

# **Informing the Digital Economy Framework Agreement (DEFA) through the language of current agreements**

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# Outline

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  - DEFA – Objective
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## Digital Economy Framework Agreement (DEFA) – What is it?

- The DEFA is touted as the world's first major region-wide **digital economy agreement**.
  - A Digital Economy Agreement (DEA) is a treaty that establishes digital trade rules and digital economy collaborations between two or more economies. – Ministry of Trade and Industry, Singapore.
- The digital economy of ASEAN has the potential to reach USD1 trillion in 2030.
- The ASEAN members further expect the DEFA to double that potential value to USD2 trillion in 2030.

## DEFA – Objective

“ASEAN DEFA will provide a **coherent, harmonized, collaborative, and rules-based** approach to ASEAN’s cooperation in the digital ecosystem to establish **an open, secure, interoperable, competitive, and inclusive** regional digital economy in the broader AEC-building agenda.”

— *Framework for Negotiating ASEAN Digital Economy Framework Agreement*

# DEFA Negotiation Framework

Agendas	Description
<b>Digital Trade</b>	aims to facilitate cross-border trade by creating a seamless trade experience with electronic documents and interoperable processes.
<b>Cross Border E-commerce</b>	aims to create a more efficient and fairer environment for cross-border e-commerce, including digital goods and services.
<b>Payment and Invoicing</b>	aims to promote digital payments and electronic invoicing by fostering technical interoperability, encourage innovation and competition, and developing relevant regulation.
<b>Digital ID and Authentication</b>	aims to develop a mutual recognizable and interoperable digital identity and electronic authentication framework within the region.
<b>Online Safety and Cybersecurity</b>	aim to improve cooperation in cybersecurity and create an open and secure online environment, with comprehensive protection to parties in a digital transaction.
<b>Cross-border Data Flows and Data Protection</b>	aims to facilitate cross-border data flow and establish frameworks to protect data privacy.
<b>Competition Policy</b>	aims to create a fair/non-discriminatory, transparent competitive environment with consistent guidelines on enforcement and better choice for consumers
<b>Cooperation on Emerging Topics</b>	aims to establish mechanisms for regulatory cooperation for relevant standards and regulations to keep up with technological innovations in emerging topics such as AI.
<b>Talent Mobility and Cooperation</b>	aims to facilitate digital talent mobility between countries and close collaboration on talent building.

## Digital Economy Agreements in ASEAN

The DEFA does **not** exist in a vacuum. The various ASEAN member states have pursued other treaties and trade agreements with Digital Economy related provisions.

This has made for a “spaghetti bowl” of potentially divergent policy positions between ASEAN member states.

The DEFA in aiming to be “**coherent, harmonized, collaborative, and rules-based**” would need to reconcile these various policy positions and existing agreements.

### **Research Objective**

Identify policy recommendations for the upcoming ASEAN Digital Economy Framework Agreement, such as gaps and areas of interest in existing obligations pertaining to the digital economy.

# Research Approach

- Create a database of digitally related trade provisions in trade agreements signed by ASEAN member states
- To use the database to employ natural language processing and machine learning techniques to analyze digital trade obligations



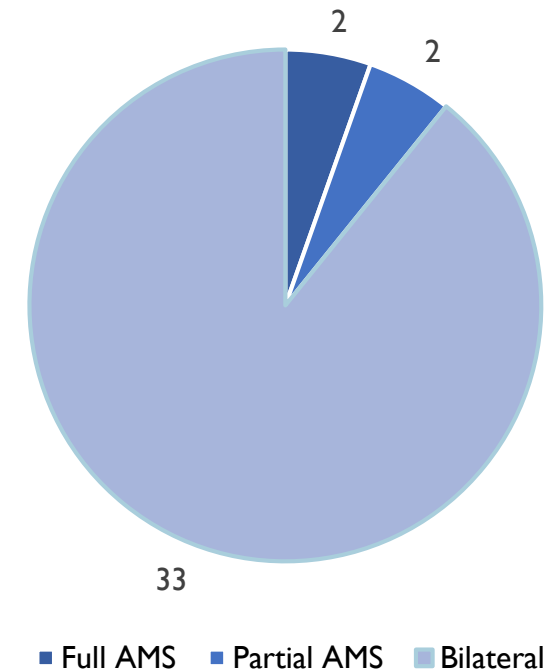
# Research Approach

- Previous datasets either had feature-specific coding of trade agreements OR provided a text-based corpus, not both
  - **Detailed coding:** Design of Trade Agreement, World Bank's Global PTA Database, WTO Database on PTAs, Trade Agreements Provision on Electronic-Commerce and Data (TAPED)
  - **Text corpus:** Text of Trade Agreements (ToTA)
- For our analysis we required:
  - Comprehensive list of trade agreements signed by ASEAN states on the topic of digital trade
  - Text-based corpus to apply natural language processing techniques on

## What's in the Corpus?

- 37 Agreements
- 159 Chapters
- 95,497 Paragraphs
- 573,034 (Bi- & Tri-gram) Tokens
  - Mean of 19.65 Unique Tokens per Paragraph
  - Median of 13 Unique Tokens per Paragraph

Agreement Distribution Based on the Participation of ASEAN Member States (AMS)



## What's in the Corpus?

- Texts of the PTAs, including preambles, chapters, annexes, and protocols (edited for latest obligations)
- Relevant metadata
  - Chapter specific document ID in the format of agreementID-chapterID
    - (Eg) RCEP is agreement 133, and its annex is chapter 22. RCEP Annex is assigned document ID 133-022.
  - Agreement name
  - Date of signature
  - Date of entry into force
  - Chapter title
  - Chapter coding – categorization of chapter titles based on content and theme
  - Existence of non-conformity measures (only applied to CPTPP)
  - Signatory states

## What's in the Corpus?

Signatory	Agreement-Level	Chapter-Level	Paragraph-Level*	Tokens Count
Singapore	22	114	62,905	446,917
Vietnam	7	38	65,524	401,846
Thailand	6	25	27,023	161,329
Brunei	4	27	38,866	261,305
Philippines	4	17	28,742	179,866
Malaysia	3	19	27,968	200,129
Indonesia	3	19	26,962	158,332
Cambodia	2	14	26,411	153,312
Laos	2	14	26,411	153,312
Myanmar	2	14	26,411	153,312

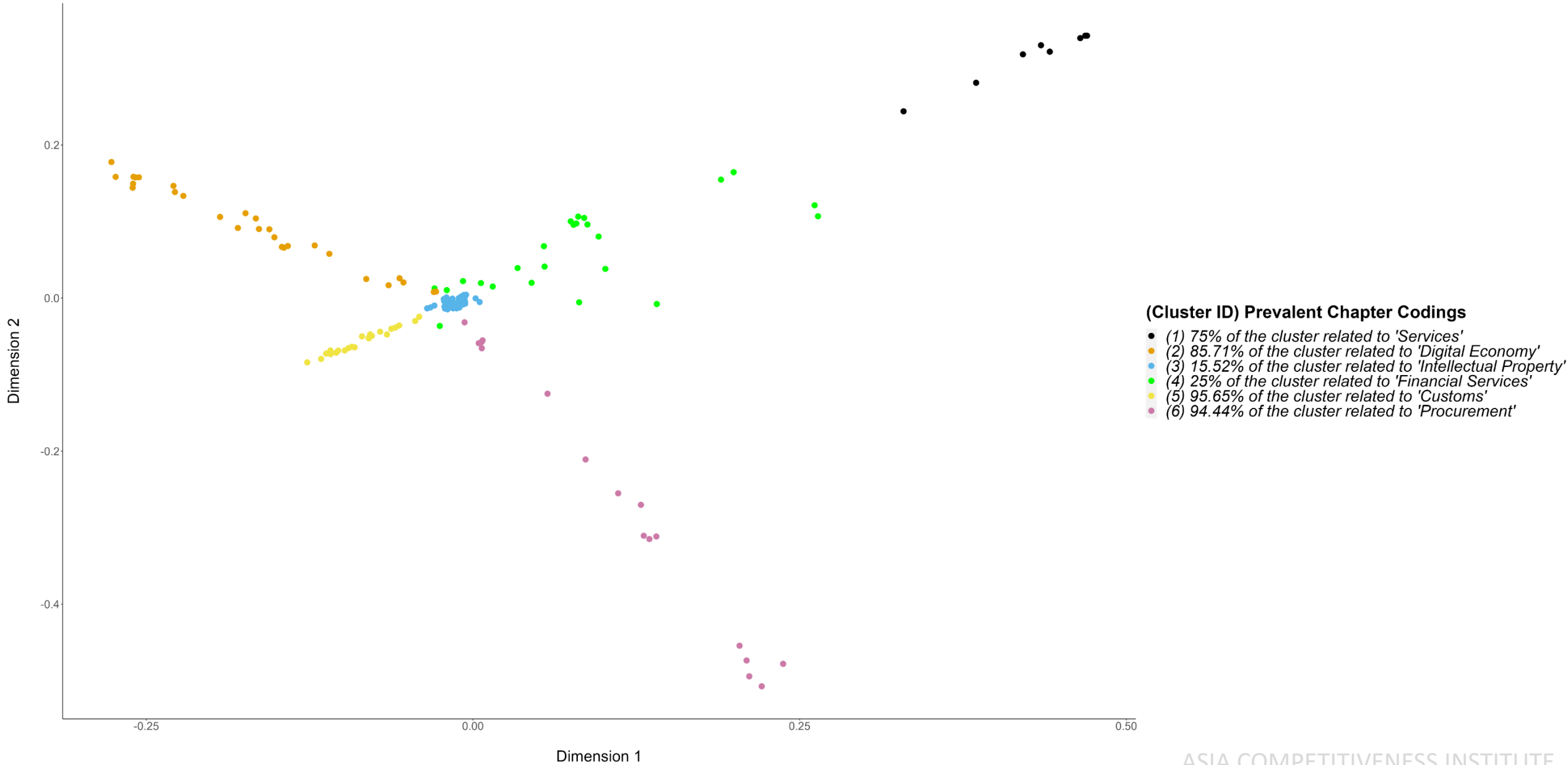
## Similarity Scores

- Similarity scores are calculated to quantify the pairwise similarity of all chapters/agreements.
  - Higher score = more similar combination of words
- It can be observed that chapter headings may not be fully representative of its contents.
- **This allows us to rapidly identify the set of documents most similar to an agreement of interest reducing the need to manually read all agreements to compare texts.**

Chapters most similar to the NZ-SG CEP e-commerce chapter

Agreement	Chapter	Similarity Score
CPTPP	Electronic Commerce	0.638
Australia Indonesia CEPA	Electronic Commerce	0.569
DEPA	Business and Consumer Trust	0.330
Sri Lanka – Singapore FTA	Electronic Commerce	0.298
DEPA	Data Issues	0.289

# Multidimensional Scaling of ASEAN's Digitally Related PTA Chapters Using Model-Based Clustering



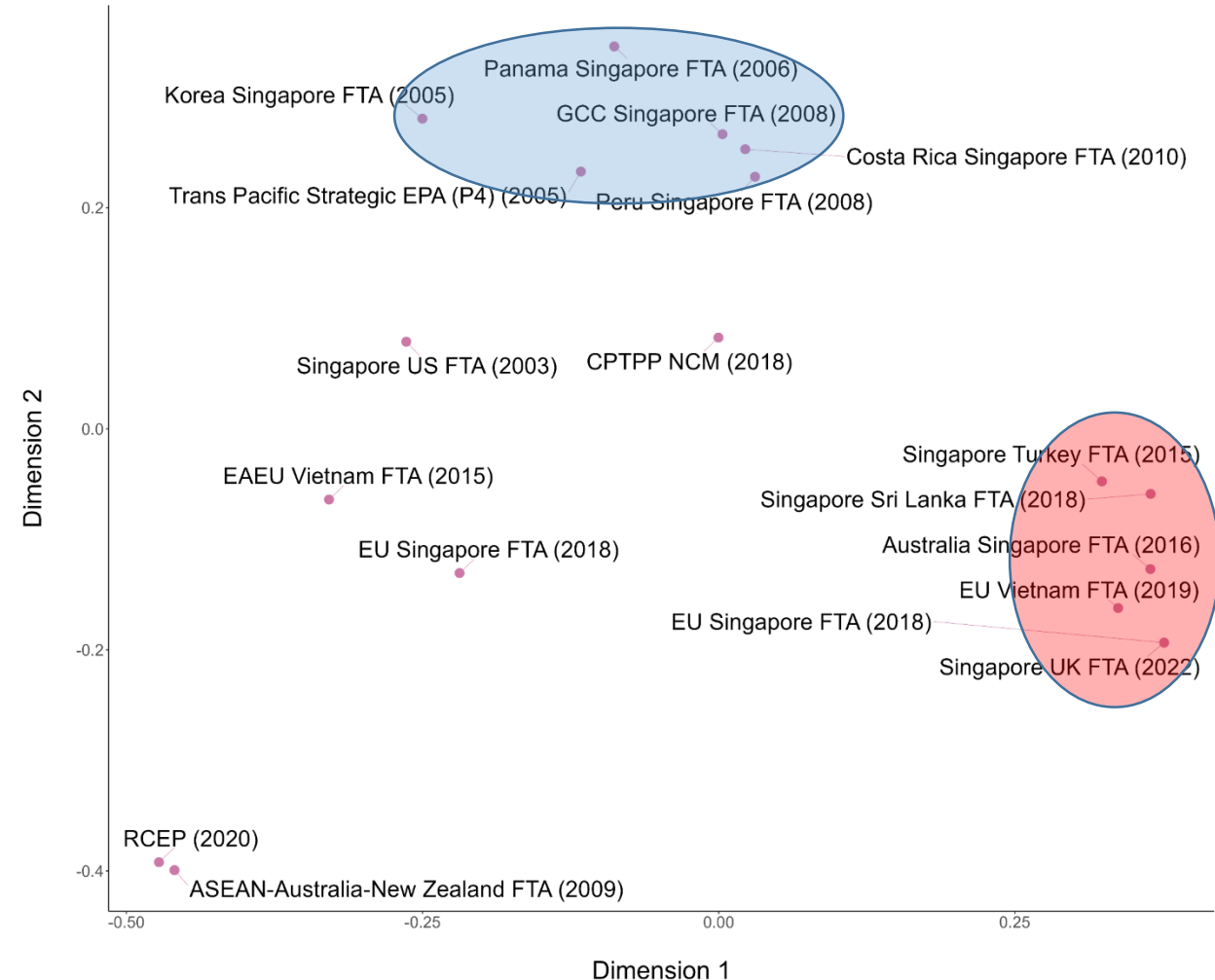
# MDS Procurements Cluster Analysis

**There is stark divergence in the policy positions of the different agreements.**

- Even within agreements by a single country (Singapore), positions can be inconsistent.
- There is a distinct element of time in the similarity of agreements.
  - Earlier agreements (2005-2010) tend to cluster at the top of the graph
  - The later agreements large cluster on the right (2015 – 2022)
- Multilateral agreements tend to diverge more from other agreements.

## Multidimensional Scaling of ASEAN's Digitally Related PTA Chapters - Cluster 6

*'Procurement' was the most common chapter coding accounting for 94.44% of documents in the cluster*



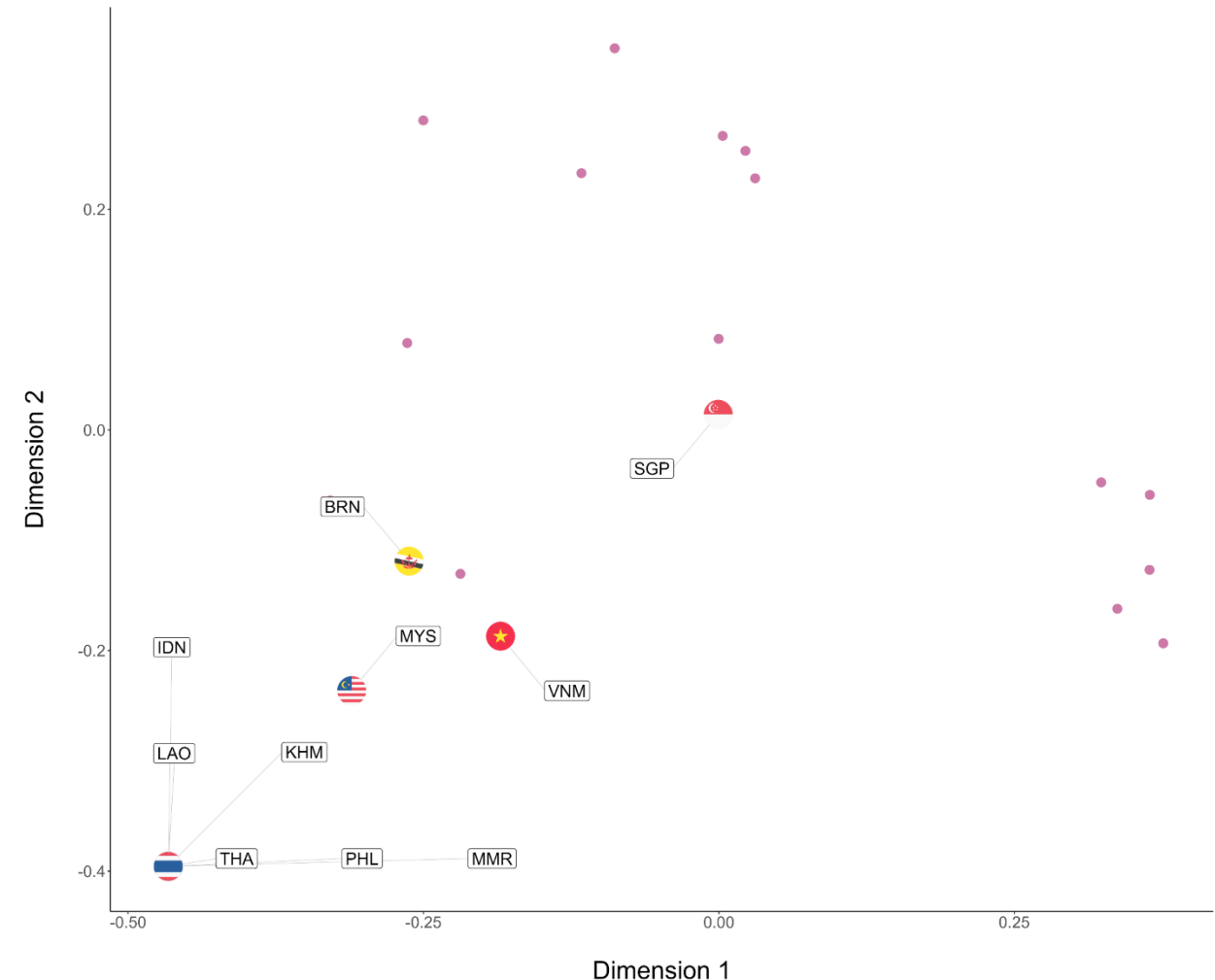
# MDS Procurements Cluster Analysis - Country Centroids

**Across countries, the positions of the ASEAN economies diverge between the CPTPP Members and Non-CPTPP members.**

- Singapore stands apart in being more aligned towards the language in the CPTPP. Other CPTPP members straddle the area between the RCEP and CPTPP, reflective of their respective national treatments within the CPTPP as well.
- The majority of the ASEAN economies' commitments on Procurement lean towards the RCEP and AANZFTA.

## Multidimensional Scaling of ASEAN's Digitally Related PTA Chapters - Cluster 6

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## MDS Procurements Cluster Analysis - Summary

Country	First Agreement Signed	Last Agreement Signed	Magnitude of Change Over the Years
Singapore	Singapore US FTA (2003)	RCEP (2020)	0.271
Vietnam	ASEAN-Australia-New Zealand FTA (2009)	RCEP (2020)	0.347
Brunei	Trans Pacific Strategy EPA (P4) (2005)	RCEP (2020)	0.381
Malaysia	ASEAN-Australia-New Zealand FTA (2009)	RCEP (2020)	0.221
Cambodia	ASEAN-Australia-New Zealand FTA (2009)	RCEP (2020)	0.007
Indonesia	ASEAN-Australia-New Zealand FTA (2009)	RCEP (2020)	0.007
Laos	ASEAN-Australia-New Zealand FTA (2009)	RCEP (2020)	0.007
Myanmar	ASEAN-Australia-New Zealand FTA (2009)	RCEP (2020)	0.007
Philippines	ASEAN-Australia-New Zealand FTA (2009)	RCEP (2020)	0.007
Thailand	ASEAN-Australia-New Zealand FTA (2009)	RCEP (2020)	0.007

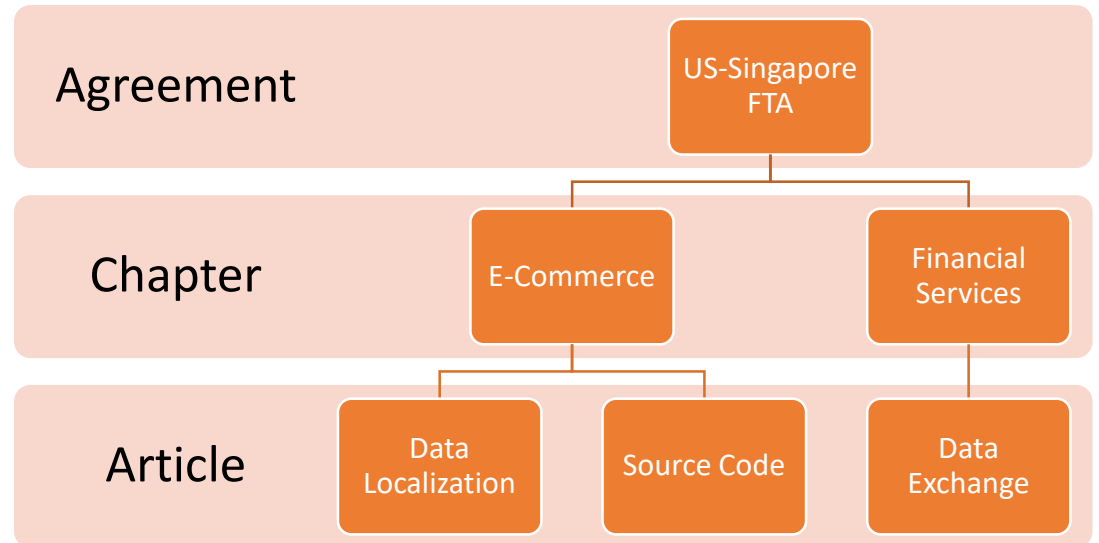
- **RCEP provides an ASEAN consensus.**
  - For most ASEAN members, the language of their agreements have not evolved much over the years between the AANZFTA and RCEP.
- **Negotiations for the DEFA should take into account positions in other agreements to ensure coherence.**
  - The CPTPP would be a good initial reference point.

# Topic Modeling

**Topic modeling enables the identification of detailed issues and language use.**

- “Topic” as the common denominator for concepts/relationship of concepts
  - Same concept but found under different terms or chapters
- Topic Modeling is an algorithmic approach to identify concepts based on the distribution of words in a document.
- Picking out potentially hidden patterns to human eyes

## Example PTA Structure



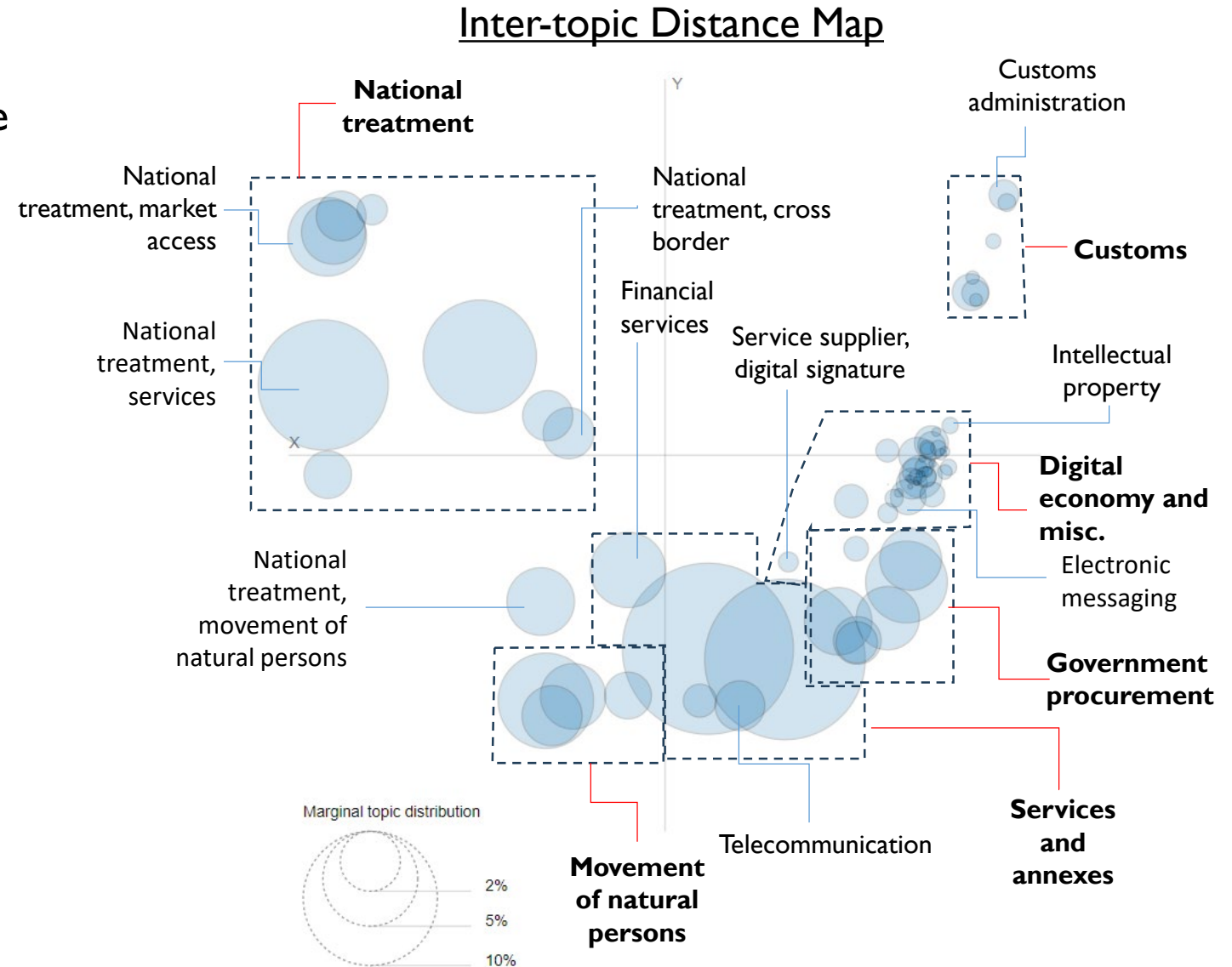
# Full Corpus Topics

### Some Unique Topics

- Commercial electronic messaging
- Compliance
- Conformity assessment
- Cooperation
- Custom
- Custom administration
- Custom procedure
- Data exchange, cross border, single window
- Data sharing
- Digital Inclusion
- Digital product, transmission
- Dispute settlement mechanism
- Electronic auction
- Electronic messaging
- Financial cooperation
- Financial service, national treatment, non conformity measure
- Government procurement
- Government procurement procedure
- Human exchange
- Intellectual property
- Joint committee
- Movement of natural person
- National treatment, cross border
- National treatment, services
- National treatment, market access
- National treatment, movement of NP
- Non conformity measure
- Online safety security
- Paperless trade
- Sanitary phytosanitary measure
- Service annex
- Service supplier, digital signature
- SME
- Taxation, expropriation
- Taxation, foreign investment
- Technical cooperation
- Telecommunication

# Full Corpus Topics

- Clustering of topics using MDS finds the following to be closely similar:
  - Digital economy and misc.
  - Services and annex
  - Government procurement
  - Movement of natural persons
- Digital economy cluster composed of numerous small topics and mixes with other smaller miscellaneous topics:
  - Digital Signatures
  - Intellectual Property
  - Electronic Messaging
  - etc



## Digital Econ. Cluster Sub-Corpus Topics

### Unique Topics Identified

- Access
- AI, duties, exclusions/national security
- Algorithm
- Automation creation exchange
- Autonomous vehicle
- Broadcast
- Collaboration
- Compliance measures
- Compliance, administration
- Computer security
- Conducive environment
- Conformity assessment
- Consumer charges
- Consumer protection
- Cooperation
- Cross-border interoperability
- Cross-border transfer
- Cryptography, algorithm
- Custom duties
- Customs procedures
- Customs, procurement
- Cybersecurity
- Cybersecurity cooperation
- Data exchange
- Data protection
- Data transfer
- Digital identity
- Digital products
- Domestic regulation
- Dispute settlement mechanism
- Economic integration
- Electronic authentication
- Electronic commerce
- Electronic commerce customs
- Electronic commerce import
- Electronic information
- Electronic messaging
- Electronic payment
- Electronic record
- Electronic service supplier
- Electronic signature
- Electronic technology
- Encourage cooperation
- Environment impact assessment
- Exclusions
- Financial institution
- Financial instrument
- Financial service
- Foster economic social development
- Further cooperation
- General provision
- Government procurement
- Government service delivery
- Human capital
- Information communication
- Information exchange
- Innovation
- Intellectual property
- Internet
- Joint committee, single submission
- Knowledge exchange
- Location of computing facilities
- Logistics
- Market Access
- Mutual concern
- Non-conformity measure
- Non-manipulation
- National treatment
- Online consumer protection
- Online safety
- Patent
- Personal data protection
- Personal information protection
- Provider
- Regulation
- Regulatory framework
- Scope of obligation
- Service delivery
- Service satisfaction
- Service, supplier
- Single window
- SME
- Software
- SPS
- Tax
- Technical information
- Trade administration
- Trade administration, import documents
- Transfer of personal information
- Transmission

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- Foster economic social development
- Further cooperation
- General provision
- Government procurement
- Government service delivery
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- Information communication
- Information exchange
- Innovation
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- Internet
- Joint committee, single submission
- Knowledge exchange
- Location of computing facilities
- Logistics
- Market Access
- Mutual concern
- Non-conformity measure
- Non-manipulation
- National treatment
- Online consumer protection
- Online safety
- Patent
- Personal data protection
- Personal information protection
- Provider
- Regulation
- Regulatory framework
- Scope of obligation
- Service delivery
- Service satisfaction
- Service, supplier
- Single window
- SME
- Software
- SPS
- Tax
- Technical information
- Trade administration
- Trade administration, import documents
- Transfer of personal information
- Transmission

# Topic Modeling Findings – ASEAN DEFA Negotiating Scope

## Digital Trade

- Custom duties
- Customs procedures
- Customs, procurement
- Logistics
- Single window
- Etc.

## Cross Border E-Commerce

- Digital products
- Electronic commerce
- Electronic commerce import
- Transmission
- Etc.

## Payments & E-Invoicing

- Electronic payment
- Electronic record
- Electronic signature
- Financial instrument
- Financial service
- Etc.

## Digital ID & Authentication

- Digital identity
- Electronic authentication
- Electronic signature

## Online Safety

- Consumer protection
- Cybersecurity
- Online consumer protection
- Personal data protection
- Etc.

## Cross-Border Data Flows & Data Protection

- Cross-border interoperability
- Cross-border transfer
- Data protection
- Data transfer
- Etc.

## Competition Policy

- Consumer charges
- Domestic regulation
- Market Access
- Non-manipulation
- Regulatory framework
- Tax
- SME
- Etc.

## Cooperation on Emerging Topics

- AI, duties, exclusions/national security
- Cryptography, algorithm
- Software
- Etc.

## Talent Mobility & Cooperation

- Human capital
- Knowledge exchange
- Technical information
- Innovation



## Topic Modeling – ASEAN DEFA Negotiating Scope

Topics related to Payment & E-invoicing Agenda	Topic Wordings*	Representative Agreements**	AMS Signatories***
Electronic Payment	financi institut, electron payment, payment servic, greater interoper, possibl facilit, regul supervis, api encourag...	Korea-Singapore FTA, DEPA, Singapore-Sri Lanka FTA, New Zealand-Singapore CEPA,	Singapore
Electronic record	digit economi, electron record, record use, record use commerci, trade activ, use commerci, exchang electron...	Korea Singapore FTA, DEPA	Singapore
Financial instrument	digit product, financi instrument, represent financi, represent financi instrument, digit product includ, product includ, includ digitised...	Singapore Sri Lanka FTA Singapore Turkey FTA Peru Singapore FTA GCC Singapore FTA Singapore Taipei (Taiwan) FTA	Singapore

\* Stemmed words based on Highest Probability metric

\*\*Representative Agreements are defined as the top 5 documents with the highest theta value (topic proportion) and no less than 0.3 of theta value (max is 1)

\*\*\* Signatories are defined as ASEAN member states who are involved in any representative agreements in the respective agendas

## Topic Modeling – ASEAN DEFA Negotiating Scope

Topics Related to Online Safety Agenda	Topic Wordings*	Representative Agreements**	AMS Signatories***
Cybersecurity	cybersecur matter, cooper cybersecur, electron commerc, shall endeavour, govern procur, cooper cybersecur matter, law regul...	CPTPP, New Zealand Singapore CEPA, Singapore Taipei (Taiwan) FTA, EAEU Vietnam FTA, Chile Thailand FTA	Singapore, Malaysia, Vietnam, Brunei, Thailand
Online consumer protection	onlin consum, onlin consum protect, build consum, consum redress build, includ mean, includ mean consum, mean consum...	Chile Thailand FTA Australia Indonesia CEPA Korea Singapore FTA New Zealand Singapore CEPA CPTPP	Thailand, Indonesia, Singapore, Malaysia, Brunei, Vietnam
Personal data protection	person data, protect person, data protect, protect person data, data user electron, user electron commerc, electron commerc...	CPTPP, DEPA, Korea Vietnam FTA, Chile Thailand FTA, Australia Thailand FTA	Singapore, Malaysia, Vietnam, Brunei, Thailand

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## Topic Modeling – Online Consumer Protection

### Chile Thailand FTA

#### Article 11.7 Electronic Commerce

“1. Recognizing the global nature of electronic commerce, the Parties shall endeavour to:

- b) exchange information and share experiences on regulations, policies, enforcement and compliance regarding electronic commerce, including:
  - (ii) online consumer protection including means for consumer redress and building consumer confidence;“

### CPTPP

#### Article 14.7: Online Consumer Protection

“1. The Parties recognise the importance of adopting and maintaining transparent and effective measures to protect consumers from fraudulent and deceptive commercial activities as referred to in Article 16.6.2 (Consumer Protection) when they engage in electronic commerce.

2. Each Party shall adopt or maintain consumer protection laws to proscribe fraudulent and deceptive commercial activities that cause harm or potential harm to consumers engaged in online commercial activities.“

**The position on online consumer protection under the Chile Thailand FTA is clearly weaker than those for economies under the CPTPP. This will need to be reconciled in DEFA.**

# Conclusion

- The use of Natural Language Processing methods in the analysis of Digital Trade Agreements has enabled the rapid identification of key documents and issues relevant to the DEFA agenda, going past the formal chapter headers of existing agreements to pick-up underlying topics and terms.
- There is clear evidence of divergent positions among ASEAN members' existing commitments with respect to different topics. Even when parties are all party to the same agreement as in the case of the CPTPP and RCEP.
- The DEFA in seeking to be **coherent, harmonized, collaborative, and rules-based** will have to reconcile these divergent positions.

# Annex