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TRADE POLICY 2.0 AND ALGORITHMS: TOWARDS THE "EASIFICATION" OF FTA IMPLEMENTATION

LUCIAN **CERNAT**

TRADE POLICY 2.0 AND ALGORITHMS: TOWARDS THE "EASIFICATION" OF FTA IMPLEMENTATION

LUCIAN CERNAT*
HEAD OF GLOBAL REGULATORY COOPERATION AND INTERNATIONAL PROCUREMENT NEGOTIATIONS, DG TRADE (EUROPEAN COMMISSION). CIRANO ASSOCIATE RESEARCHER AND FELLOW.

Abstract

The EU is the trading bloc with the most extensive network of bilateral free trade agreements (FTAs). These trade agreements offer tremendous market access opportunities for EU companies. However, FTAs are becoming increasingly complex. Therefore, in trying to cover many trading partners and a growing range of trade-related issues, a critical question emerges: how easy is it for EU firms to understand and take advantage of FTAs? This is a crucial question since a perfectly negotiated FTA offering optimal trade conditions would be useless if no exporter would make use of it. One effective way to facilitate FTA implementation is to rely on a combination of firm-level Trade Policy 2.0 combined with the use of algorithms to codify trade rules in simple online tools for SMEs. This paper describes two concrete examples (ROSA and Access2Procurement) deployed by the EU to "easify" the FTA implementation and ensure that companies can understand their provisions and take advantage of their benefits.

1. The growing complexity of FTAs: is this an issue for small and medium exporters (SMEs)?

Trade agreements are becoming very complex. That is particularly true for bilateral free trade agreements (FTAs). As of October 2021, there are over 350 FTAs in operation worldwide (also known as regional trade agreements (RTAs) in the WTO context). Despite their common names, this generic three-letter acronym hides a wide diversity of legal provisions that can differ from one FTA/RTA to another.

With 45 FTAs notified to the WTO, the EU has been declared by the WTO secretariat the "world champion" of FTAs (Figure 1). The EU FTAs that are currently in force cover around 35% of total EU trade. By offering duty-free access for essentially all products,

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FTAs are important drivers of international trade in providing invaluable market access opportunities for the exporting and importing companies of their signatories. FTAs also contain ambitious provisions beyond tariff elimination. The typical EU FTA covers a wide range of issues from traditional tariff removal provisions, to services, IPR rules, public provisions, and many other chapters (e.g. on good regulatory practices, technical barriers to trade, and sustainable trade).

Figure 1. Major FTAs notified to the WTO
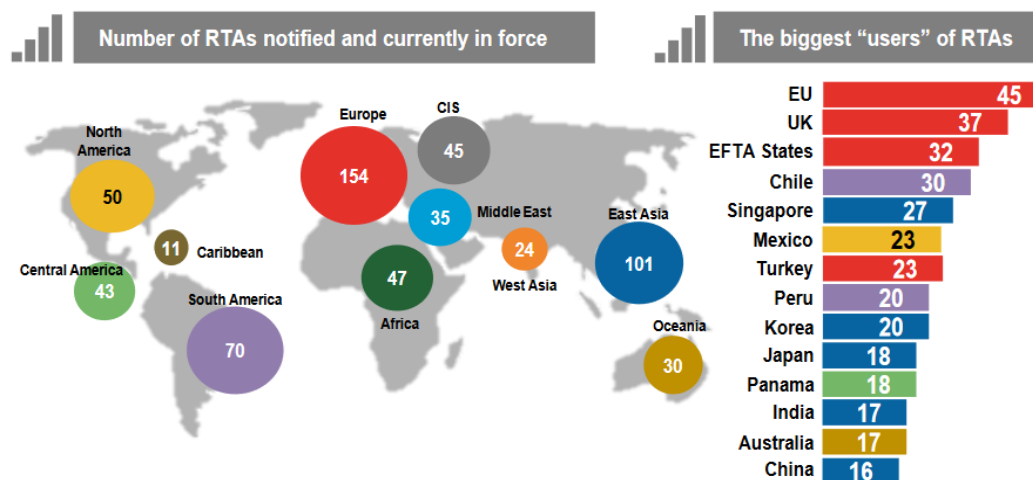
Source: WTO (https://www.wto.org/english/tratop_e/region_e/rtafactfig_e.pdf).

> **The more ambitious and sophisticated an FTA is, the more complex it is to understand and make use of its provisions, particularly by SMEs.**

For instance, the EU-Canada FTA (also known as CETA) has over 1500 pages and more than 350'000 words, including many technical, legal terms and specific terminology. To put things into perspective, CETA contains more pages and, arguably, more complex jargon than the Lord of the Rings trilogy does. You may speak Elvish, but if you do not speak "legalese," and are an SME engaged in international trade, it is pretty easy to lose the FTA plot. Therefore, without expert legal advice, making total sense of FTA provisions can be daunting.

Despite these complexities, the empirical evidence offers an encouraging picture. Many exporters and importers can take advantage of the main duty-free provisions offered by FTAs. The standard metric to assess the use of FTAs by companies is called preference utilization rate (calculated as the ratio of exports that made use of FTA preferences over the value of exports that are in principle eligible for such preferences). A perfect utilization ratio of 100% is rarely feasible. In practice, such metrics for a fully

implemented FTA are, on average, in the range of 70-90%. For instance, in the case of CETA, 57% of Canadian exports to the EU took advantage of the CETA tariff preferences. For EU exports to Canada, the preference utilization rate for 2020 was 55% (European Commission, 2021). For a relatively "young" FTA like CETA that has been in operation for only a few years, these are good results (Warin and Stojkov, 2016).

However, FTA implementation requires many advocacy efforts. For instance, despite CETA being a well-known FTA, in a recent business survey conducted by DG TRADE, around 50% of EU exporters to Canada declared that they were unaware of the existence of CETA, after four years of implementation. A Trade Policy 2.0 approach offers one promising avenue for FTA implementation.

2. The emergence of innovative approaches: Trade Policy 2.0 and "rules as code"

2.1. Trade Policy 2.0: initial applications

This lack of awareness and capacity to understand how to comply with FTA provisions by certain SMEs triggered interest from DG TRADE[2] to adopt new online digital solutions that would offer automated, personalized advice to SMEs based on their specific situation. This is in line with a new "Trade Policy 2.0" approach to trade policymaking (Cernat, 2015). One of the main objectives of EU trade policy is to create new business opportunities for the over 1 million importing and exporting firms in Europe, including for many SMEs that are successful exporters (Cernat et al., 2020).

> **It would be a major improvement if "the firm" were the underlying unit of analysis when assessing the effectiveness of our FTAs.**

In "Trade Policy 2.0", the unit of analysis shifts from countries and sectors to exporting and importing firms. This can lead to several benefits, both for policy makers and the business community (Cernat and Jansen, 2017).

A first "Trade Policy 2.0" tool launched by the European Commission in 2017 in the context of EU-Canada FTA negotiations (dubbed #CETAcomes2town) geo-localised a

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[2] DG TRADE is the Directorate-General at the European Commission in charge of the common commercial policy for all EU Member States.

large, representative sample of the approximately 70'000 EU firms exporting to Canada (Figure 2). Take Italy, for instance. There are over 13'000 Italian companies exporting to Canada, with more than 10'000 of them being SMEs located all over Italy, in major cities or smaller towns (Figure 3). Putting exporters on the map offers a great communication potential, as it will help the local business communities across Europe to trade across the Atlantic with their Canadian counterparts, and thus likely to benefit from CETA.

Figure 2. "CETA comes to your town": a Trade Policy 2.0 approach to FTA negotiations
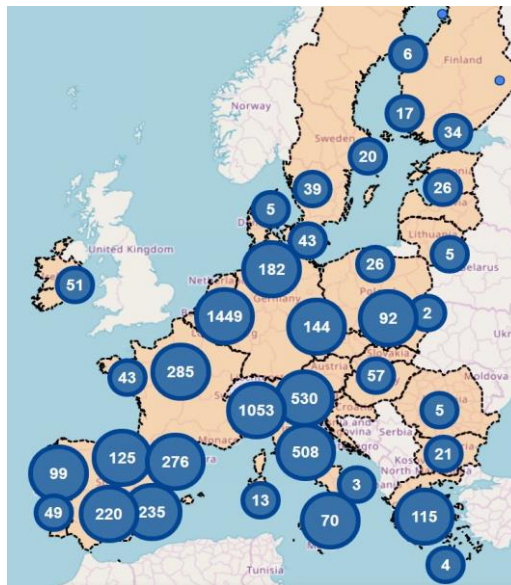
Source: DG TRADE. Available at: https://ec.europa.eu/trade/policy/in-focus/ceta/ceta-in-your-town/
Legend: The figures on the map indicate the number of EU direct exporters to Canada. Users can zoom in and see the detailed geographical distribution of exporters.

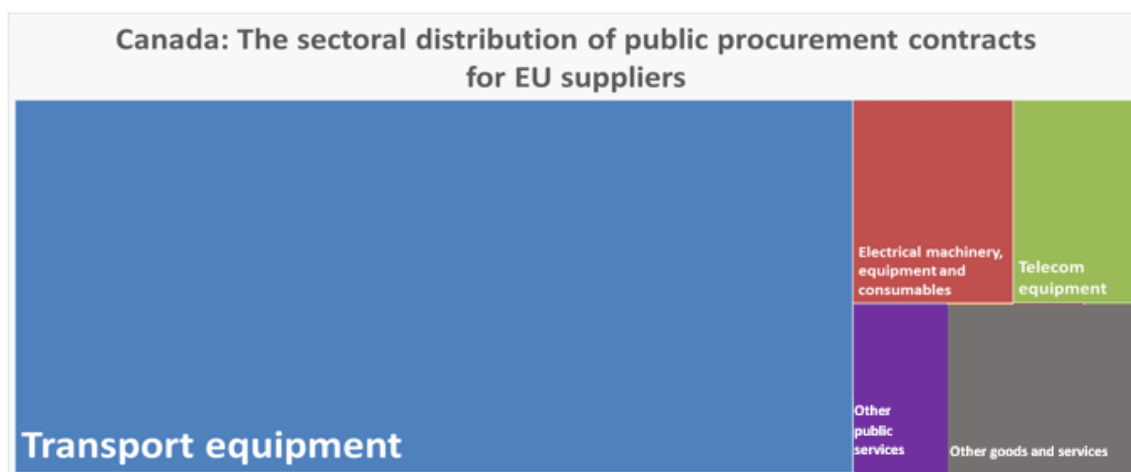***Figure 3. Top exporting Italian cities to Canada***
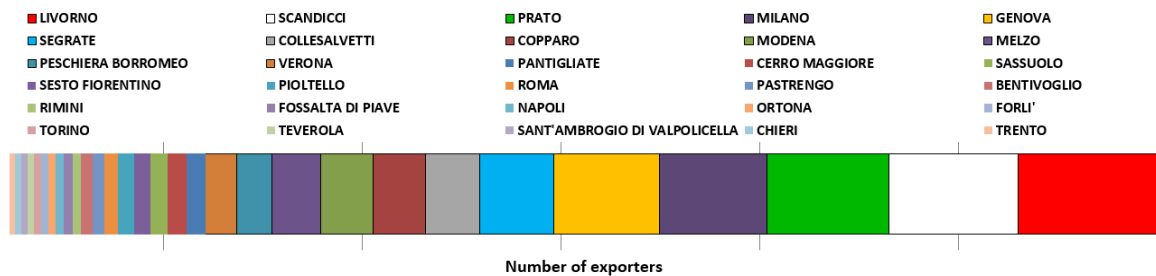
Source: Author's elaboration based on the underlying firm-level data of the "CETA comes to town" initiative.
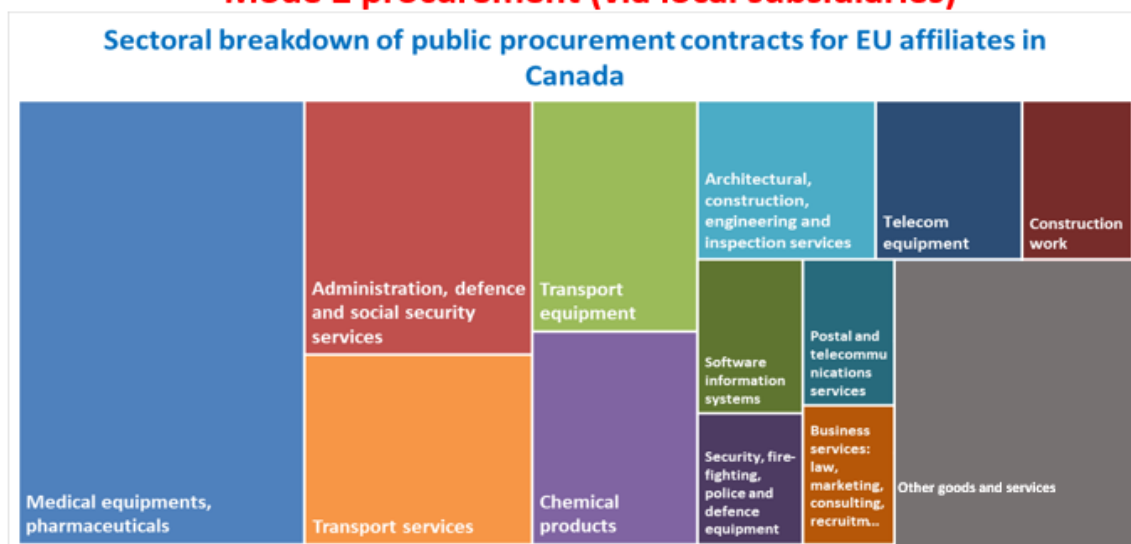
The same "Trade Policy 2.0" approach has been deployed in the case of public procurement negotiations. More and more FTAs contain ambitious procurement chapters offering new business opportunities and a level playing field for companies interested in participating in public procurement markets of the FTA partners. For instance, using a firm-level Trade Policy 2.0 approach, DG TRADE mapped the extent to which EU companies win public contracts in Canada, using different modes of supply (Figure 4).

Figure 4. Using firm-level data to map public procurement opportunities in Canada

Mode 1 procurement (cross-border)

Canada: The sectoral distribution of public procurement contracts for EU suppliers

Transport equipment

Electrical machinery, equipment and consumables

Telecom equipment

Other public services

Other goods and services

Mode 2 procurement (via local subsidiaries)

Sectoral breakdown of public procurement contracts for EU affiliates in Canada

Medical equipments, pharmaceuticals

Administration, defence and social security services

Transport services

Transport equipment

Chemical products

Architectural, construction, engineering and inspection services

Software information systems

Security, fire-fighting, police and defence equipment

Postal and telecommunications services

Business services: law, marketing, consulting, recruitm...

Telecom equipment

Construction work

Other goods and services

Legend: Mode 1 (cross-border) procurement refers to Canadian public contracts won by EU companies established outside Canada. Mode 2 (local presence procurement) refers to contracts won by EU subsidiaries in Canada. For more details on the various modes of supply in public procurement, see Cernat and Kutlina-Dimitrova (2015).

Some EU companies win public contracts in Canada directly from the EU (mode 1), whereas others win such contracts via their local subsidiaries (the so-called Mode 2 public procurement).

2.2. "Rules as code": the seven stages of legal digitalization

In parallel with these innovative approaches to trade policymaking, there has been a strong interest from the academic and policy community for a whole range of computer-based techniques that aimed at the "easification" of complex legal texts and their transformation into "rules as code" (Mohun and Roberts, 2020). Such "*if, then*" logical approach to law is not entirely new. As Termini (2019) extensively describes, legal and mathematical reasoning have a lot of logical elements in common, and it is not uncommon for legal scholars to use a complex mathematical formula to prove their point (e.g., Finkelstein, 1978 or Cornides, 1974). In today's world, law, mathematics, and algorithms come together in a global trend towards SMART Law (i.e., scientific, mathematical, algorithms based on risk and technologies) applicable in many legal areas (Restrepo-Amariles and Lewkowicz, 2020).

While mathematical theorems and statistical software have been used in court for decades, more recently, public administrations in several countries have attempted to produce legislation so that computers can read without (or with minimal) human inputs and without the loss of legal meaning. As described by Wong (2020), "rules as code" is part of a broader attempt to digitalize policymaking, and it can entail several stages (Figure 5).

Figure 5. Rules as code: different levels of digitalization
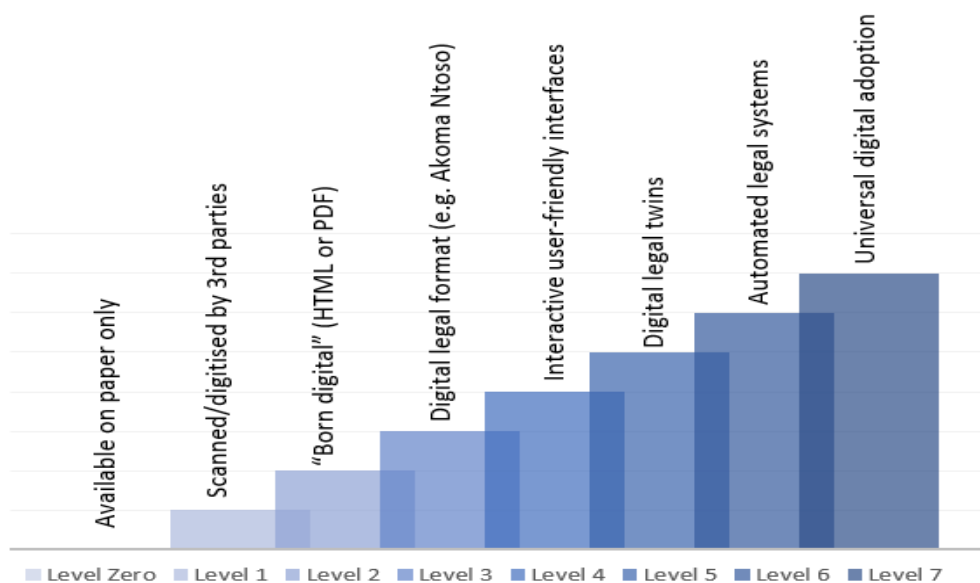
Source: Author's elaboration based on Wong (2020).

Level zero (and, to a large extent, level 1) is essentially behind us. Nowadays, most (if not all) new legal trade texts are available online in HTML or PDF format. However, at level 2, there are not many "smart" features available, except basic functionalities such as the ability to search the legal text for keywords, for instance. Some legal texts also have a structured format, e.g., FTAs are available chapter by chapter and with clickable cross-references from one part of the document to another. The text of CETA falls under level 2, for instance. Such digital documents have an official status and may be used for all practical and legal purposes.

At level 3, the legal text is encoded in a specialized legal format, such as the Akoma Ntoso initiative by the UN and a number of parliaments. This digital initiative uses technology-neutral Extensible Markup Language (XML) to capture both the structural elements (e.g., sections, preambles, headings, annexes, etc.) and semantic components (e.g. provisions, definitions, names, dates, places, etc.) of a legal text in a way that can be read and understood by software applications. Another example is the AT4M, the XML-based editor used by the European Parliament (Fabiani, 2013).

At level 4, legal digitalization goes one step further as the rules are typically directly encoded in the application, in the form of "if-then-else" statements written directly a user-friendly interface that offers personalized legal answers. Some "statutory interpretations" may occur as part of the product development process of such interfaces. There is a need for a strong cooperation between the coding team and the legal team at this level. In most cases, the result is relatively static. For instance, if trade rules (or their interpretations) change, the IT team needs to rework the underlying code of the user interface.

Level 5 requires that a "digital twin" is generated as part of the trade policymaking, or in parallel with the standard trade agreement that remains written in natural language. While for the public the natural language version of the FTA is seen as "official," trade policymakers may consider the digital version as generally equivalent to the natural language version.[3]

In level 6, such a system will allow for interactive features, with personalized explanations and specific answers to real-world situations faced by SMEs. Moreover, a level 6 digital legal text would also indicate necessary actions that private actors, users, or public agencies need to take to ensure proper implementation. In addition to such instructions/advice, the system can also produce appropriate, officially valid compliance documents or certificates. Level 7 is essentially a generalized use of the functionalities presented at level 6 across all trade rules and treaties that are now

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[3] The idea of "digital twins" is gaining traction in several areas (supply chain management, urban policies, public infrastructure, etc). However, this remains an emerging field with limited concrete examples in the area of trade policy making. For a good description of the main challenges faced by such an approach in the case of New Zealand, see Barraclough, Fraser and Barnes (2021).

expected to appear as digital code and have such interactive functionalities offered as part of simple, online tools for SMEs.

3. Can algorithms transform trade policy?

As previously explained, "rules as code" features can fundamentally transform and "easify" the understanding by users of official versions of legislation and trade rules. This is entirely in line with the objectives of Trade Policy 2.0 principles that aim to facilitate the implementation of FTAs by all companies, irrespective of size. One key parameter in a successful FTA implementation strategy is ensuring that FTA rules are "machine-consumable," i.e., ensuring that FTA legal provisions can be coded in a "digital twin" that algorithms and software tools can understand.[4] The potential for such a body of computational law in trade facilitation has been clearly described (Atkinson, 2020). For instance, FTA provisions can be codified in an algorithm that could perform specific rules of origin calculations, verify the eligibility criteria, and ultimately guide SMEs to ensure they can comply with FTA rules and reap their benefits. This computational Trade Policy 2.0 approach opens the way for individual SMEs to interact digitally with the FTA rules via a simple web interface.

DG TRADE adopted a combination of Trade Policy 2.0 with "rules as code" in two recent initiatives: (i) the Rules of Origin Self-Assessment Tool (ROSA) and (ii) Access2Procurement. While none of these tools has a legally binding character and they are not meant to offer a fully digital version of the FTA provisions themselves, both tools borrow some elements from the digitalization scale presented earlier.

> **One of the key features of ROSA and Access2Procurement tools is their ability to provide personalized answers to SMEs concerning specific FTA rules (rules of origin in the case of ROSA and public procurement for Access2Procurement).**

The two tools will provide a clear answer to users (e.g., eligible/ineligible) based on the specific inputs from SMEs. Unlike systems that fall under less advanced levels of digitalization, both ROSA and Access2Procurement provide real, tailor-made answers to users, not just a link to the FTA text online or some generic explanations.

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[4] In the computational law context, a relevant initiative is also the EU-funded CoHuBiCoL research project, bringing together both lawyers and computer scientists to conduct advanced research into computational law.

3.1. ROSA: making sense of rules of origin in FTAs

Rules of origin are a critical and indispensable part of any preferential trade arrangement. As mentioned earlier, certain exporters find it difficult to comply with the rules of origin contained in FTAs. For instance, in a pan-European survey of a representative sample of EU exporters, rules of origin appeared as problematic trade formalities, alongside non-tariff barriers. Measures concerning rules of origin and the related origin certificates constituted around 16% of all issues raised by EU exporters (European Commission and ITC, 2016). Many companies also reported that such difficulties do not stem necessarily from the rules *per se* but rather from the lack of awareness and the complex procedural aspects required to comply with rules of origin.

Figure 6. ROSA: an example of the step-by-step procedure to determine the eligibility
for duty-free treatment under CETA

Source: DG TRADE ROSA tool (https://trade.ec.europa.eu/access-to-markets)

To bridge this awareness gap, DG TRADE developed a digital tool, called ROSA (Rules of Origin Self-Assessment) that allows companies to check the rules of origin applicable to their products under each FTAs (Figure 6). ROSA offers a step-by-step approach, allowing each SME to see if their product meets preferential or duty-free FTA access criteria.

In addition to the direct access to relevant legal texts in FTAs, ROSA also contains simple, plain-language explanations of the technical terms and parameters used in rules of origin requirements and practical examples. The SME will obtain a tailored-made, self-assessment report based on their answers at the end of the step-by-step procedure. The outcome (e.g., eligible/ineligible for duty-free FTA treatment) can be

saved as an electronic document. The development of ROSA was a great leap forward in the overall functionalities offered by DG TRADE's Access2Markets, upgrading the level of information from general to personalized answers. As a result of these constant improvements, five months after its launch, Access2Markets already attracted around 10,000 daily users.

> **The Access2Markets tool reached over 1 million users and was voted in 2021 as the "most popular" public administration tool in the European Ombudsman Award for Good Administration.**

3.2.   Access2Procurement: bidding farewell to unawareness

The latest addition to the Access2Markets portal created by DG TRADE is the Access2Procurement tool. The need for more straightforward, business-friendly advice on using the procurement chapters in FTAs has been identified as a priority by EU exporting firms (Business Europe, 2020). The need for an "easification" of FTA procurement chapters for SMEs is understandable. For instance, the procurement provisions in CETA represent roughly 10% of the length of this FTA, with over 35'000 words in the main procurement chapter and its numerous annexes. This is not unusual since the full text (including annexes) of a modern FTA usually has over one thousand pages, and the procurement chapter and annexes can span several hundred pages.

Navigating the CETA procurement chapter is not always straightforward for a non-trade expert. The CETA procurement provisions apply to over 8000 Canadian public entities, scattered across different Canadian provinces at a different level of government. Public entities can buy different types of goods and services or may need construction work. There are over 4000 different types of such goods and services, classified either under specific procurement codes (CPC) or sometimes under the Federal Supply Classifications (FSC), or the standards product classification for international trade (HS codes). Some products and services are exempted from the CETA coverage for certain provinces or public procurement entities in Canada.

The CETA procurement chapter establishes rules that also depend on the value of public contracts, the so-called thresholds. Public contracts valued above these CETA thresholds are cover by the FTA, while those below thresholds are not. For instance, a public contract for the purchase of goods needs to be above 130'000 SDRs (special drawing rights)[5] if the public entity is part of the Canadian central government. For

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[5] The Special Drawing Rights is an international unit of account created by the IMF based on a basket of main currencies. SDRs are used frequently to express public procurement

goods procured by public entities at the sub-central level, the threshold is generally set at 200'000 SDRs, but in some instances, at 355'000 SDRs. In contrast, for construction works, the threshold is 5'000'000 SDRs.

Figure 7. Access2Procurement: coding the CETA procurement rules
Web interface

Underlying coding algorithm: an illustrative example

```
formcontrolname="jurisdiction" name="jurisdiction"> event
  <option class="ng-star-inserted" _ngcontent-dnj-c41="" value="null">-- Any --</option>
  <option class="ng-star-inserted" _ngcontent-dnj-c41="" value="10000">Alberta</option>
  <option class="ng-star-inserted" _ngcontent-dnj-c41="" value="10001">British Columbia</option>
  '>Canada (Federal)</option> '>New Brunswick</option> '>Nova Scotia</option> '>Quebec</option>
  '>Manitoba</option>          '>Newfoundland</option> '>Nunavut</option>      '>Saskatchewan</option>

formcontrolname="sector" name="sector"> event
  <option class="ng-star-inserted" _ngcontent-dnj-c41="" value="null">-- Any --</option>
  <option class="ng-star-inserted" _ngcontent-dnj-c41="" value="10000">Academic</option>
  '>Crown Corporation</option>  '>Gas Utilities</option>       '>Hospital</option>
  '>Electric Utilities</option> '>Government Department</option>'>Municipal Government</option>
```

Source: DG TRADE, Access2Procurement portal (https://webgate.ec.europa.eu/procurement/#/step1)

Therefore, the eligibility under CETA for a European company interested in bidding for a public contract in Canada depends on the combination of all these main parameters (entity/subject matter/value threshold) and the specific exceptions under each of them. Getting a straight answer to a simple question by an EU SME like "will my offer be considered on the same basis as the offer from a Canadian company?" can

commitments on thresholds in a neutral and more stable monetary form than national currencies. One SDR is worth approximately 1.2 EUR or 1.75 CAD.

theoretically fall in over 200 million potential combinations (based on level of government, goods vs. services, thresholds, specific conditions, or exceptions).

The Access2Procurement tool codifies these procurement parameters into a single step-by-step web interface that will only require a few simple inputs from any interested EU SME before offering a straight answer. All it takes for interested companies is to indicate the name of the Canadian public entity, the estimated value of the contract, and the broad object of the public tender (acquisition of goods, services, or construction work).[6] The web interface is straightforward (see the upper part of Figure 7).

Underneath this simple interface, however, the CETA text is codified in a detailed algorithm that captures all the possible combinations of the CETA procurement chapter and its annexes in an "if then, else" logic to arrive at the final answer (yes/no) needed by the EU companies interested in bidding for public contracts in Canada.

> **The Access2Procurement tool makes it simpler for SMEs to assess their interests via a simple, step-by-step explanation of the main procurement parameters in the CETA agreement.** [7]

Although the Access2Procurement tool is not making statutory interpretations of the law (the old dictum *iudex est lex loquens* remains valid), the tool offers valuable information in line with the expectations of EU exporters (Business Europe, 2020).

4. Looking forward

This paper tried to illustrate a simple fact: with growing complexity in FTAs, their legal provisions need to be accompanied by clear, personalized advice for EU companies in order for them to make the most of the opportunities offered by trade agreements. Thus, a firm-level Trade Policy 2.0 approach coupled with computational law techniques, as described in Genesereth (2021), offers great potential to boost FTA implementation. The ROSA and Access2Procurement are only two recent examples of how simple, online tools can offer the clarity SMEs need to benefit from FTAs. Several more sophisticated analytical innovations hold great promise for a future "Government4.0" approach, a concept encompassing the use of open data, artificial intelligence and machine learning techniques, natural language processing, or

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[6] Depending on the specific procurement parameters, several additional questions may come up (e.g. in the case of the public company Hydro-Québec, CETA does not cover the acquisition of several types of products, identified using specific HS codes).

[7] Given that certain procurement contracts covered by CETA are subject to more complex conditions, the Access2Procurement tool carries a disclaimer indicating its non-legally binding character of the assessment obtained using this tool.

advanced data visualization tools for policymaking (de Marcellis-Warin and Warin, 2020).

Challenges still remain. Two, in particular, are noteworthy. Firstly, translating the FTA legal text into a computer algorithm that would give an SME a straight answer is not always possible. Not all FTA provisions lend themselves to a simple "if then, or else" type of computer algorithms that underpin the two online tools described above. Some FTA provisions use rather vague, ambiguous terminology that leaves a wide margin of interpretation for procurement entities. On these aspects, a computational approach may only offer "it depends" as an answer. A simple algorithm cannot capture concepts that require complex legal judgment or administrative discretion. More sophisticated approaches based on artificial intelligence and natural language processing may provide an answer to such situations in the future. In the meantime, policymakers interested in an SME-friendly computational Trade Policy 2.0 approach to FTA implementation should try to minimize the use of constructive ambiguity in FTAs.

A second challenge relates to the SMEs themselves. For a large and very diverse trading bloc like the EU, reaching out to all exporting SMEs (or their vast majority) remains daunting. Despite the big success of the Access2Market portal and its dedicated online tools, a considerable number of EU SMEs are still not fully aware of its existence. For many EU SMEs, not using the Access2Market portal and its advanced functionalities provided by ROSA and Access2Procurement may mean that they do not fully understand the opportunities offered by EU FTAs. This lack of awareness keeps EU SMEs away from potentially lucrative commercial opportunities abroad. Using multiple communication channels (including social media) and promoting FTAs at the local level using the "FTA comes to town" approach is our best bet against this challenge.

However, there are also good signs for the future.

Even the more complex FTA provisions are amenable to "easification" via a computational Trade Policy 2.0 approach.

The good news is that many EU SMEs already take advantage of the core FTA provisions, also thanks to award-winning online tools like Access2Markets. The bottom line is clear: ROSA and Access2Procurement have proved that the "easification" of FTAs based on a computational Trade Policy 2.0 approach has gotten off to an excellent start.

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