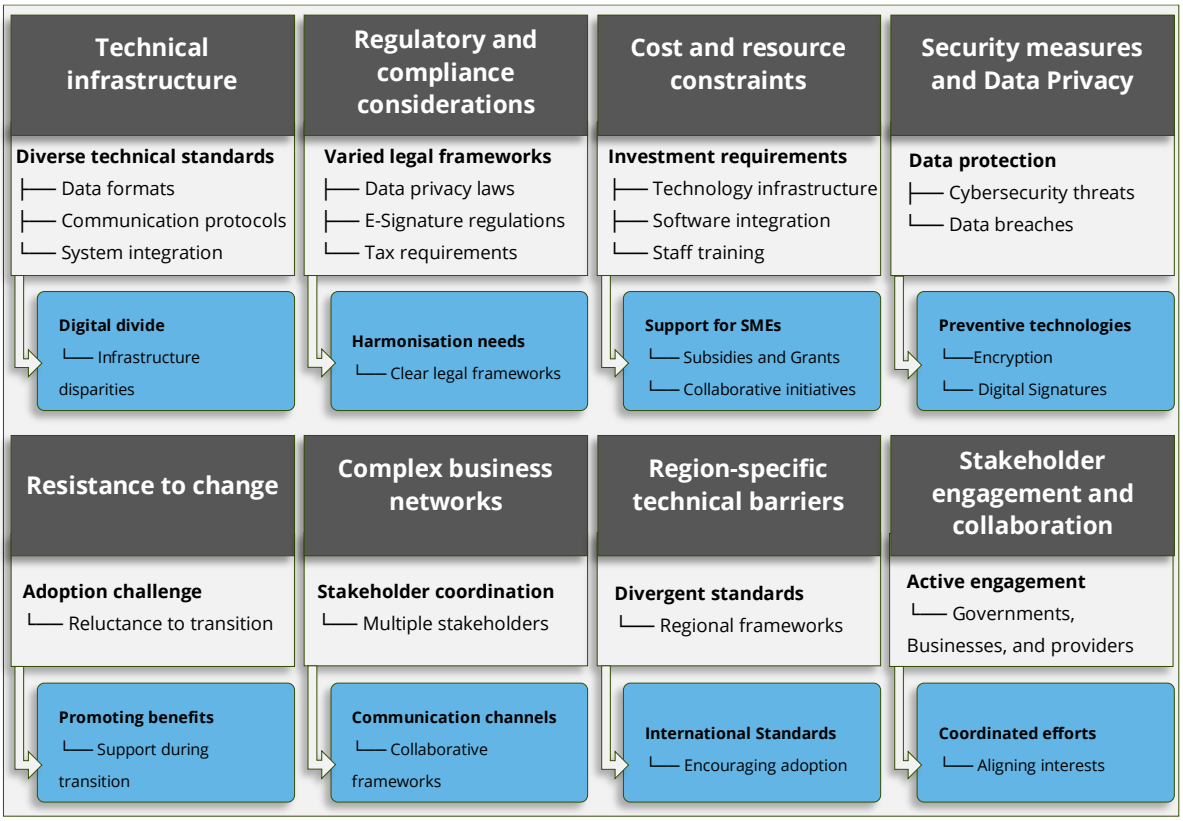
This example demonstrates that achieving business efficiency and tax compliance through e- Invoicing interoperability is possible under certain conditions. For future implementations, it's essential to evaluate the

specific needs of businesses and tax authorities, address legal, semantic, and structural differences, and consider the geographic relationships between economies.

4.3 Challenges and key factors for achieving interoperability

Achieving interoperability for eInvoicing across the APEC region is fraught with significant technical and regulatory challenges. These barriers, ranging from region-specific standards to legal inconsistencies, hinder the seamless exchange of digital invoices and complicate cross-border transactions. This section delves into the primary obstacles impeding interoperability and outlines the critical areas requiring attention for ultimately facilitating smoother and more cost-effective cross-border trade to enable eInvoicing interoperability.

Figure 4.2: Agreements and practical examples of interoperability in digital trade



Source: Deloitte Access Economics (2024)

4.3.1 Technical Interoperability

One of the primary challenges in achieving interoperability for eInvoicing systems is the existence of diverse technical standards and formats across different regions and industries. Misalignment in standards impedes seamless data exchange, with variations in data formats, communication protocols and system integration requirements creating significant hurdles. Addressing these inconsistencies requires substantial efforts to develop and adopt common standards that facilitate cross-border transactions.

The varying levels of technological infrastructure and digital maturity across APEC economies present another challenge to eInvoicing interoperability. Some economies boast advanced digital infrastructure and robust eInvoicing systems, while others are still in the early stages of digital transformation. This disparity creates a digital divide, where less developed economies struggle to adopt and implement interoperable eInvoicing systems. Although this situation encourages investment in digital infrastructure and the adoption of best practices, it also exacerbates inequalities between economies and slows down overall progress toward interoperability.

The technical infrastructure for interoperability encompasses the underlying systems, technologies, and protocols that enable different entities, systems, or platforms to seamlessly communicate, exchange data, and work together. This infrastructure forms the foundation for achieving effective interoperability across all regions, including interactions between service providers and Enterprise Resource Planning systems **(ERPs)**.

Key components of the technical infrastructure for interoperability:

- Access Points
- Data Exchange Protocols
- Authentication Protocols
- Messaging Protocols
- File Format Protocols

4.3.1.1 Access Points

Access points play a vital role in the e-Delivery network for users of Interoperability eInvoicing models. Facilitating the exchange of eInvoices between sellers and buyers they perform two key functions:[clxxii]

1. Connecting to the business application systems of sellers and buyers
2. Integrating with the e-Delivery network using standardised message delivery protocols

For example, Access Points used for Peppol undergo a certification process. It establishes standards and interoperability requirements for providers. Certification ensures that providers are capable and compatible within the network, maintaining its reliability and stability while mitigating risks that could undermine trust.[clxxiii]

4.3.1.2 Data Exchange Protocols

Technical interoperability relies on standardised data exchange protocols that facilitate the exchange of data and messages between systems. Common protocols AS2 (Applicability Statement 2) and AS4 (Applicability Statement 4). These protocols define the rules and formats for transmitting data over networks and ensure compatibility between different systems.

AS2 (Applicability Statement 2):

AS2 is a widely adopted communication protocol for secure and reliable data transmission over the Internet. It uses Hypertext Transfer Protocol **(HTTP)** as the underlying transport mechanism and supports encryption, digital signatures, and message integrity checks. AS2 ensures the secure exchange of eInvoices between trading partners, providing end-to-end data protection.[clxxiv]

Peppol is fully phasing out the use of AS2 communication protocol whereas AS4 is mandatory to use going forward.[clxxv]

AS4 (Applicability Statement 4):

AS4 is an extension of AS2 and is specifically designed for exchanging structured business documents, including eInvoices, over the Internet. AS4 builds upon the reliability and security features of AS2 while incorporating additional capabilities such as message bundling, and support for larger payloads. AS4 enables seamless and secure communication between different systems, promoting interoperability in eInvoicing.[clxxvi]

4.3.1.3 Authentication Protocols

Authentication protocol standards play a crucial role in ensuring secure and reliable eInvoicing interoperability. Protocols such as OAuth 2.0 and Security Assertion Markup Language (SAML) are widely adopted to authenticate and authorise users, safeguarding the integrity and confidentiality of invoice data during transmission.[clxxvii]

However, implementing these protocols presents several challenges. Diverse business environments may have varying security requirements and infrastructure capabilities, making standardisation difficult. Additionally, achieving seamless integration across different systems and jurisdictions often requires significant effort and coordination. Compatibility issues, regulatory compliance, and evolving security threats

further complicate the deployment of robust authentication mechanisms. Overcoming these challenges is essential for fostering trust and efficiency in the global eInvoicing landscape.

4.3.1.4 Messaging Protocols

Messaging protocols are the set of rules that govern communication and data exchange on the internet. Simple Object Access Protocol **(SOAP)** and Representational State Transfer **(REST)** enable communication and data exchange between systems over the Internet.[clxxviii]

Both methods provide a standardised way to expose functionalities and exchange structured data, making them suitable for eInvoicing interoperability. By leveraging web services, systems can interact and exchange eInvoices using well-defined interfaces and protocols.

4.3.1.5 File Format Protocols

Consistent data formats are essential for seamless data exchange and interpretation. These data formats underpin file formats, such as XML or JSON which provide a structured and universally understood way to represent and transmit data. By adopting common data and file formats, systems can understand and process data correctly, regardless of their specific technologies or platforms.

Refer to Appendix 2 for more detail on the protocols.

Table 4.1: File Formats

File Format Protocols	**XML**	• Versatile, text-based format for structuring and exchanging data online. • Standardises invoice data representation for smooth communication between systems. • Customisable tags and structures ensure adaptability and compliance with standards.[clxxix] • Organises invoice data hierarchically, facilitating validation and automated processing. • Supported by many software applications for seamless business process integration. • Automates invoice generation, transmission, and processing, reducing errors and speeding up transactions. • Essential for achieving interoperability and improving eInvoicing efficiency.
	JSON	• Lightweight, text-based data interchange format.[clxxx] • Modern and efficient method for representing invoice data in eInvoicing. • Adaptable to various applications with simple syntax using key-value pairs and arrays. • Enhances readability for developers and business users, aiding in troubleshooting. • Lightweight nature improves network performance for real-time and high-volume transactions. • Widely supported across programming languages and platforms, ensuring interoperability. • Allows creation of custom data structures, adhering to industry standards and regulatory requirements.
Data Exchange Format	**Peppol BIS Billing**	• EInvoice format for electronic procurement documents within the Peppol network. • Promotes seamless exchange of procurement-related documents across borders. • Requires inclusion of buyer reference or purchase order reference in eInvoices.

		• Detailed invoice lines include product/service names, quantity, net amount, buyer accounting reference, time period, order reference, allowances/charges, and price details.[clxxxi]
	Peppol PINT	• Peppol International Invoice **(PINT)** Billing is an advanced specification for globally interoperable invoice specifications. • Set to replace the existing BIS Billing 3.0 specification in several economies. • PINT is an extension to Peppol BIS-Billing 3.0, and BIS-Billing 3.0 is compatible with PINT.[clxxxii] • The PINT group was established to create an international business interoperability specification, eliminating the need for multiple economy-specific derogations. • The PINT model has three layers: shared (universally understood information), aligned (minor jurisdictional differences), and distinct (economy-specific or industry-specific information). • The shared layer ensures consistent processing across all participating economies, supporting cross-border interoperability. • The aligned layer addresses jurisdictional differences, and the distinct layer caters to unique local requirements.[clxxxiii] • Achieving cross-border interoperability requires collaboration, standardisation, and alignment among solution providers, governments, and stakeholders.
	EDIFACT	• Computer-to-computer exchange of business documents in a standard electronic format. • Automates data transfer, enhancing efficiency, accuracy, and speed in transactions. • Uses standard formats to ensure universal data understanding across systems. • Common documents include purchase orders, invoices, shipping notices, and payment remittance advices. • Ensures confidentiality and regulatory compliance through encryption and secure networks. • Widely used in industries like retail, automotive, healthcare, logistics, and manufacturing for efficient B2B communication.[clxxxiv]

4.3.2 Regulatory and compliance considerations

Varied legal and regulatory frameworks related to electronic invoicing and data protection pose significant challenges. Differences in data privacy laws, electronic signature regulations and tax requirements create barriers to interoperability. For example, some regions may lack prescriptive laws on e-signatures, leading to inconsistencies that complicate cross-border interoperability.[clxxxv]

One of the primary challenges in achieving eInvoicing interoperability within the APEC region is the variation in regulatory frameworks across member economies. Each economy has its own set of rules and regulations governing eInvoicing, which differ significantly in terms of legal requirements, compliance standards, and enforcement mechanisms. This diversity complicates the harmonisation of eInvoicing standards and practices, making it difficult for businesses to ensure compliance across multiple jurisdictions. While tailored solutions can meet specific domestic needs and promote innovation, the lack of uniformity creates barriers to seamless cross-border trade and increases compliance costs for businesses operating in multiple economies.

4.3.3 Cost and resource constraints

Implementing interoperable systems often requires significant investments in technology infrastructure, software integration and staff training. SMEs face challenges in meeting these costs, which can limit their ability to achieve interoperability. Addressing these financial barriers through subsidies, grants, or collaborative initiatives can help SMEs adopt interoperable eInvoicing systems.[clxxxvi]

4.3.4 Security measures and data privacy

Ensuring data security and protecting sensitive information during cross-border data exchange is a critical challenge. Cybersecurity threats, data breaches and compliance with data protection regulations can impact efforts to promote interoperability. Robust security measures and international cooperation on cybersecurity standards are necessary to mitigate these risks.[clxxxvii]

Interoperability requires robust security measures to protect data integrity, confidentiality, and privacy. Technologies such as encryption, digital signatures, and secure communication protocols (e.g., SSL/TLS) help safeguard sensitive information during data exchange. Implementing proper authentication and access control mechanisms ensures that only authorised entities can access and interact with systems, maintaining the integrity of the interoperable infrastructure.

Such mechanism includes using x.509 public key infrastructure **(PKI)** certificates to provide authentication of senders and receivers and registering participants into the network using a controlled process to ensure accurate discovery and document transport.[clxxxviii]

Adherence to ISO/IEC 27001 is important and indicates that a network operator has implemented a system to manage risks associated with the security of data it owns or handles, ensuring this system is robust and effective.[clxxxix]

Ensuring the security and trustworthiness of eInvoicing systems is crucial for widespread adoption. Businesses and consumers need confidence that their transactions are secure, and their data protected. However, varying levels of cybersecurity measures and data protection regulations across APEC economies can undermine trust in cross-border eInvoicing systems. Building a secure and trusted eInvoicing ecosystem requires coordinated efforts to establish common security standards and practices. Enhancing security and resilience promotes trust among stakeholders, but significant investments in cybersecurity infrastructure and overcoming resistance from economies with less stringent regulations are necessary.

4.3.5 Resistance to change

Resistance to adopting new technologies and digital processes can impede interoperability initiatives. Businesses and governments may be reluctant to transition from traditional paper/PDF-based invoicing methods to electronic systems, delaying interoperability efforts. Promoting the benefits of eInvoicing and providing support during the transition can help overcome this resistance.[cxc]

4.3.6 Complex business networks

In complex supply chains and business networks, interoperability challenges arise due to the involvement of multiple stakeholders with varying systems and processes. Coordinating data exchange among diverse partners can be a barrier to achieving seamless interoperability. Establishing clear communication channels and collaborative frameworks can facilitate smoother interactions.[cxci]

4.3.7 Region-specific technical barriers

Regions may enact their own eInvoicing frameworks with specific technical standards that act as barriers to digital trade. These divergent standards hinder interoperability between different systems and complicate cross-border transactions. Encouraging the adoption of international standards can help mitigate these technical barriers.[cxcii]

4.3.8 Stakeholder Engagement and Collaboration

Achieving eInvoicing interoperability necessitates the active engagement and collaboration of various stakeholders, including governments, businesses, and technology providers. Coordinating efforts and aligning interests among these diverse groups can be challenging, as each may have different priorities and concerns. Effective stakeholder engagement ensures that developed policies, standards, and practices are inclusive and address the needs of all parties involved. This fosters a collaborative approach to problem-solving and innovation

but can be time-consuming and resource-intensive, with potential difficulties in achieving consensus and alignment among stakeholders.

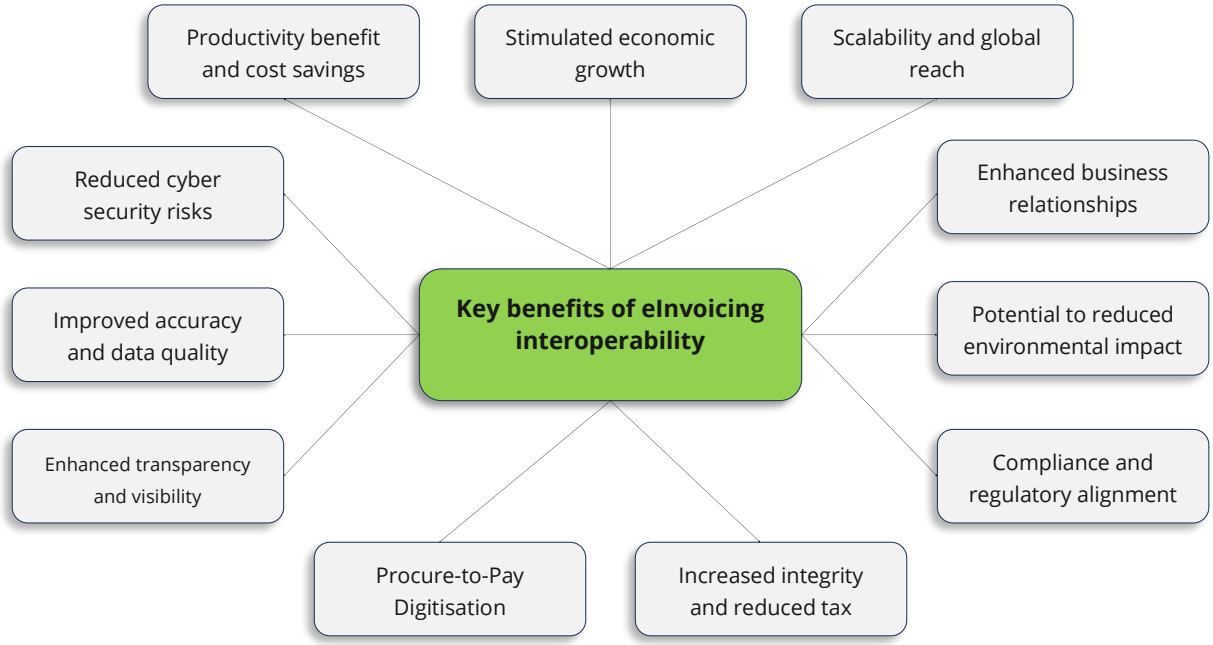
5 Potential economic gains from enhancing interoperability

5.1 Economic benefits of interoperable eInvoicing systems

The adoption of electronic invoicing across APEC economies has the potential to generate substantial economic benefits. This section discusses the nature of the benefits of adopting eInvoicing for cross border transactions and provides a high-level estimate of the magnitude of these benefits both across the region and by member economy.

The first subsection of this chapter discusses the approach used to quantify the potential productivity gains and cost savings associated with greater levels of eInvoicing adoption in APEC trade. The second subsection examines a range of other benefits most in addition to those quantified. The key benefits examined in this Chapter are set out in Figure 5.1.

Figure 5.1: Key benefits of improving interoperability of eInvoicing systems



Source: Deloitte Access Economics (2024)

5.2 Quantifying the productivity gains and costs savings from greater adoption of eInvoicing in cross border trade

5.2.1 Data and methodological approach

To assess the economic benefits of eInvoicing interoperability in the APEC region, a structured methodology was applied, combining multiple data sources, assumptions, and adjustments to ensure the analysis reflects both regional nuances and broader economic conditions.

5.2.1.1 Data sources

The analysis was primarily informed by data from the Australian Bureau of Statistics **(ABS)**, which provided insights into international trade transactions involving Australia. This was combined with historical data on the number of transactions from other economies where this was publicly available including Canada and New Zealand. ComTrade and World Bank-wide trade data was also incorporated to estimate number of transactions for each APEC member economy. This allowed for the approximation of the total value import and export across the region.

5.2.1.2 Key assumptions

The average transaction value was derived using data on the number of transactions and value of trade for Australia; Canada; and New Zealand. Average import and export transaction values (or in the case of Australia average values by trading partner) were used for these economies. Where this data was not available an average based on the four economies mentioned above was used.

Note that, transaction values may be lower between economies sharing land borders, especially in smaller or regional economies where trade transaction value are lower and transportation options are more cost-efficient. This is likely to lead to a higher number of transactions and potential lower average transaction values. Thus, the model's estimates may be conservative, with potential underestimation of the number of transactions.

Further, the analysis assumed that the productivity gains from eInvoicing would be consistent across industries and transaction types.

5.2.1.3 Steps involved

The number of transactions for each APEC economy were estimated by using the average transaction value by bilateral economy pair in APEC. These were applied to import and export transactions, forming the basis for determining the number of bilateral transactions between each economy pair in APEC.

The productivity benefits per transaction were estimated using established benchmarks from existing eInvoicing studies, which are discussed further in 5.2.2 below. By applying these benefits across the estimated number of transactions, the potential economic gains for each APEC economy were calculated.

As much of the productivity gains relate to reduction and removal of repetitive tasks that occur in the absence of electronic invoicing, productivity gains will differ depending on labour costs in each APEC economy. Labour costs have been estimated in relative terms based on data from the Global Trade Analysis Project (GTAP).

5.2.1.4 Caveats

The reliance on average value of transaction data from Australia; Canada; and New Zealand as a proxy for other APEC economies introduces limitations, particularly in smaller APEC economies. Transaction values between neighbouring economies, particularly those with shared land borders, may be significantly lower than in transactions involving geographically distant economies. This suggests that the number of transactions could be higher than estimated, making the analysis conservative in its projections of potential productivity benefits and cost savings.

5.2.2 Productivity benefit and cost savings

eInvoicing streamlines the invoicing process, reduces manual errors, and lowers processing costs. The productivity benefits of eInvoicing are estimated by comparing cost components such as labour, storage, and error reduction of traditional paper/PDF invoices compared to structured eInvoices. Deloitte Access Economics estimates that the productivity benefits of eInvoicing amount to USD 14.84 per invoice.[cxciii] These estimates align

closely with findings from the 2024 European Commission preparatory study on the effects of Directive 2014/55/EU, which highlights comparable productivity gains in public procurement. [cxciv]

These benefits are split as follows:

- Accounts Payable: Accounts payable departments capture 60% of the total productivity gain, equating to USD 8.90 per invoice.
- Accounts Receivable: Accounts receivable departments account for the remaining 40%, benefiting by USD 5.94 per invoice.[cxcv]

In the context of cross-border invoicing, the benefits to accounts payable accrue to importers while the benefits to accounts receivable accrue to exporters.

The move from paper to PDF or emailed invoices could bring further benefits; however, the focus here is on the added productivity gains of structured eInvoicing, where standardised formats minimise manual labour and reduce errors. It does not capture any storage savings associated with a shift from PDF to paper invoices.

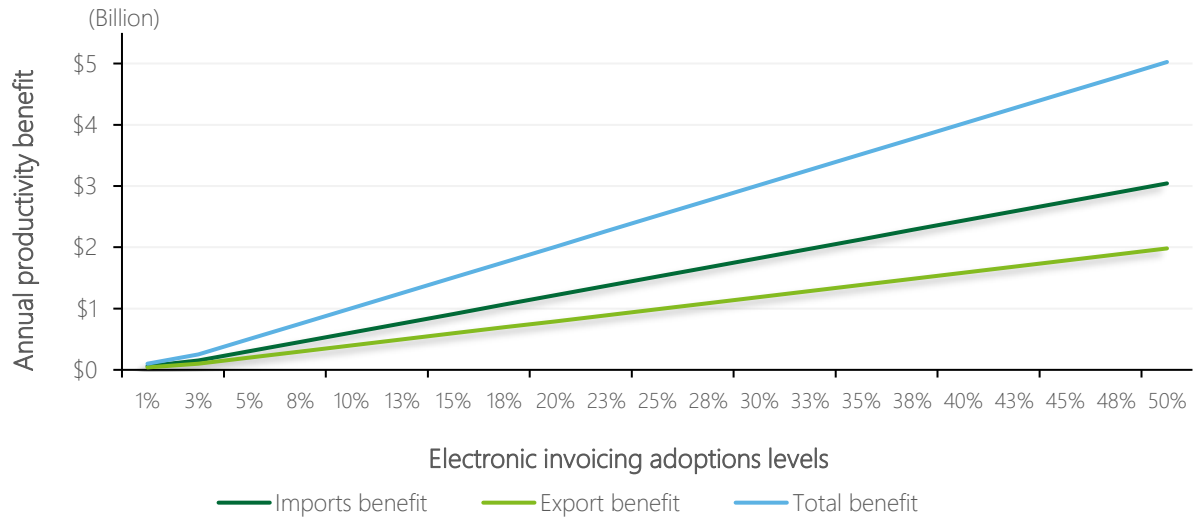
The productivity benefit values are based on removing costly activities that are undertaken regularly and repetitively. These values reflect ongoing efficiencies achieved through structured eInvoicing rather than one-off or initial costs associated with implementation.

The identified productivity benefits require coordination across economies for full realisation. If one economy adopts eInvoicing for cross border trade this will not realise productivity gains unless an APEC trading partner is able to receive or send an eInvoice. Thus, the overall gains depend on the coordinated adoption of structured eInvoicing systems across the APEC region. Greater alignment and uptake among economies enhance the cumulative benefits. Conversely, disparities in adoption rates may result in variations in realised productivity and cost savings.

5.2.3 Economic impact of eInvoicing adoption

While the economic benefits are dependent on the level of adoption of eInvoicing in cross border transactions, the potential productivity benefits and cost savings from higher adoption are substantial. Based on different adoption scenarios, the anticipated productivity and trade efficiency gains are projected to reach as high as USD 5 billion annually at a 50% adoption rate., with imports benefit of USD 3 billion and exports benefit of 2 billion, contributing to overall trade efficiency across APEC economies. At a more conservative adoption level of 10%, the benefits could amount to approximately USD 1 billion.[cxcvi] (Chart 5.1). [cxcv]

Chart 5.1: Projected productivity benefits for APEC trade vs eInvoicing adoption rates (Billion USD) *



*The analysis considers only productivity benefit generated from international trade, not internal economy benefits.
Source: Deloitte Access Economics (2024)

The potential annual productivity gains for APEC members vary considerably based on the level of eInvoicing adoption. As shown in Table 5.1, at adoption rate of 50% can yield substantial benefits, with the United States alone realising gains of USD 2.2 billion.

The economic benefits of eInvoicing tend to be larger in economies with higher labour costs and greater transaction volumes. In these economies, the savings from reducing manual invoicing processes are more significant, making eInvoicing a key driver of productivity improvements. This reflects the greater opportunity cost of inefficiency in high-cost labour markets, where automating invoicing results in substantial cost reductions and trade efficiency gains. Therefore, economies with higher labour costs stand to realise larger economic benefits from widespread eInvoicing adoption.

Table 5.1: Potential annual productivity gains for APEC members at 50% of eInvoicing adoption levels*

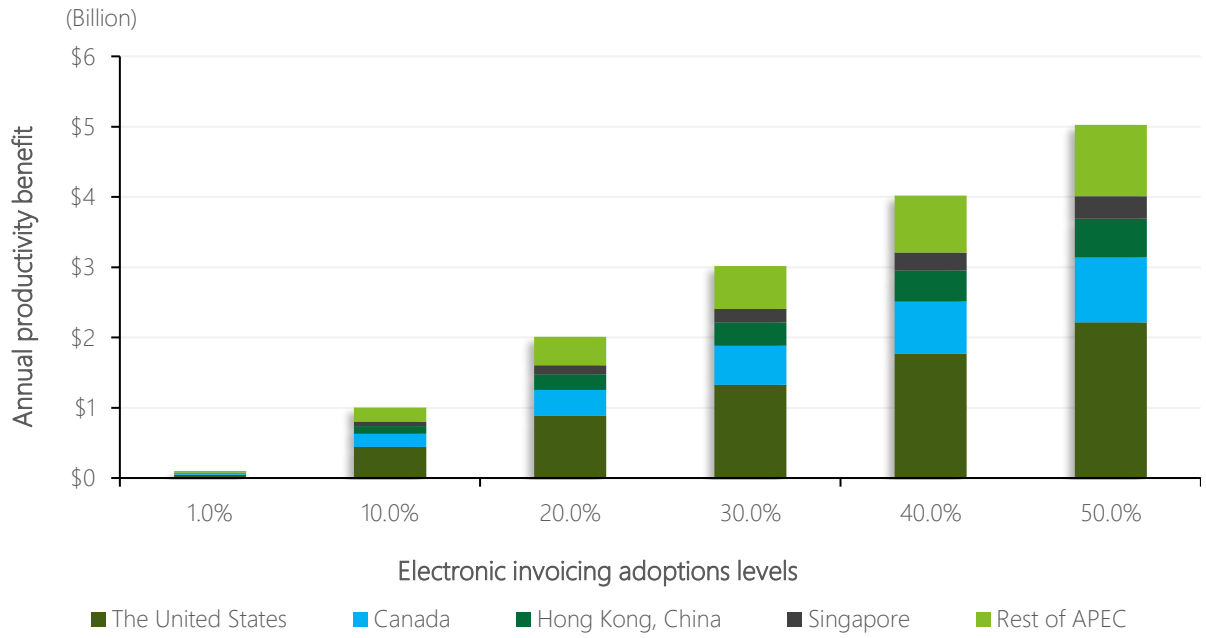
APEC members	Annual productivity value (Millions, USD)
Australia	88
Brunei Darussalam	14
Canada	927
Chile	25
The People's Republic of China	151
Hong Kong, China	552
Indonesia	10
Japan	190
The Republic of Korea	167
Malaysia	27
Mexico	61
New Zealand	39
Papua New Guinea	1
Peru	9

The Republic of the Philippines		6
The Russian Federation		31
Singapore		319
Chinese Taipei		176
Thailand		10
The United States		2.2 billion
Viet Nam		9
	Total	**5.025 billion**

*The analysis considers only productivity benefit generated from international trade, not internal economy benefits.
Source: Deloitte Access Economics (2024)

The United States has the potential to realise approximately USD 442 million in economic benefits from eInvoicing at 10% adoption rate, followed by other economies such as Canada with USD 185 million, Hong Kong, China with USD 110 million, Singapore: USD 63 million, and USD 202 million for the Rest of APEC. (Chart 5.2)[cxcvii]

Chart 5.2: Annual APEC Economies' Productivity gains from eInvoicing (Billion USD)



Source: Deloitte Access Economics (2024)

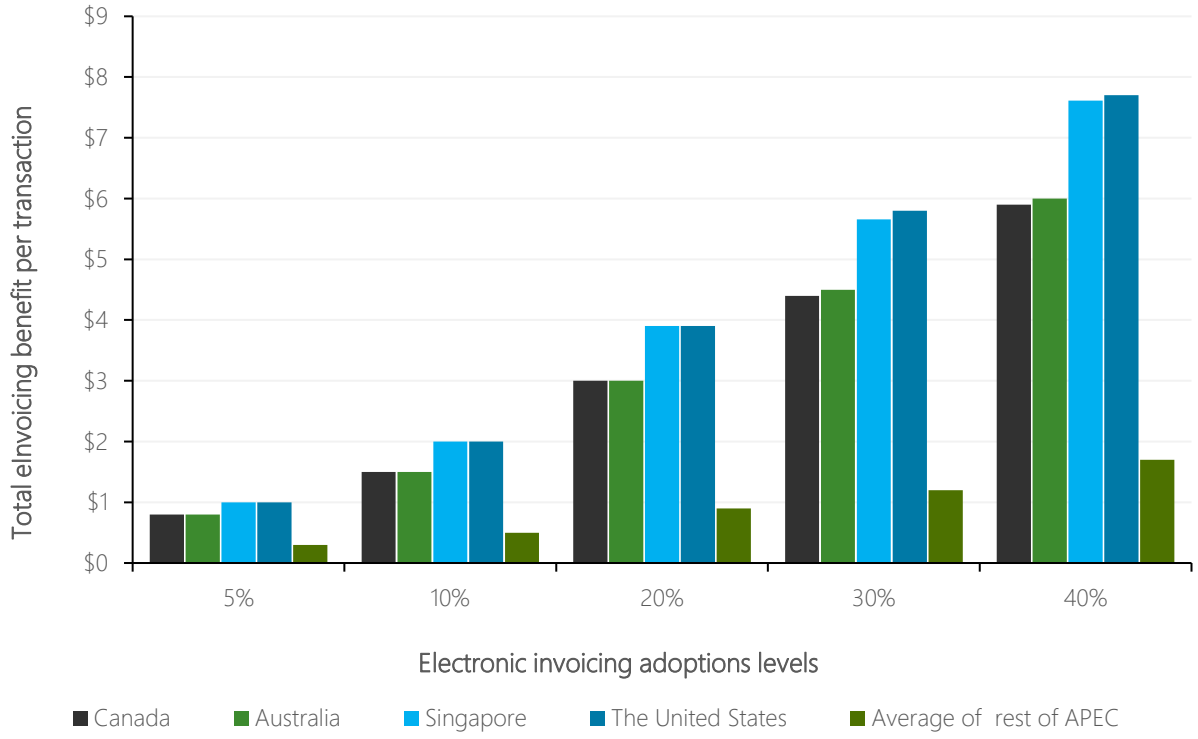
At a higher adoption level of 50%, the total benefits are projected to reach USD 5 billion, with the United States realising benefits of up to USD 2.2 billion.

Per-transaction benefits across APEC economies

The analysis demonstrates that the potential productivity benefits of eInvoicing vary across APEC economies, with larger economies generally experiencing higher per-transaction gains:

- Regional variations: The United States; Singapore; and Australia exhibit the highest per-transaction benefits in US dollar terms, reflecting their relatively higher labour costs and the value of their real exchange rates.
- Adoption rate impact: The productivity benefits increase substantially with higher adoption rates. For example, Singapore can expect to realise benefits of up to USD 7.6 per transaction at a 40% adoption rate (Chart 5.3)

Chart 5.3: Total eInvoicing benefit per transaction vs eInvoicing adoption levels (USD)



Source: Deloitte Access Economics (2024)

The economic benefits of interoperable eInvoicing are wide-ranging, extending beyond direct productivity improvements. As businesses across APEC adopt interoperable eInvoicing systems, they unlock not only financial gains but also contribute to more sustainable and resilient economic growth. While this analysis quantifies the cost savings and efficiencies realised through streamlined invoicing processes, the broader value proposition of eInvoicing is highlighted in the following sections.

To maximise the benefits of eInvoicing across the APEC region, government leadership is essential. Domestic adoption of eInvoicing can be accelerated through government initiatives, with public sector uptake setting a strong example for businesses. Across APEC, encouraging larger economies to lead in eInvoicing implementation may serve as a similar driver, enabling benefits to flow more effectively across the region by setting a common standard and encouraging other economies to participate.

5.3 Other economic benefits of eInvoicing

5.3.1 Reduced cyber security risks

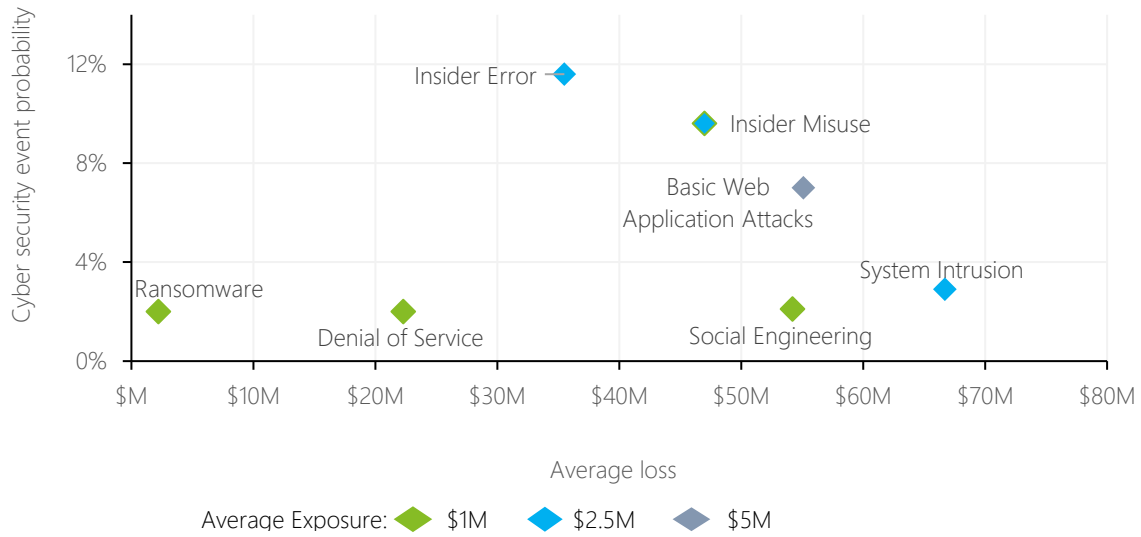
eInvoicing systems inherently feature strong security elements such as encryption, secure access controls, and audit trails, which help protect sensitive financial data from unauthorised access and cyber threats. [cxcvii] These security features are advantageous for organisations seeking to mitigate risks, particularly in industries handling large number of transactions.

Beyond these inbuilt security features, the broader adoption of interoperable eInvoicing systems has the potential to amplify cybersecurity benefits, where the security of the network is a focus. Interoperability ensures that eInvoicing systems across different platforms can communicate securely and consistently, reducing fragmentation and potential system vulnerabilities that cybercriminals may exploit. When all systems across supply chains are connected securely, the chances of unauthorised access, data breaches, and cyber-attacks are significantly reduced, thus protecting financial and operational data across industries. [cxcviii]

The need for such robust, interconnected systems is evident when examining data on cyber security risks across various sectors. The 2023 Cybersecurity Risk studies estimate the Public Administration sector faces the highest cyber event probability at 17%, with an estimated USD 36.5 million in potential losses and USD 7.6 million in exposure. Healthcare follows with a 9% probability of a cyber event, USD 40.6 million in losses, and USD 5.5 million in exposure (see Chart 5.4) [cxcix].

This highlights the need for interoperable eInvoicing systems to reduce exposure to such risks. When systems are fully interoperable, they can reduce the likelihood of these cyber incidents and create a more resilient infrastructure across sectors. Additionally, eInvoicing minimises the use of paper/PDF documents, which can be lost or intercepted. Automated digital records are easier to secure and track, reducing the risk of sensitive information being compromised.[cc]

Chart 5.4: Simulated risk outcomes: Event probability, revenue loss, and exposure risk for key cybersecurity threats



*The amount of exposure (or risk) does not equal just multiplying the chance of an event happening by how much one could lose. This is because there can be extra losses that happen after the main event, which are also part of the risk calculations. This data comes from a simulation study on a typical U.S. company with 1,000 employees and USD 1 billion in revenue.
Source: RiskLens, Cybersecurity Risk Report (2023)

However, greater digitisation also introduces more cyber risks. Implementation is key to mitigating these risks. The framework must have adequate security protections which are enforced. Organisations must adopt comprehensive cybersecurity measures and continuously monitor and update their systems to protect against evolving threats.

By automating invoicing processes, organisations can reduce the likelihood of human error, a primary contributor to financial losses. The streamlined nature of eInvoicing minimises manual data entry and the potential for mistakes, thereby enhancing accuracy and efficiency. Integrating eInvoicing with broader risk management strategies allows organisations to leverage risk quantification to assess and prioritise potential vulnerabilities associated with invoicing processes.[cxcviii]

5.3.2 Improved accuracy and data quality

Interoperable electronic invoicing systems ensure data consistency, accuracy, and integrity throughout the invoicing process. Standardised data formats and seamless integration between systems minimise errors and discrepancies, enhancing overall data quality. This reduces the risk of errors in transactions.[cxcix]

5.3.3 Enhanced transparency and visibility

Increased interoperability enables better visibility of the invoicing process, allowing businesses to track invoice status, monitor payment timelines and access real-time insights into financial transactions. Improved transparency fosters trust and accountability in business relationships.[cc]

5.3.4 Procure-to-Pay (P2P) Digitisation

eInvoicing, as an integral part of the P2P process, offers numerous benefits that enhance overall business operations. Key advantages include increased efficiency, touchless processing, and automation.

eInvoicing significantly improves the efficiency of the invoicing process. By automating data entry and validation, businesses can reduce manual errors and speed up invoice processing times. Companies that implement eInvoicing experience a 60-80% reduction in invoice processing time, leading to faster payments and improved cash flow management.[cci]

Touchless processing is a primary feature of eInvoicing within the P2P process. This means that invoices can be processed without any manual intervention, from receipt to payment. Organisations using touchless eInvoicing reported an 89% on touchless processing rates[ccii] across all invoices. This reduces labour costs and minimises the risks of errors and fraud.

Automation is at the core of eInvoicing, enabling seamless integration with existing P2P systems. Automated workflows ensure that invoices are automatically matched with purchase orders and delivery receipts, streamlining the approval process. Automation through eInvoicing can lead to a substantial decrease in payment cycle times, enhancing supplier relationships by ensuring timely payments and reducing disputes.

5.3.5 Faster payment processing

Interoperable electronic invoicing systems facilitate faster payment processing and improve cash flow management. Real-time data exchange and automated workflows accelerate the invoicing cycle, leading to quicker payments and improved working capital.[cciii]
Studies have shown in general, electronic invoices are processed and settled 5 to 7 days faster than traditional paper/PDF invoices, reducing the reliance on external financing sources.[cciv]

5.3.6 Increased integrity and reduced tax evasion

Interoperable eInvoicing systems help businesses comply more easily with local and international regulations, such as VAT obligations and anti-corruption measures. Governments, in turn, can better enforce tax laws and financial reporting standards. eInvoicing ensures that invoices are standardised and securely exchanged between businesses and governments, making it harder for fraudulent activities such as invoice tampering, duplicate invoicing, and tax evasion.[ccv]

In Latin America, where eInvoicing interoperability is widely adopted, tax compliance rates has improved considerably. Brazil has experienced an increase in tax revenue, amounting to USD 58 billion, due to improved invoicing and reporting practices.[ccvi]

Mexico reported a 34% increase in tax collections during the initial phase of its eInvoicing rollout, even before the mandates on reporting were fully implemented. In the same period, Colombia aimed to halve VAT evasion through the implementation of electronic invoicing systems. The interoperability of these systems allows for real-time or near real-time validation of invoices by tax authorities, which is necessary in combating tax fraud.[ccvii]

5.3.7 Compliance and regulatory alignment

Interoperable electronic invoicing systems help businesses comply with regulatory requirements and industry standards. By adopting common protocols and formats, organisations can ensure alignment with legal frameworks and reporting obligations. This reduces the risk of non-compliance and associated penalties.[ccviii]

5.3.8 Potential impacts on the environment

The transition to electronic invoicing could also yield some environmental benefits. The focus of the modelling has been on a shift from PDF invoices processed manually to eInvoices. But there will be some legacy paper systems and where they can be replaced by an electronic solution this saves paper etc. They may also be small differences between energy uses between PDFs and eInvoices, but likely to be fairly small.

To the extent that there is a shift from paper to eInvoices there will be some environmental savings. A transition away from paper is estimated at 40g of CO2 saved per paper invoice. This estimate includes emissions from production, transportation, and disposal. Additionally, the shift conserves trees, which can absorb 22kg of CO2 annually, equating to a reduction of 80g of CO2 per invoice over a tree's ten-year lifespan. [ccix]

Further, an Australian study indicates that electronic invoicing can substantially lower the carbon footprint compared to paper-based processes, reducing greenhouse gas emissions by 63% per invoice. This reduction is achieved by shifting to digital processes, which decrease the need for paper, ink, and printing. [ccx]

On the other hand, it is important to note that the operation of digital systems required for electronic invoicing can marginally increase energy consumption and carbon footprint. The additional energy demand of existing data centres and the infrastructure supporting digital transactions must be considered.

Thus, while eInvoicing may reduce demand for paper and result in some reductions in energy use this needs to be considered alongside potential energy demands of data centres.

5.3.9 Enhanced business relationships

Seamless interoperability in electronic invoicing strengthens business relationships by enabling efficient communication, accurate data exchange, and improved collaboration between trading partners. When systems work together seamlessly, businesses can share information in real-time, reducing misunderstandings and delays that may otherwise strain commercial relationships. This ease of exchange allows businesses to operate with greater transparency, which builds trust and reliability.

Improved interoperability also increases operational efficiency, as trading partners spend less time on manual processes and data correction. This efficiency creates shared benefits for all parties, as resources can be reallocated to higher-value activities, such as exploring new market opportunities and strengthening existing partnerships. Ultimately, an interoperable electronic invoicing system creates a more dependable and responsive trading environment, supporting long-term, productive business relationships across the APEC region. [ccxi]

5.3.10 Scalability and global reach

Interoperable electronic invoicing systems enable businesses to scale operations, expand into new markets and engage with international partners more effectively. Standardised processes and interoperable platforms support cross-border trade and facilitate global business transactions.[ccxi]

5.3.11 Stimulated economic growth

The adoption of interoperable electronic invoicing systems can contribute to overall economic growth by fostering a more efficient and transparent business environment. The 2024 Billentis report estimates that the global eInvoicing and enablement market has currently reached USD 8.9 billion, with projections indicating growth to approximately USD 23.7 billion by 2028, reflecting a compound annual growth rate of 27.9%. Billentis further estimates that total global electronic invoice volumes have reached 125 billion, comprising 90 billion eInvoices and 35 billion e-receipts.[ccxii]

The transition to eInvoicing is expected to streamline cross-border transactions, reduce trade friction, and foster more seamless regional trade integration. Regions with high digital maturity, such as Singapore and Hong Kong, China are particularly well-positioned to leverage these benefits. However, the broader adoption across smaller economies presents a key opportunity to facilitate their participation in global supply chains.

The widespread implementation of eInvoicing across APEC economies will not only drive cost savings and operational efficiencies but also support broader goals of economic integration and digital trade facilitation. The tangible financial gains reflected in both import and export activities underscore the critical role of digital transformation in shaping the future of trade.

5.4 Summary of eInvoicing benefits

eInvoicing offers significant productivity enhancements by automating the invoicing process, reducing manual errors, and lowering processing costs. Deloitte Access Economics estimates that the productivity gains per invoice amount to approximately USD 14.84, with accounts payable benefiting from 60% of this value (USD 8.90), while accounts receivable accounts for the remaining 40% (USD 5.94). These figures align with findings from a 2024 European Commission study, which highlights similar productivity gains in public procurement processes.

The broader economic benefits of eInvoicing are closely tied to its adoption levels. With a 50% adoption rate, it is projected that the gains in productivity and trade efficiency could total USD 5 billion annually, comprising USD 3 billion for imports and USD 1 billion for exports. Even with a conservative 10% adoption rate, the benefits could still reach approximately USD 1 billion. These gains vary across APEC economies, with higher-income economies seeing greater savings due to their elevated labour costs. For example, the United States could realise around USD 442 million in savings at a 10% adoption rate, and up to an estimated USD 2.2 billion at a 50% adoption rate.

Beyond productivity, eInvoicing also strengthens security, accuracy, and compliance. These systems incorporate robust security measures, such as encryption and audit trails, mitigating cyber risks and bolstering the resilience of businesses against potential threats. Interoperability is key, ensuring secure communication across different platforms and reducing the likelihood of cyber incidents such as data breaches, invoice fraud, data manipulation, and unauthorised access to sensitive financial information.

eInvoicing plays a crucial element in the procure-to-pay (P2P) process. It provides a variety of advantages that improve overall business performance with increased efficiency, touchless end to end processing, and automation throughout the process. eInvoicing creates enhanced visibility into the invoicing process, enabling organisations to track payments in real time, which promotes trust and accountability. Faster processing times also have a positive impact on cash flow management, with studies showing that electronic invoices are settled 5 to 7 days faster than traditional methods.

From a regulatory perspective, eInvoicing supports tax compliance by standardising transactions and making it more difficult for fraudulent activities to occur. The success of eInvoicing in economies like Brazil and Mexico demonstrates its potential to improve tax collection and reduce evasion rates.

Moreover, eInvoicing contributes significantly to environmental sustainability by eliminating the need for paper, ink, and physical storage, which reduces both waste and resource consumption. The transitioning from paper to digital invoicing can reduce greenhouse gas emissions by 63% per invoice. This reduction reflects the lifecycle impact, cutting emissions associated with paper production, printing, and transportation.

As businesses digitise their invoicing processes, they gain the flexibility to scale operations and expand into new markets, which can stimulate broader economic growth. Market projections suggest that the global eInvoicing market could grow to approximately USD 23.7 billion by 2028, underscoring the role of digital transformation in facilitating trade and economic integration. Overall, the adoption of eInvoicing promotes efficiency, sustainability, and stronger business relationships, while ensuring compliance with regulatory frameworks.

Importantly, many of the benefits of eInvoicing accrue for domestic transactions alone. However, promoting interoperability allows for these benefits to extend to cross-border transactions enhancing the scale over which the benefits of eInvoicing can be realised.

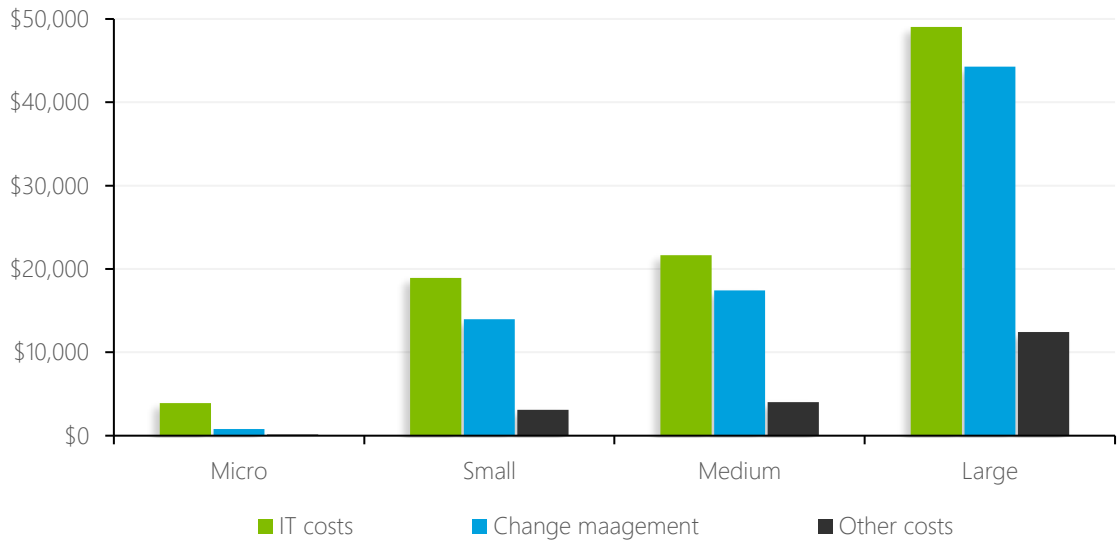
5.5 Costs of implementation

The cost of adopting eInvoicing remains a key consideration for large enterprises across the APEC region. Data from the Ipsos Business Survey (2023) and the Publications Office of the European Union (2024) show that initial setup costs and ongoing management fees vary widely depending on business size and geographic location.

The financial impact differs between large and small businesses. Small businesses often incur lower costs, as many accounting software packages include integrated eInvoicing features, reducing the need for customised solutions. Adoption is made easier by automated processes, which require only basic digital skills, such as generating invoices and communicating with customers. Larger suppliers frequently absorb these costs, enabling small businesses to adopt the system more readily. For small businesses, the Ipsos Business Survey (focused on adoption costs in Australia rather than the EU) indicates that efficiency gains and timely payments are key outcomes, often achieved without the need for additional staffing. [ccxiii]

Larger enterprises face higher costs. The Ipsos Business Survey found that on average, eInvoicing users across all business sizes reported spending USD 45,533 to adopt the system, with IT-related expenses accounting for around 50% of the total. Change management costs, including training and external support, made up 40%. Domestic implementation costs for large enterprises averaged USD 105,754, compared to smaller businesses at USD 36,016 and micro businesses at USD 4,850. [ccxiv] The chart below shows the domestic cost variations across different business sizes.

Chart 5.5: Average overall cost to start using eInvoicing, by business size, (USD, 2023)



Source: Ipsos Business Survey (2023)

Sectoral differences are also noteworthy. Large enterprises in the professional services sector reported the highest average costs (USD 156,000), while primary industries faced lower expenses, with averages of USD 33,300 for large businesses and USD 12,200 for medium businesses. [ccxvi]

Approximately 79% of respondents reported that implementation costs met or exceeded their anticipated budget, indicating that expenses were as high as or higher than expected. However, many businesses reported positive experiences once the initial hurdles were overcome. [ccxvii]

For large enterprises operating across multiple jurisdictions, implementation costs are relatively higher. An EU study reports that these expenses include one-off costs such as setup fees, training, and investments in hardware and software. Recurring costs for maintaining hardware and software are estimated at approximately USD 550 annually. [ccxv]

Expanding eInvoicing systems to cover multiple jurisdictions introduces additional costs, with setup expenses reaching up to USD 196,000 per economy. Further, enterprises engaging multiple service providers and obtaining legal advice to meet specific domestic requirements incur considerably higher ongoing expenses. [ccxvi] The following table provides a detailed breakdown of these costs based on evidence from the EU. While these costs are significant, they may not be reflective of costs associated with increasing the interoperability of eInvoicing, especially if some costs of achieving interoperability are borne by software providers.

Table 5.2: Electronic Invoicing costs assessment for B2B cross-border eInvoicing, 2023

Large enterprises (LE) survey data	USD
Service Provider annual fee	545

Setup costs (one-off)	5,445
Training (one-off)	2,180
Legal advice (one-off)	2,180
Hardware (one-off)	10,890
Software (one-off)	5,445
Recurring hardware costs	545
Recurring software costs	545
Recurring costs for (Different service providers in multiple jurisdiction)*	435,620
Firm's set-up costs to establish eInvoicing systems in each EU Member State**	196,030

*Firms' recurring costs arise from the need to engage multiple service providers and legal advisors to meet specific domestic requirements, which can be expensive. Using different providers for each economy, along with potential duplication from an EU standard and existing EDI, further increases costs.
** Set-up costs (per economy) refer to the multinational firm's initial investment required to establish an eInvoicing system in each EU Member State.

Source: European Union, 'Preparatory Study on the Effects of Directive 2014/55/EU' (2024). Data was provided by multinational corporations from sectors including energy, chemicals, retail, automotive, and international shipping.

Enhanced interoperability, streamlined processes, and mutual recognition of eInvoicing standards are expected to drive down the costs associated with widespread adoption. [ccxviii]

These findings underscore the need for a strong business case to encourage further investment in eInvoicing, especially among larger enterprises. Addressing concerns about setup and ongoing costs is essential to drive adoption and unlock the full range of benefits that eInvoicing can deliver, including greater trade efficiency and reduced administrative burdens. Interoperability can play a role in enhancing the business case for adoption by increasing the benefits of this investment.

5.6 Costs and benefits and the impact of interoperability

The scope study does not extend to undertaking a full cost benefit analysis of eInvoicing or specific eInvoicing. The costs and benefits are likely to vary across economies and across firms within an economy. However, a few observations about the nature of costs and benefits are worth noting in this context:

- Existing research shows that benefits are likely to outweigh costs in a given economy to a greater degree where adoption levels are high i.e., sufficiently high that productivity gains and cost savings outweigh the initial upfront costs.[ccxvii]

- Interoperability is likely to strengthen the benefits of adoption by increasing the scale of invoices where cost savings can be achieved by allowing eInvoicing to be extended to cross border transactions.

- At a firm level much of the costs involve initial set up costs including software and hardware investments and change management. There will be costs in changing fields to support interoperability- and the EU study suggests this can be substantial. However, clear standards on fields required to support interoperability may ultimately reduce the need to invest in multiple systems or service providers to translate eInvoices to meet the needs of firms in other economies. So, promoting interoperability now may reduce costs in the future.

- The economic impact of eInvoicing adoption in APEC economies is based on productivity gains and cost savings, independent of tax structures. Digitisation reduces administrative burdens, accelerates payment cycles, and improves data accuracy, benefiting both imports and exports. That is, the benefits are independent of the type of tax system used. However, where eInvoicing has been adopted to improve tax administration or to help minimise tax avoidance in domestic trade it will be important to ensure that interoperability is implemented in a way that continues to support domestic tax objectives.

6 Recommendations for implementing eInvoicing across APEC

6.1 Proposed recommendations for interoperability

To achieve eInvoicing interoperability across APEC economies, several high-level recommendations can be made, aligned with the APEC principles that have already been defined between the economies. These recommendations address the enablers and the primary challenge on the lack of interoperability between eInvoicing systems, which creates inefficiencies, increases costs, and complicates cross-border transactions.

1. **Legal and Regulatory Recognition:** Where it has not already been done, APEC economies should accord electronic invoices the same legal effect as paper invoices by ensuring the necessary changes are made to their legal and regulatory frameworks. Legal recognition of eInvoices is crucial for their acceptance and use in cross-border trade.

   Granting the same legal status to eInvoices as paper invoices provides a clear and consistent framework for businesses, reducing legal uncertainties and fostering greater adoption of eInvoicing. However, differences in legal systems and regulatory priorities may pose challenges for economies that have not already granted eInvoices the same legal effects as paper invoices.

   Economies should consider adopting successful models from economies including Chile; Malaysia; and New Zealand, which offer diverse legal frameworks for eInvoicing. These frameworks can be adapted and tailored to meet the specific needs of other economies, providing a robust foundation for implementing eInvoicing systems.

2. **Adoption of Common Standards, Technical Specifications and Protocols:** APEC economies should adopt and implement common, open standards and protocols for eInvoicing, such as the Peppol standards with common technical specifications.

   The economies should look at the minimum set of data points that are required for an eInvoice to be accepted as a valid invoice, noting that ideally fewer data points should be required to facilitate easier cross border invoicing.

   Utilise eDelivery specifications to encourage the adoption of existing technical specifications and standards, rather than developing new ones.[ccxviii]

   This includes utilising the AS4 profile to support larger volume of eInvoices being processed through the transmittal of data over networks through the seamless and secure communication. Standard messaging protocols, such as SOAP and REST, are utilised to govern communication and data exchange on the internet.

   The eDelivery service provides significant benefits for organisations by enhancing interoperability, security, and reliability in data exchange.[ccxix] It promotes cost efficiency by reducing the need for physical document handling and helps ensure compliance with legal and regulatory standards. By leveraging existing technical specifications and standards, eDelivery supports seamless communication between different IT systems, safeguarding sensitive information through robust encryption and digital signatures.

   Having the foundational technology basis enables efficient interoperability across regions, facilitating seamless interactions between service providers and Enterprise Resource Planning (ERP) systems. Investing in robust technical infrastructure is crucial for ensuring smooth and secure electronic transactions.

   The technical infrastructure needs to be prompted on an atmosphere of trust among all participants in the message exchange network with integrity and confidentiality. Moreover, the scalability and performance should enable the number of participants and exchanged messages in the data exchange network to grow.[ccxx]

   Language barriers also need to be considered, as they can complicate the standardisation process. Selecting a single standard language is beneficial to facilitate common standards or choosing a framework

that can translate. Utilising language translation software can help standardise eInvoice delivery across the network making systems language agnostic.[ccxxi]

Common standards and protocols ensure that eInvoices can be easily exchanged and understood across different systems and jurisdictions, reducing the complexity and cost of cross-border transactions. This approach promotes uniformity and reduces the need for multiple formats, enhancing efficiency and reliability. Acknowledging the challenges due to varying levels of technological advancement and regulatory environments, APEC economies should work towards achieving consensus on common standards to promote interoperability.

3. **Development of Secure Infrastructure:** Invest in the security of the common eInvoicing infrastructure, regardless of the framework chosen. This infrastructure should allow buyers and sellers to exchange eInvoices securely across borders. Security is a critical component of digital trust. Secure infrastructure ensures the integrity and confidentiality of eInvoices, which is essential for gaining the confidence of businesses and consumers. Enhanced security measures protect against fraud and data breaches, fostering greater trust in digital transactions.

4. **Capacity Building, Knowledge Sharing:** APEC economies should support initiatives that facilitate capacity building and the sharing of best practices related to eInvoicing. Building capacity and sharing knowledge helps economies understand and implement eInvoicing systems effectively, promoting mutual understanding and trust in each other's eInvoicing policies and processes. These capacity building initiatives can accelerate the adoption of eInvoicing, ensuring that all economies, regardless of their current level of development, can participate in the interoperable eInvoicing ecosystem. However, coordinating these efforts across diverse economies may be challenging, and there may be disparities in the uptake and implementation of best practices.

5. **Funding assistance:** Economies that require financial assistance with their eInvoicing implementation could investigate the availability of funds from a variety of funding sources. Additionally, encouraging public-private partnerships (PPPs) can further share the costs of implementation, with private companies investing in the infrastructure and receiving returns through service fees or other arrangements, thereby reducing the financial burden on governments.

   Promoting regional cooperation, where more developed APEC economies provide financial and technical assistance to less developed members, can facilitate knowledge transfer, capacity building, and financial support, ensuring all economies can participate in the eInvoicing ecosystem. Furthermore, encouraging economies to apply for innovation and development grants from various international and regional bodies focused on digital transformation and economic development, while providing guidance and support in preparing grant applications, can increase the chances of securing funding.

   Developing cost-sharing arrangements, where the costs of eInvoicing implementation are distributed among multiple stakeholders, including government agencies, businesses, and service providers, can ensure a fair and sustainable funding model. The need for funding is particularly evident if Peppol were chosen as the common standard. The cost of Peppol, which is a fixed fee of EUR 25,000 per year to be a Peppol Authority (Post-Award, Pre-Award, and Capability Lookup include in fees), and additional fees for a National Domain, may be a limiting factor for some economies. [ccxxi] This fee applies regardless of their level of development or the extent of their network usage, highlighting the necessity for financial support mechanisms.

6. **Public-Private Partnerships:** Fostering public-private partnerships is essential for driving the development and adoption of interoperable eInvoicing systems. Collaboration between governments, businesses, and technology providers is critical for developing practical and scalable eInvoicing solutions. Public-private partnerships can leverage the strengths of each sector to achieve common goals, providing the necessary resources, expertise, and innovation to develop effective eInvoicing systems. However, aligning the interests and priorities of public and private stakeholders may be complex and require careful management.

   By exploring and implementing these combined recommendations for capacity building, funding assistance, and public-private partnerships, APEC can ensure that all member economies, regardless of their financial capabilities, can successfully implement and benefit from eInvoicing systems. This approach will promote greater interoperability, efficiency, and economic integration across the region.

By following these high-level recommendations, APEC economies can work towards achieving eInvoicing interoperability, thereby enhancing efficiency, reducing costs, and facilitating seamless cross-border trade. These recommendations are aligned with the APEC principles of promoting seamless connectivity and strengthening digital trust.

7. **Ownership and Responsibility:** The promotion and adoption of interoperable eInvoicing across APEC for use in cross border trade will require both individual and collective action. Economies should continue report on individual actions at APEC, focusing on technical interoperability, legal frameworks, standards, security, capacity building, and partnerships. APEC economies could also consider initiating pilot programs to test eInvoicing interoperability between economies, starting with those using similar frameworks, such as Peppol PINT, those that are mature in terms of the digital roadmap, and where bilateral trade agreements accommodate eInvoicing. A pilot programs could identify any issues with cross border eInvoicing or increase confidence in the model. They can also effectively demonstrate the benefits and of eInvoicing through increased efficiency, cost savings, and enhanced transparency, therefore serving as a scalable model for broader adoption by other economies.

6.2 Recommendations for economies based on eInvoicing maturity

The maturity of eInvoicing systems varies widely across different regions, influenced by factors such as technological infrastructure, regulatory frameworks, government support and readiness for digital transformation.

This table categorises regions based on their eInvoicing maturity into three distinct levels: high, medium, and low. Each category reflects the current state of eInvoicing adoption and integration, providing a framework for understanding the strengths and challenges faced by different economies.

Accompanying each maturity level are tailored recommendations aimed at guiding stakeholders towards enhancing their eInvoicing capabilities. By recognising the specific needs associated with each maturity level, stakeholders can develop targeted strategies to foster the growth of eInvoicing, ultimately contributing to a more efficient and interconnected digital economy.

Table 6.1: Recommendations for economies

eInvoicing Maturity	**Characteristics:**	**Recommendations:**
High	• Established eInvoicing systems with widespread adoption. • Advanced technological infrastructure and regulatory frameworks. • Strong government support for digital transformation.	• Promote further adoption of existing frameworks. • Review how the existing regulatory framework could be aligned with international standards to facilitate cross-border transactions. • Review how existing systems could be integrated into an APEC framework. • Consider if existing systems are becoming outdated and could be replaced with an interoperable model. • Focus on increasing participation among SMEs to enhance overall system usage. • Share best practices and lessons learned with developing and nascent economies. Provide technical assistance and support to help them enhance their eInvoicing systems. • Foster collaboration between the public and private sectors to drive the adoption of eInvoicing. This can include joint initiatives, funding opportunities, and shared infrastructure projects.

Medium	• Developing eInvoicing systems with some level of adoption. • Growing digital infrastructure but facing challenges with standardisation and regulatory compliance. • Moderate adoption of eInvoicing. • Moderate government support for digital initiatives.	• Strengthen the existing regulatory framework by aligning it with international standards and best practices. • Harmonise regulations across economies and regions to improve efficiency and reduce costs. • Foster collaboration between the public and private sectors to drive the adoption of eInvoicing. This can include joint initiatives, funding opportunities, and shared infrastructure projects. • Increase awareness and provide training for businesses, especially SMEs, to drive adoption. • Commit and further invest in systems, processes and frameworks that aligns to a common standard.
Low	• Limited or no existing eInvoicing systems. • Underdeveloped digital infrastructure and varying levels of digital readiness. • Limited regulatory framework and policies. • Low adoption of eInvoicing. • Weak government support for digital transformation initiatives.	• Define the economy's eInvoicing strategic objectives and develop the future eInvoicing roadmap. • Ensure the eInvoicing initiative is adequately funded. • Establish a clear regulatory framework that mandates the use of eInvoicing for specific transactions. This can be achieved by drafting and enacting legislation that recognises the same legal status of electronic invoices as paper invoices. • Develop and implement a domestic eInvoicing framework, preferably one that is interoperable with other APEC economies. • Invest in the necessary technological infrastructure to support eInvoicing. • Design systems with flexibility that allows for compatibility with international technology ecosystems. • Encourage alignment of eInvoices with international standards to facilitate future integration and cross-border trade. • Collaborate and leverage off those economies who are more mature and who can share insights into the economy's approach.

6.3 Specific economy recommendations

The following recommendations for each economy are based on the above high level recommendations and they have been tailored to each economy's situation.

- **Australia:** The recommendation for Australia is to further adopt and promote the use of the Peppol framework for eInvoicing, which is already in use. Australia's strengths include a robust digital infrastructure and strong government support for digital transformation. However, ensuring widespread adoption among SMEs remains a challenge. Evidence of progress is seen in the Australian government's mandate for eInvoicing adoption for government agencies, which could be extended to use by the business transacting with government and other areas of the private sector.

- **Brunei Darussalam:** It is recommended that Brunei Darussalam implement a domestic eInvoicing framework that is aligned with international standards. The region's small economy is a strength, allowing for the potential of rapid implementation. However, it faces weaknesses due to limited existing digital infrastructure. Aligning with international standards will facilitate cross-border trade.
- **Canada:** Canada could enhance its existing eInvoicing infrastructure and define the framework to be used. They should ensure compatibility with international standards. The region's advanced technological infrastructure and strong regulatory frameworks are significant strengths. Nonetheless, diverse provincial regulations may complicate a domestic implementation. Harmonising standards will reduce costs and improve efficiency.
- **Chile:** For Chile, integrating existing eInvoicing systems with an international framework to ensure interoperability is recommended. Chile's strengths lie in its established eInvoicing system with high adoption rates. However, to gain more cross border trade Chile could consider aligning with international standards potentially by adding an interoperable component onto the existing system.
- **The People's Republic of China:** For China integrating existing eInvoicing systems with an international framework to ensure interoperability is recommended. China's large market and significant digital infrastructure are major strengths. However, diverse regional regulations and practices present challenges. A unified international standard will facilitate seamless cross-border transactions, as evidenced by improvements in other large markets with unified systems.
- **Hong Kong, China:** It is recommended to implement a domestic international eInvoicing framework standards that is aligned with international standards. The region boasts advanced financial and technological infrastructure, which is a strength. However, there is a need for greater awareness and adoption among SMEs. Adoption of international standards will build trust in digital transactions, supported by evidence from other regions with high SME adoption rates.
- **Indonesia:** Indonesia could develop and implement a domestic eInvoicing framework based on international standards. The region's growing digital economy and government support for digital initiatives are strengths. However, there are varied levels of digital readiness across regions. A domestic framework will enhance efficiency and reduce costs, as shown by similar frameworks in other economies.
- **Japan:** Enhancing existing eInvoicing framework to ensure compatibility with international standards is recommended for Japan. The region's advanced technological infrastructure, adoption of Peppol, and high digital literacy are significant strengths. Further compatibility will facilitate cross-border trade, as evidenced by other advanced economies with aligned systems.
- **The Republic of Korea:** Korea could promote the use of international eInvoicing standards and protocols. Korea's advanced digital infrastructure and high adoption rates of digital technologies are major strengths. However, there is a need for greater alignment with international standards. Adoption of these standards will improve trust and efficiency in digital transactions, supported by evidence from other digitally advanced economies.
- **Malaysia:** Implementing a domestic eInvoicing framework that is aligned with international standards is recommended for Malaysia. The region benefits from government support for digital transformation, a strength. However, there are varied levels of digital readiness among businesses. A domestic framework will facilitate seamless cross-border transactions, as demonstrated by other nations with similar frameworks.
- **Mexico:** Mexico could integrate existing eInvoicing systems with international frameworks to ensure interoperability. The region's established eInvoicing system with high adoption rates is a strength. However, to ensure cross border trade is possible there is a need for alignment with international standards. Integration will enhance cross-border trade efficiency, supported by evidence from other integrated systems.
- **New Zealand:** For New Zealand, promoting the use of the Peppol framework for eInvoicing is recommended. The region benefits from government support and advanced digital infrastructure, strengths that facilitate implementation. However, ensuring widespread adoption among SMEs remains a challenge. The Peppol framework will facilitate seamless cross-border transactions, as evidenced by its adoption in other economies.
- **Papua New Guinea:** Developing a domestic eInvoicing framework and building digital infrastructure is recommended for Papua New Guinea. The potential for rapid implementation in a small economy is a strength. However, the region faces weaknesses due to limited existing digital infrastructure. A domestic framework will enhance efficiency and reduce costs, as shown by similar initiatives in other small economies.
- **Peru:** Integrating existing eInvoicing systems with international frameworks to ensure interoperability is recommended for Peru. The region's established eInvoicing system with high adoption rates is a

strength. However, to ensure cross border trade is possible there is a need for alignment with international standards. Integration will enhance cross-border trade efficiency, supported by evidence from other integrated systems.

- **The Republic of the Philippines:** The Philippines could implement a domestic eInvoicing framework that is aligned with international standards. The growing digital economy and government support for digital initiatives are strengths. However, there are varied levels of digital readiness across regions. A domestic framework will enhance efficiency and reduce costs, as evidenced by similar frameworks in other growing digital economies.
- **The Russian Federation:** Developing a unified domestic eInvoicing standard that aligns with international protocols is recommended for Russia. The region's large market and significant digital infrastructure are strengths. However, diverse regional regulations and practices present challenges. A unified standard will facilitate seamless cross-border transactions, as demonstrated by other large markets with unified systems.
- **Singapore:** Promoting the use of the Peppol framework for eInvoicing is recommended for Singapore. The region's advanced financial and technological infrastructure is a strength. However, ensuring widespread adoption among SMEs remains a challenge. The Peppol framework will facilitate seamless cross-border transactions, supported by evidence from other regions with high SME adoption rates.
- **Chinese Taipei:** Enhancing existing eInvoicing systems to ensure compatibility with international standards is recommended for Chinese Taipei. The region's advanced technological infrastructure and high digital literacy are strengths. However, there is a need for better alignment with international standards. Compatibility will facilitate cross-border trade, as shown by other regions with advanced digital infrastructures.
- **Thailand:** Thailand could implement a domestic eInvoicing framework that is aligned with international standards. The region benefits from government support for digital transformation, a strength. However, there are varied levels of digital readiness among businesses. A domestic framework will facilitate seamless cross-border transactions, as evidenced by other nations with similar frameworks.
- **The United States of America:** Enhancing existing eInvoicing systems to ensure compatibility with international standards like Peppol is recommended for the United States. The region's advanced technological infrastructure and strong regulatory frameworks are strengths. However, diverse state regulations may complicate nationwide implementation. Harmonising standards will reduce costs and improve efficiency, supported by evidence from other large economies with similar challenges.
- **Viet Nam:** Implementing a domestic eInvoicing framework that is aligned with international standards is recommended for Viet Nam. The region's growing digital economy and government support for digital initiatives are strengths. However, there are varied levels of digital readiness across regions. A domestic framework will enhance efficiency and reduce costs, as shown by similar frameworks in other growing digital economies.

A1. Appendix 1: Economy Summary

Economy	Model/Infrastructure	Mandates	Tax Invoice/Invoice Requirements	Other Considerations
Australia	• Interoperability model • Peppol framework for eInvoicing • The Australian Taxation Office (ATO) is the Peppol Authority.	• NSW agencies were mandated to adopt eInvoicing by 1 January 2022	• Australia's tax invoice requirements are detailed in section 29.70 of the A New Tax System (Goods and Services Tax) Act 1999	• Promotes eInvoicing for efficiency and productivity • Five-day payment terms introduced for businesses using eInvoicing with government, meeting terms in Resource Management Guide 417
Brunei Darussalam	• There is currently no mandatory model or infrastructure for tax purposes • Government Vendor Portal (TAFIS) uses SAP Ariba	• No mandate	• N/A	• N/A
Canada	• There is currently no mandatory model or infrastructure for tax purposes. • The Canadian Revenue Agency (CRA) is the Tax Authority managing eInvoicing	• eInvoicing is permitted but not mandatory	• No required format • Standard archiving period for GST/HST purposes is 6 years after the end of the year they relate to	• Encourages public bodies to accept eInvoices to evaluate potential benefits • Member of Peppol but no recommended framework
Chile	• Pre-clearance model • Uses Electronic Tax Document (DTE) • SII accredits taxpayers as issuers and receivers of DTE	• Mandatory for all Chilean taxpayers since 2018	• Required format is XML, • Archiving period is 6 years for both issuers and receivers	• N/A
People's Republic of China	• China has built a nationally unified e-fapiao service platform, providing taxpayers with 24-hour online free one-stop services for the issuance, distribution and verification of digital e-fapiao • State Taxation and Administration is the Tax Authority	• eInvoicing is promoted on a voluntary basis	• Required format is local XML • Default archiving period is 30 years and 10 years for financial accounting reports	• N/A
Hong Kong, China	• Post audit model • No designated infrastructure for B2B • B2G transactions can use the government's e-procurement system	• No mandatory requirement • Consent required before sending eInvoices for B2B	• Acceptable formats of government's e-procurement system: PDF, .doc, .docx, .xls, .xlsx, with archiving period of at least 7 years	• ETO provides legal requirements for electronic transactions applicable under the legislation • Under the IRO, no explicit requirement on the form of records (whether in paper or electronic form) to be kept.
Indonesia	• Pre-clearance model • Uses e-Faktur Pajak system • The Direktorat Jenderal Pajak (DJP) is the Tax Authority	• Mandatory since 2016 for VAT-registered taxpayers with sales > IDR 4.7 billion/year	• Required format is XML • Archiving period of 10 years	• Aims to prevent tax fraud and improve trade efficiency

Economy	Model/Infrastructure	Mandates	Tax Invoice/Invoice Requirements	Other Considerations
Japan	• Interoperability model • Recommends Peppol framework • Digital Agency, Government of Japan (DAJ) is the Peppol authority	• No mandate	• Domestic standard: JP PINT (Peppol BIS Standard Invoice JP PINT and so on) • Archiving period of 7 years (in the usual case)	• N/A
Republic of Korea	• CTC model with real time reporting • Uses e-Tax system • National Tax Service is the Tax Authority • Centralised platform 'Hometax'	• Partially mandatory: from July 2023, required for taxpayers with yearly revenue > KRW 100 million	• Required format is XML • Archiving period of 5 years (10 years for immovable property)	• Mandate from July 2023 also applies to taxpayers with VAT registration
Malaysia	• Interoperability model • MY-PINT standard extends Peppol BIS Billing 3.0 • The Inland Revenue Board (IRB) or Lembaga Hasil Dalam Negri Malaysia (LHDNM) is the Tax Authority • Malaysia Digital Economy Corporation is Peppol Authority	• Partially mandated with phased implementation between 01/08/2024 – and 01/07/2025	• Acceptable formats are XML or JSON • Archiving period of 7 years	• Phased approach targets specific business groups according to annual turnover
Mexico	• Pre clearance model • Uses CFDI for eInvoicing • Servicio de Administración Tributaria is the Tax Authority	• Mandatory use of CFDI (version 4.0) from 1 April 2023 for all buyers and suppliers	• Required format is CFDI XML • Archiving period of 5 years for both issuers and recipients • Documents archived according to NOM151	• N/A
New Zealand	• Interoperability Model • Adopted Peppol eInvoicing Network • MBIE is the Peppol authority	• No mandate • From 31 March 2022, central public entities must be able to receive eInvoices if their supplier chooses to use them	• Required format is Peppol BIS Billing 3.0 • Archiving period of 7 years • Expected to move to PINT A-NZ	• N/A
Papua New Guinea	• No current or future regulations on eInvoicing	• No mandate	• N/A	• N/A
Peru	• Post clearance model • Uses CPE regulated by SEE	• Mandatory for all companies	• Required format is XML (UBL V2.1) • Archiving period of 5 years	• Superintendency of the National Tax Administration responsible for digitising the economy aiming for a transparent market
The Philippines	• Post audit model • Uses EIS program	• As per sections 237 and 237-A of the Tax Code of 1997, mandatory for:1. Exporters 2. E-Commerce 3. Large Taxpayers Service	• Required format is JSON • Transmission via EIS portal or API connection • Archiving period of 10 years	• N/A

Economy	Model/Infrastructure	Mandates	Tax Invoice/Invoice Requirements	Other Considerations
The Russian Federation	• Post audit model • Must use authorised EDI provider and obtain certification	• Mandatory for certain traceable goods as per Federal Law No. 371-FZ • Voluntary use since 2012	• Required format is XML • Archiving period of 4 years	• Aims for 95% of invoices and 70% of transport and goods waybills to be issued electronically by end of 2024
Singapore	• Interoperability model • Uses InvoiceNow (Peppol-based) • IMDA is Peppol authority	• Not mandated but strongly promoted • Phased introduction of tax reporting from 1 May 2025 and mandatory for specific groups starting 1 April 2026	• Required format is SG Peppol BIS Billing 3.0 • Archiving period of 5 years • Singapore is transitioning to PINT and to fully support PINT within 2 years.	• Delayed payments and inefficiencies in invoicing methods are challenges faced by businesses
Chinese Taipei	• Clearance model with the features of centralised model • Uses eGUI system • clearance model but with the features of centralized invoicing	• Mandatory for all companies	• Required format is MIG-3.2.1 (XML) • PDF must follow government specifications • Archiving period of a minimum 5 years	• Aims to eliminate use of paper invoices after three years of phased adoption
Thailand	• Real time reporting model • Uses Electronic Transactions Development Agency (ETDA) system via e-Tax Invoice & e-Receipt system (RTIR) • eInvoices can be emailed for small companies	• Voluntary since 2012 • Buyer consent required	• Required format of XML • Archiving period of 5 years • Data submitted to Thai tax authority by 15th of each month	• Part of "Thailand 4.0" initiative to transform into a digital economy • Three-year tax deduction incentive introduced to encourage eInvoicing adoption
The United States	• Four corner model • Piloting a standardised B2B electronic document exchange system • BPC oversees the new exchange network	• No mandates due to tax complexities and lack of centralised authority	• Processed electronically in Structured or Hybrid invoice format (EDI or XML) • Archiving period of 7 years from filing of tax return • Influenced by IRS guidelines, state laws, and industry standards	• Paperwork Elimination Act mandates federal agencies and suppliers must have an option to submit an electronic invoice • Nationwide eInvoicing mandate not yet possible due to absence of VAT system or input tax credit mechanisms in most states
Viet Nam	• Clearance model • Transmit data to tax authorities directly or through authorised service provider	• Mandatory for all enterprises, business households, and individuals from 1 July 2022	• Required format of XML • Archiving period of 10 years • Must have a digital signature and be archived securely • Law 20/2023/QH15 allows digital messages to not be considered invalid due to receipt method	• Mandate aimed at combating VAT fraud and reducing VAT gap

A2. Appendix 2: File Format Protocols and Data Exchange Formats

A.1. eXtensible Markup Language (XML)

XML is a versatile, text-based format used for structuring and exchanging data online. In eInvoicing, XML provides a standard way to represent invoice data, ensuring smooth communication between different systems and organisations. Its customisable tags and structures make it adaptable to various applications while maintaining compatibility with industry standards and regulations.[ccxxii]

XML organises invoice data hierarchically, including elements like invoice number, date, sender/receiver info, and tax details, which facilitates easy validation and automated processing. Supported by many software applications, XML enables seamless integration into existing business processes, ensuring efficient electronic invoice exchange between trading partners.

By automating invoice generation, transmission, and processing, XML reduces manual intervention, minimises errors, and speeds up transactions, enhancing overall operational efficiency. In summary, XML's standardised, flexible, and structured format makes it crucial for achieving interoperability and improving the efficiency of eInvoicing.

A.2. JavaScript Object Notation (JSON)

JSON is a lightweight, text-based data interchange format that is easy for humans to read and write, and easy for machines to interpret and produce [ccxxiii] In the context of eInvoicing, JSON serves as a modern and efficient method for representing invoice data, enabling seamless communication between different systems and applications.

JSON's simplicity and flexibility make it highly adaptable to various applications, including eInvoicing.[ccxxiv] In eInvoicing, JSON enables the seamless exchange of invoice data between systems and applications.

JSON's simple syntax of key-value pairs and arrays facilitates the representation of complex data structures, making it ideal for API-based integrations. Its readability aids developers and business users in understanding and troubleshooting invoice data, while its lightweight nature improves network performance for real-time and high-volume transactions.

Widely supported across numerous programming languages and platforms, JSON ensures interoperability and efficient processing of electronic invoices in diverse environments. Its ability to create custom data structures allows adaptation to various industry standards and regulatory requirements, providing tailored eInvoicing solutions while maintaining interoperability.

A.3. Peppol Business Interoperability Specification (Peppol BIS):

Peppol BIS is the eInvoice format specifically designed for electronic procurement documents within the Peppol network. It enables seamless exchange of procurement-related documents, such as invoices. This standard is essential in modern eInvoicing, promoting interoperability and streamlined communication between different business systems across borders.

EInvoices in Peppol must include buyer reference or purchase order reference. Invoice lines can include names of products or services, quantity, net amount, buyer accounting reference, time period, order reference, allowances or charges, and price details.[ccxxv]

A.4. Peppol International Invoice (PINT)

PINT billing is an advanced specification by OpenPeppol that’s designed to create globally interoperable invoice specifications. It is set to replace the existing BIS Billing 3.0 specification in several economies around the world.

[ccxxvi] Current APEC economies which have been impacted by the transition to PINT include Australia; Japan; Malaysia; New Zealand; and Singapore.. [ccxxvii] PINT is an extension to Peppol BIS-Billing 3.0, BIS-Billing 3.0 is compatible with PINT.[ccxxviii]

In 2018, Singapore became the first economy outside of Europe to adopt Peppol, requiring extension from the European-based specifications to meet local needs, while allowing network interoperability the solution is not hassle-free. To improve on this, the PINT group was established to create an international business interoperability specification that eliminates the need for multiple economy-specific derogations.

The PINT model consists of three layers: shared, aligned, and distinct. The shared layer includes universally understood and consistent information, such as invoice numbers. The aligned layer addresses minor jurisdictional differences, like varying tax terminology (e.g., GST in Australia vs. VAT in Europe). The distinct layer allows for economy-specific or industry-specific information that may not be relevant elsewhere. This structure ensures the shared layer is processed consistently across all participating economies, supporting cross-border interoperability, while the aligned layer is likely to be processed, and the distinct layer caters to unique local requirements. [ccxxix]

Achieving comprehensive cross-border interoperability will require collaboration, standardisation, and alignment among solution providers, governments, and stakeholders. The PINT model provides a promising framework for establishing a global standard for cross-border eInvoicing, promoting interoperability while accommodating specific economy requirements. The adoption of the PINT model and continued stakeholder collaboration will be crucial in achieving seamless cross-border eInvoicing. [ccxxx]

A.5. Electronic Data Interchange for Administration, Commerce, and Transport (EDIFACT):

Electronic Data Interchange **(EDI)** is the computer-to-computer exchange of business documents in a standard electronic format. Unlike paper-based methods, EDI automates data transfer, enhancing efficiency, accuracy, and speed in transactions.

EDI uses standard formats to ensure data is universally understood across systems, covering documents like purchase orders, invoices, and shipping notices. Automation reduces manual errors and speeds up processing times.

Transactions are encrypted and transmitted over secure networks, ensuring confidentiality and regulatory compliance. Common EDI documents include purchase orders, invoices, Advance shipping notices (ASNs), and payment remittance advices.

EDI is widely used across various industries, including retail, automotive, healthcare, logistics, and manufacturing, to facilitate smooth and efficient B2B communication.[ccxxxi]

A3. Appendix 3: Economic modelling steps and key assumptions

A3.1 Overview of economic modelling for eInvoicing

The economic modelling for eInvoicing across APEC economies involves quantifying the productivity gains and costs savings from shifting from PDF invoice to eInvoicing for cross border transactions. The key steps undertaken are set out below and described in more detail in the paragraphs that follow:

1. Identifying the value of bilateral trade flows between APEC economies.
2. Estimating the average transaction value of bilateral trade flows between APEC economies.
3. Calculating the number of bilateral transactions between APEC economies.
4. The benefits of an electronic invoice relative to a PDF invoice are calculated based on evidence from the literature. This captures reductions in manual processing, error minimisation, and storage costs.
5. Productivity benefits are adjusted based on estimated differences in labour costs by economy to generate a cost savings by invoice
6. Productivity benefits are multiplied by number of bilateral transactions and various scenarios for adoption levels to estimate the magnitude of potential economic benefits across APEC.

These steps are discussed in greater detail below.

A3.2 Identifying the value of bilateral trade flows between APEC economies and average transaction value

The model uses trade data for APEC economies to assess the value of bilateral transactions. These transaction values are based on annual international trade values from the United Nations (UN) ComTrade database. This is used alongside ABS data on average transaction values to estimate average transaction value for bilateral economy pairs within APEC. These steps are outlined further below.

A3.2.1 International trade value across APEC economies

UN ComTrade data provides the trade values for each APEC economy. Table A.1 shows an example of annual APEC economy's trade value.[ccxxxii]

Table A.1: Aggragated annual bilateral import value from Comtrade database, 2023 (USD, Billion)*

	Australia	Brunei Darussalam	Canada	Chile	The People's Republic of China
Australia	-	0.5	2.4	0.6	155.6
Brunei Darussalam	2.4	-	0.0	0.0	1.9
Canada	2.8	0.0	-	0.8	43.9
Chile	0.3	0.0	1.8	-	43.0
The People's Republic of China	71.8	0.8	66.1	19.8	-
Hong Kong, China	0.6	0.0	0.3	0.1	13.7
Japan	18.1	0.1	15.3	2.5	160.5
Indonesia	3.8	0.2	2.1	0.4	74.2
The Republic of Korea	18.1	0.1	10.2	1.5	161.7
Malaysia	12.8	2.0	2.6	0.2	102.9
Mexico	3.0	0.0	34.1	1.7	18.7
New Zealand	5.3	0.0	0.7	0.1	13.5
Papua New Guinea	2.1	0.0	0.0	0.0	3.5
Peru	0.1	0.0	3.5	1.8	25.5
The Republic of the Philippines	0.7	0.1	1.6	0.1	19.5
The Russian Federation	0.0	0.2	0.1	0.0	129.2
Singapore	11.0	0.3	1.1	0.1	31.4
Thailand	13.1	0.1	3.6	0.6	50.5
Chinese Taipei	6.1	0.0	6.0	0.3	199.3
Viet Nam	6.6	0.1	9.8	1.2	92.1
the United States of America	32.5	0.3	277.0	17.2	165.2
Total import value (USD, Billions)	**211.2**	**4.9**	**438.3**	**48.8**	**1,506**

Source: United Nations ComTrade database (2024)

A3.2.2 Average transaction value and adjustment for bilateral trade relationships

ABS data on Australia's international trade—including total transaction counts, and aggregate trade values for imports and exports—is used to estimate a four-year average transaction value for imports and exports for each APEC economy trading with Australia. The application of a 4-year average mitigates annual fluctuations, thereby offering a more stable foundation for comparison.[ccxxxiii] This is combined with data on average transaction values in for imports in Canada and imports and exports in New Zealand. Publicly available data on number of transactions was not identified for other APEC economies or the available data was considered too outdated to inform the analysis. For these other economies, an average of their values in the ABS dataset and the average transaction value in New Zealand and Canada was used.

Table A.2: Estimated average number of import transactions:

	1	2	3	4	5
	Australia	Brunei Darussalam	Chile	The People's Republic of China	Hong Kong, China
Australia	-	87	711	224,909	18,219
Brunei Darussalam	1,991	-	4,562	4,562	4,562
Canada	4,305	3,394	3,394	3,394	3,394
Chile	948	4,214	-	4,214	4,214
The People's Republic of China	143,296	51,663	51,663	-	51,663
Hong Kong, China	1,628	4,441	4,441	4,441	-
Japan	37,771	16,488	16,488	16,488	16,488
Indonesia	8,812	6,835	6,835	6,835	6,835
The Republic of Korea	25,164	12,286	12,286	12,286	12,286
Malaysia	20,957	10,884	10,884	10,884	10,884
Mexico	5,611	5,768	5,768	5,768	5,768
New Zealand	13,692	8,300	8,300	8,300	8,300
Papua New Guinea	6,430	6,041	6,041	6,041	6,041
Peru	415	4,036	4,036	4,036	4,036
The Republic of the Philippines	1,241	4,312	4,312	4,312	4,312
The Russian Federation	552	4,082	4,082	4,082	4,082
Singapore	17,427	9,707	9,707	9,707	9,707
Thailand	27,037	12,910	12,910	12,910	12,910
Chinese Taipei	8,982	6,892	6,892	6,892	6,892
Viet Nam	11,125	7,606	7,606	7,606	7,606
The United States of America	60,768	24,154	24,154	24,154	24,154

* Four-year average Australian's exports value.

Source: Australian Bureau of Statistics, (2021), Characteristics of Australian Importers.

The approach to estimating average transaction values by economy is an estimate only as these values are likely to vary considerably by economy and over time. Based average transaction values on information from Australia;

Canada and New Zealand is likely to mean for other APEC economies are an estimate only. Notably, transaction values for Australia were found to be relatively high and it is likely that other APEC economies (particularly those that share land borders) may have lower average transaction values. This would mean the estimated benefits may be conservative.

A3.2.3 Inflation adjustment and US dollar conversion

Once the average transaction values are established, they are adjusted for inflation[ccxxxiv]. The next adjustment addresses annual exchange rate fluctuations by converting all values into a consistent currency—in this case, US dollars—to establish a common benchmark.

A3.2.4 Calculating the number of bilateral transactions between APEC economies

This step combines the datasets outlined in Tables 1 and 2 to estimate the average number of transactions between APEC economies, a key factor in determining the productivity gains and costs savings from eInvoicing.

To estimate the transaction counts, the bilateral import value between APEC member economies was divided by the average transaction value, providing an estimate of transaction number between each bilateral economy pair.

A3.2.5 Assumptions and data considerations

Note that transaction values were estimated based on a small number of APEC economies from which this data could be sourced. As a result, these estimates should be seen as relatively high level indications of the magnitude of potential productivity gains from eInvoicing adoption rather than precise estimates.

Further, while UN ComTrade provides a solid foundation for aggregated annual trade value for each APEC member, however, variations in reporting and data collection methods among APEC economies may introduce some differences.

A3.3 Evaluate productivity gains and cost savings per invoice

A3.3.1 Productivity metrics and cost saving assumptions

The productivity benefits per transaction were estimated using established benchmarks from existing eInvoicing studies. Deloitte Access Economics estimates that the productivity benefits of eInvoicing amount to USD 14.84 per invoice.[ccxxxv] The different components that make up these savings are shown in Table A.4. These estimates align closely with findings from the 2024 European Commission preparatory study on the effects of Directive 2014/55/EU, which highlights comparable productivity gains in public procurement. [ccxxxvi]

Table A.4: Estimated productivity benefits breakdown

Cost Category	Cost (AUD)
Total costs of paper invoice	$30.87
Storage cost savings for PDF invoice processed manually	$3.20
Labour savings in AP time to process structured e-invoice	$15.57
Labour savings from AR time to process structured e-invoice	$2.13
Storage cost savings for electronic invoice	$3.20
Reduction in error costs	$0.79
Total costs for PDF invoice	$30.87- $3.20 = **$27.67**
Total cost for structured e-invoice	$30.87 - $15.27 - $2.13 - $3.20 - $0.79 = **$9.18**
Productivity benefits relative to a paper and PDF invoice	$27.67- $9.18 = **$18.49**

[1] Deloitte Access Economics, (2016)

[2] IBM Sterling Report (2010)
[3] AP Benchmark report average of paper processing costs in 2012 and 2013 ($10.16) cost of structured invoice processing ($1.405), inflated to $2015 plus on costs and overheads.
[4] IBM Sterling report (2010) indicates a cost saving of $1.75 compared to a paper invoice - this is converted to AUD in 2016.
[5] IBM Sterling Report (2010)
[6]4% error rate based on Hackett Group (2014) reduced by 37% due to eInvoicing based on the IBM Sterling Report. The cost per error is $53.50 cost based on the IBM Sterling Report (2010) (4% x 0.37 x $53.50)
Source: Deloitte Access Economics (2024)

Further, the productivity gains are allocated 60% to Accounts Payable (Imports) and 40% to Accounts Receivable (Exports), as per the Australian Taxation Office (ATO) eInvoicing value assessment for 2024. These figures have been adjusted to account for inflation and converted to US dollar. [ccxxxvii]

Table A.5: Estimated productivity benefits adjusted for inflation and conversion to US dollar

	Accounts Payable (Imports)	Accounts Receivables (Exports)
Estimated eInvoicing savings benefit (2023, AUD)	$18.49 * 0.6 = $11.09	$18.49 * 0.4 = $7.40
Inflator factor(2016 to 2023)	1.2327	
Exchange rate AUD to USD	1.5357	
Estimated eInvoicing savings benefit - Inflation adjusted (2023, AUD)	$11.09 * 1.2327 = $13.68	$7.40 * 1.2327 = $9.12
Estimated eInvoicing savings benefit - Exchange rate adjusted (2023, USD)	$13.68 * 1.5357 = **$8.90**	$9.12 * 1.5357 = **5.94**

Source: Deloitte Access Economics (2024)

These benefits are split as follows:

- Accounts Payable: Accounts payable departments capture 60% of the total productivity gain, equating to USD 8.90 per invoice.
- Accounts Receivable: Accounts receivable departments account for the remaining 40%, benefiting by USD 5.94 per invoice.[ccxxxviii]

In the context of cross-border invoicing, the benefits to accounts payable accrue to importers while the benefits to accounts receivable accrue to exporters.

A3.3.2 Assumptions and data considerations

The analysis operates under the assumption that the base case comparison is between electronic invoices (PDF format) and traditional PDF invoices. In this context, it is presumed that the use of PDF invoices incurs higher processing costs, time delays, and error rates compared to electronic alternatives. This is a key assumption and productivity gains may be smaller if some of the shift is from semi-automated invoices that can be machine read to eInvoicing.

Further, the analysis assumes that the productivity gains from eInvoicing will be consistent across various industries and transaction types. However, note that different sectors may experience varying levels of efficiency improvements due to factors such as existing processes, technological adoption, and the complexity of transactions. For instance, industries with higher number of transactions or more straightforward invoice processing workflows, such as retail, might see more pronounced productivity benefits compared to sectors that involve complex billing structures, such as construction or government contracting.

Additionally, the assumption presumes that all organisations are equally equipped to implement eInvoicing systems effectively. Variability in infrastructure, staff training, and organisational readiness can lead to disparities in productivity gains.

A3.4 Assessing potential economic benefits by economy at varying adoption rates

The final step of the modelling involved calculating potential economic benefits for each economy using scenario analysis to account for varying eInvoicing adoption rates. The productivity benefit for imports was calculated as follows:

Estimated number of import transactions ×
eInvoicing benefit for Accounts Payable (Imports)
× Assumed eInvoicing adoption rate

Similarly, the productivity benefit for exports was calculated as:

Estimated number of export transactions ×
eInvoicing benefit for Accounts Receivable (Exports)
× Assumed eInvoicing adoption rate

Each result was then adjusted by differences in labour cost per worker based on data from the Global Trade Analysis Project[ccxxxix], allowing for differences in labour costs. Ideally a direct measure of labour costs would have been used but such measures were not available on a consistent basis for all APEC member economies. Table A.6 below provides an example of Canada's productivity benefit when importing from Australia:

Table A.6: Estimated eInvoicing benefits for Canada's Imports from Australia*

Canada's productivity gain when importing from Australia	
Canada's average of import transactions from Australia	693,689
eInvoicing benefit for accounts Payable (Imports)	$8.90
Assumed e-Invoicing adoption rate	50%
Productivity benefit from imports prior to labour cost adjustment at 50% adoption rate	693,689 * $8.905 * 0.50 = **$3,088,607**
Canada's labour cost ratio relative to Australia	0.9710
Imports benefit adjusted for labour cost	**$3,088,607 * 0.9710 = $2,998,083**

*The analysis considers only productivity benefit generated from international trade, not internal economy benefits.
Source: Deloitte Access Economics (2024)

The total eInvoicing benefit for Canada includes the combined productivity gains from Canada's imports and exports with each of the APEC member economies. A total of 840 calculations were performed, covering all potential trade pairs between the 21 APEC members, to fully capture the network effects of eInvoicing adoption across the region.

A3.4.2 Scenario analysis for adoption rates

The model enables flexibility in adjusting eInvoicing adoption rates, allowing for estimation of the resulting economic benefits for each APEC member economy. The table A.7 below presents the potential annual productivity gains from import and exports for APEC members at various eInvoicing adoption levels.

Table A.7: Potential annual productivity gains for APEC members at different eInvoicing adoption levels (USD, Millions) *

APEC Economies member	2.5%	7.5%	12.5%	22.5%	27.5%	32.5%	37.5%	42.5%	47.5%	50.0%
The United States of America	111	332	553	996	1,217	1,438	1,659	1,881	2,102	2,213
Canada	46	139	232	417	510	602	695	788	880	927
Hong Kong, China	28	83	138	248	304	359	414	469	525	552
Singapore	16	48	80	144	176	208	240	272	303	319
Japan	9.5	29	48	86	105	124	143	162	181	190
Chinese Taipei	8.8	26	44	79	97	114	132	149	167	176
The Republic of Korea	8.4	25	42	75	92	109	125	142	159	167
The People's Republic of China	7.6	23	38	68	83	98	113	128	144	151
Australia	4.4	13	22	40	49	57	66	75	84	88
Mexico	3.0	9.1	15	27	33	39	46	52	58	61
New Zealand	2.0	5.9	9.8	18	22	26	30	33	37	39
The Russian Federation	1.6	4.7	7.8	14	17	20	23	27	30	31
Malaysia	1.4	4.1	6.8	12	15	18	20	23	26	27
Chile	1.3	3.8	6.3	11	14	16	19	22	24	25
Brunei Darussalam	0.7	2.1	3.5	6.3	7.7	9.1	11	12	13	14
Thailand	0.5	1.5	2.5	4.5	5.4	6.4	7.4	8.4	9.4	9.9
Indonesia	0.5	1.4	2.4	4.3	5.3	6.3	7.2	8.2	9.2	9.7
Viet Nam	0.5	1.4	2.3	4.2	5.1	6.0	7.0	7.9	8.8	9.3
Peru	0.4	1.3	2.2	3.9	4.8	5.7	6.5	7.4	8.3	8.7
The Republic of the Philippines	0.3	0.9	1.4	2.6	3.2	3.8	4.3	4.9	5.5	5.8
Papua New Guinea	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Total productivity benefit	**251**	**754**	**1,256**	**2,261**	**2,764**	**3,266**	**3,769**	**4,271**	**4,774**	**5,025**

*The analysis considers only productivity benefit generated from international trade, not internal economy benefits.
Source: Deloitte Access Economics (2024)

At a higher adoption level of 50%, the total benefits are projected to reach USD 5 billion, with the United States realising benefits of up to USD 2.2 billion.

This modelling assumes that current cross border eInvoicing are not currently occurring but there is likely to be some cross border invoicing currently. Thus, these results reflect the value of an increase in adoption from current levels i.e., if adoption is 1% currently, the 50% adoption scenario is equivalent to an increase in adoption from 1% to 51%.

A3.5 Caveats and limitations

The eInvoicing economic model provides a way of assessing the potential magnitude of productivity gains and cost savings from an increase in eInvoicing adoption in APEC. Importantly, it is not a forecast or projection of eInvoicing adoption. In economies where eInvoicing has not been mandated, adoption rates have been well below 50% and thus this would represent an ambitious goal, although companies engaged in importing and exporting do tend to be larger and thus likely to be more digitally mature.

A key limitation arises from the use of transaction data from a limited set of economies as a proxy for estimating transaction values across other APEC economies. Data from these economies may not accurately reflect the trade dynamics of all APEC economies, particularly smaller or geographically proximate economies where transaction values and volumes may differ significantly. For instance, economies that share land borders, or those with close historical trade ties, may experience a higher frequency of transactions with lower individual values. Consequently, this proxy-based approach could lead to a conservative estimate of productivity gains and cost efficiencies, particularly in cases where the number of transactions is likely higher than those estimated by the model.

The model's productivity estimates are also based on average benefits per eInvoice, which may not capture sector-specific differences in efficiency gains. External factors—such as varying regulatory landscapes, levels of digital readiness, and market maturity across industries—can all influence the degree to which businesses adopt and benefit from eInvoicing. These dynamics are likely to affect the uniform application of the productivity benefits estimated in this analysis. While the model provides a benchmark for potential gains, variations across sectors and transaction types may lead to different outcomes in practice.

A3.5.1 Range of results and scenario variability (Best case vs. Worst case)

The model's results should be seen as a range of potential outcomes rather than definitive forecasts. **This analysis provides a "what-if" scenario assessment**, estimating the potential benefits if APEC economies achieve specific adoption levels and progress in unison towards interoperability in eInvoicing. **The benefits depend on coordinated take up:** as more economies adopt the system, the potential for cumulative productivity gains increases. However, this interdependence means that the realised benefits will vary based on the coordinated adoption rates among economies. Disparities in adoption can lead to differences in overall productivity and cost savings, highlighting the importance of alignment in take-up across the region.

If some economies adopt eInvoicing more rapidly than others, the distribution of gains may become uneven. Early adopters may face costs related to implementation without realising the expected benefits, especially if other economies do not adopt complementary international components. This scenario can lead to a situation where the advantages of early adoption are diminished. Therefore, for APEC to fully unlock the economic benefits of eInvoicing, a coordinated and harmonised approach would be most effective, highlighting the importance of collective action across member economies.

Limitation of our work

General use restriction

This report is prepared solely for the use of the Department of Foreign Affairs and Trade. This report is not intended to and should not be used or relied upon by anyone else and the Department of Foreign Affairs and Trade and Deloitte accept no duty of care to any other person or entity. The report has been prepared for the purpose of improving eInvoicing adoption and interoperability across APEC economies by identifying best practices and overcoming implementation challenges. You should not refer to or use the Department of Foreign Affairs and Trade and/or the name of Deloitte or this report for any other purpose.

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