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Republic of Estonia
Ministry of Economic Affairs and Communications

European Commission

REPORT ON THE STATE OF PLAY AND PREPAREDNESS FOR THE REAL-TIME ECONOMY (RTE)

IN ESTONIA AND THE BALTIC SEA REGION COUNTRIES

within the project “Supporting productivity and competitiveness of Estonian SMEs through Real-Time Economy and single contact point digital solutions”

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Report on the state of play and preparedness for Real-Time Economy (RTE) in Estonia and the Baltic Sea region countries"

The report is completed within the project "Supporting productivity and competitiveness of Estonian SMEs through real-time economy and single contact point digital solutions"

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Glossary

Term	Definition
B2A	Business-to-administration
B2B	Business-to-business communication/information/data exchange
B2G	Business-to-government communication/information/data exchange
Beneficiary	Ministry of Economic Affairs and Communications of the Republic of Estonia
BSR	Baltic Sea Region
CEF	Connecting Europe Facility
DG REFORM	The European Commission's Directorate-General for Structural Reform Support
DGE	Digital Gateway for Enterprises
DPP	Digital Product Passport
e-receipt	Electronic receipt
e-CMR	An electronic version of the consignment note used under the CMR convention when transporting goods by road
e-FTI	Electronic Freight Transport Information
e-ID	Electronic Identification, an e-IDAS building block
e-IDAS	European Framework for electronic Identification, authentication and trust services
e-KYC	Electronic “Know Your Customer” service
ERP	Enterprise Resource Planning software
EU	European Union
G2G	Government-to-government communication/information/data exchange
GDP	Gross Domestic Product
ITL	Estonian Association of Information Technology and Telecommunications
ICT	Information and communications technology
INFOBALT	A locally and internationally recognised representative of the Lithuanian ICT industry
LIKTA	Information and Communication Technology Association, Latvia
M2M	Machine-to-Machine connection or data exchange
MoU	Memorandum of Understanding

NSG, NSG&B	Nordic Smart Government and Business Project
RRF	Recovery and Resilience Fund
RTE	Real-Time Economy
SMEs	Small and medium-sized enterprises
TOOP	Once-Only Principle Project
VKE	Small and medium-sized enterprises (väikesed ja keskmised ettevõtted) in Estonian
X-Road	Estonian e-government PKI data exchange layer allowing G2G, B2G and B2B trust creation

Executive summary

Purpose of the report

The current “Report on the state of play and preparedness for Real-Time Economy (RTE) in Estonia and the Baltic Sea Region (BSR) countries” is a part of the project “Supporting productivity and competitiveness of Estonian SMEs through Real-Time Economy and single contact point digital solutions” (REFORM/SC2021/092) granted to the Estonian Ministry of Economic Affairs and Communications.

The current report serves as a review of the state of play and preparedness for RTE in Estonia and the Baltic Sea Region countries. The purpose of this report is to cover the state of art in Real-Time Economy application and development outlook in order to identify potential cooperation and joint development actions in the region.

The **ultimate goal of the project** is to support creating more opportunities for reducing administrative burden for small and medium enterprises in the Baltic Sea region (BSR), ensuring real-time exchange of business data in the BSR and employing technology for a productive dialogue between business and government.

The countries in the analysis scope are Estonia, Latvia, Lithuania, Poland, Finland, Sweden and Denmark. Additionally, Norway was invited to contribute.

Methodology

The work on the current report has been carried out through desk research, interviews and a joint regional workshop held in the hybrid format. The research was conducted between July and September 2022. The workshop in September 2022 included country-specific presentations held by stakeholders from each country (private and public sector representatives), individual assignments and group work that brought stakeholders from different countries to the same table. Several methodologies, as well as tools, were used to moderate discussion and collect input.

To make the report more interactive, we introduced personas – fully fictional characters that represent stakeholders in the European RTE ecosystem. Our personas represent the key challenges, needs and expectations in the government sector, private sector and academia.

Real-Time Economy and RTE building blocks in the region

Data-driven, automated, seamless and secure business-to-government and business-to-business data exchange is seen as the new normal. In parallel with more and more interoperable government solutions at a national and cross-border level, more cross-border support is also expected by businesses. The new RTE approach has a strong component of business-centricity in government reporting. It focuses on combining financial information exchange with actual supply chain processes from orders, transport-to-business reports, invoicing to receipts, from catalogues to statistics.

In the current report, we have addressed the following RTE building blocks: e-invoicing, e-receipts, e-CMR (electronic consignment notes), real-time product information, automated and real-time reporting, automated KYC (Know Your Customer) services, real-time e-procurement and real-time supply chains (including e-waybills and e-CMR). We have also covered environmental and sustainability reporting as an emerging topic. We did not analyse industry-specific applications of RTE (such as the digital agriculture sector or digital construction) as we focused on the general approach that can then be applied to cover different industry specifics.

State of Art and standpoints

All technical competencies are present within the region. Each country in the Baltic Sea Region has RTE success stories to share. The application of e-invoicing standards has been successful in each of the countries. Initiatives, plans and activities related to other RTE building blocks have their own strengths, flaws and gaps, which should be analysed and reflected on. **Most of the RTE building blocks are in the very early stages** allowing successful alignment and possible wins through joint efforts in planning more functional cross-border solutions.

Collaboration and information exchange in the region can be observed in **three collaboration spaces**: the Estonia-Finland space (based on works on e-governance, X-Road and national access point works), the Estonia-Latvia-Lithuania-Poland space (mainly on selected RTE building blocks and extensively on e-CMR affairs) and Finland-Sweden-Denmark-(Norway-Iceland) space (Nordic Smart Government and Business).

Target groups for the RTE development are the small and medium enterprises (including also micro-enterprises), software and service providers, the public sector (including municipalities), and academia as well as the end consumers (private persons). It is important to stay user-centric even in technical matters. The aim is to find the balance between the demands for the bookkeeping system and information sharing and collaboration, and guarantee a process-centric, not a report-centric flow of RTE functioning. The creation of trust both in terms of service offerings and data security is a key enabler of RTE.

Operational Environment is characterised by a strong playgroup and the potential for a growing number of cooperation projects. Key actions and priorities for upcoming years are nevertheless very similar in all observed countries, regardless of differences in their current actions, policy frameworks, networks and projects. Even though the standpoint and current strategies on RTE are very different in the observed countries, and none of the regional policies holds a strong priority on the cooperation at the Baltic Sea Region level, the policies have the potential to state such priorities and engage resources for implementing them.

State of Art on Organisation, Culture and Talent. Automation and digitalisation are quite new fields, and there is a significant lack of analysts and enterprise architects in the domain who would be able to see the bigger picture. Specialists that can plan both cross-border and national solutions for cross-sectoral data exchange and keep in mind the business process-centric approach will be in demand across the region. The region is clearly missing educational competencies in the executive and administrative sectors that are required for the RTE development.

Legal and Governance. Legislation is behind the technology development. In some cases, outdated definitions in accounting and consumer protection laws can be a blocker to further deployment of electronic documents. Clear definitions should be endorsed by visibility on the actual application of the law. Legislative changes should be supported by ethical rules that minimise the fear of mistakes among usual citizens and ensure a trustful dialogue between the government, enterprises, and consumers.

Technology. The technologies needed for the RTE solutions are based on the internal requirements of the specific building blocks, standards and tools. They are also supported by regular e-governance, interoperability and IT system tools, such as e-ID, e-signature or cybersecurity tools. Joint awareness of the applicability of such tools at the cross-border level is a key requirement for a successful RTE application.

Innovation and Research. Knowledge in the RTE segment is publicly available, but combining, comparing and aligning across the necessary building blocks might need joint priority taking, collaboration within a specific project or network, and possibly also external support and contribution. There is also a clear need for topical research at universities, consultancies, and competence centres. In addition to that, it is essential to engage more experienced experts to work with the RTE development in the government sector, private sector and associations, as well as upskill the stakeholders on RTE topics.

Finances and resources. Stakeholders also see the lack of steady or large-scale funding as a clear challenge. Yet, the understanding is there that with clear priorities, roadmaps, cost efficiency and goalsetting, external funding (that comes from the EU-level or other funding programmes) can be received.

Readiness for regional cooperation. All countries in the region are on the same technological level and have a shared understanding of the target situation. The countries are ready to engage in the mapping of the cooperation options, establishing a network of information and best practice exchange and reviewing the options of possible funding for joint actions.

RTE building blocks

E-invoicing is the most advanced in all observed countries. There is a special interest in the further use and evolution of PEPPOL.

E-receipt development is an integrated part of e-invoicing and is a priority for several countries.

E-KYC is mostly associated with the banking sector. However, in the future, it is seen as a key building block for ensuring trustworthy business relationships also in the private sector.

Automated and real-time reporting is closely related to the goals of increasing tax revenue and at the same time simplifying the reporting and reducing administrative burden. This block also supports the real-time data visibility and transparency of actual ongoing operations (in bulk, in an anonymised and generalised manner) for the business sector itself.

Real-time supply chains and e-CMR solutions try to address the digitalisation of information, documentation and reporting flow of the production industry, retail and logistics sectors, where the data exchange between partners and reports or checks performed by the competent authorities could be done seamlessly and digitally. For this building block, the cross-border functioning of business-to-government RTE is essential.

Real-time product information and e-catalogues are gaining attention and are highly essential for the application of real-time supply chains. It is of particular importance also in the context of sustainability reporting and analysis of the environmental footprint. However, it is not yet mature enough to drive the green transition.

E-procurement is in place for all the observed countries for public tendering, but it might not be applicable in the same way for the private sector. Supply chain solutions are scattered and might not be actively used across the partner networks especially if multiple countries are involved.

Environmental and sustainability reporting is a missing service in the Baltic Sea Region countries. However, it has growing importance and is worth incorporating into the RTE development.

As supporting building blocks, RTE development is closely related to e-ID, digital wallet, X-Road-like structures and once-only principle.

Key statements on readiness for regional cooperation

The key statement would be "using neighbour's best practice with pride" and "creating new joint solutions. Ensuring that countries do not do the same work at different places at the same time is a key objective. By connecting and innovating together as a region, it is possible to use the resource pool much more effectively. Each country can work on a few important elements/blocks for everyone's use. In addition, intellectual property and IT law best practices should be also implemented to support already developed components.

Successful regional cooperation could be based on the following statements:

Mindset: trust is the key. The development of a Real-Time Economy might appear as a technical initiative aiming at creating common standards, infrastructure and technical rules. In practice, we see it first and foremost as a mindset shift based on a key element: building trust between government and citizens (represented both by businesses and consumers) to eliminate the fear of making mistakes in the digital world.

Mindset: "Sandbox" and test-before-invest approach. Trust is clearly connected with the second mindset shift: agile thinking that makes the sandbox approach and quick testing of new technologies possible. It is important to create process flexibility for proof-of-concept exercises and train the legal teams on identifying key legal issues in such technology projects, as sandbox deployments, standard testing, hackathons and cross-border trials.

Collaboration: Joint collaboration with funding applications. Countries should start collaborating already at the moment of preparing and submitting applications for funding for cross-border RTE-related initiatives, to ensure sufficient funding and work towards joint solutions.

Collaboration: Wider stakeholder network. It is important to develop and maintain an RTE stakeholder network. In addition to the government and private sector representatives, it should also include municipalities and academic representation. Besides, in building the wider stakeholder group, it should be remembered that RTE is also closely related to sustainability, industrial solutions, intelligent transport and smart city initiatives even though those are not directly parts of the RTE domain.

Research and innovation. More researchers and field experts should be engaged in cross-border studies or other collaboration formats on various topics, including business process analytics, data analytics, cost-benefit or impact assessment, policy, legal and social aspects of RTE. This will ensure that they have a better understanding of the business needs to make research more practically applicable. They should work together with the technical ICT, data science, interoperability, semantics, blockchain or distributed ledger, and cyber security experts that should be involved to support the actual development.

Collaboration: Fast onboarding to RTE topics. It is important not only to provide sufficient funding for new positions but also to make it possible to quickly onboard new stakeholders to the RTE topics. It will help to address the resourcing challenges and mitigate possible changes in the local RTE teams. We recommend using this report as a quick starter for RTE topics for a wide range of stakeholders: government officials, other public sector representatives, businesses, associations or/and the academic sector, which aim at incorporating RTE topics into their learning or teaching curriculum.

Summary

The report states a high readiness of the engaged stakeholders in the observed countries to develop a joint roadmap to allow better alignment and best practice exchange. The report investigates the ways to cooperate in various operational, organisational, user engagement, legal, governance, innovation and technology domains, as well as in selected building blocks individually through proof-of-concept development and quick wins. The report covers the insights on the key RTE domains.

The conducted work and report contribute to the next deliverables in this project – harmonised vision and a roadmap for the development of the RTE in the BSR and a Report on an RTE validation model for innovative initiatives and services. The findings will also be relevant for working on an e-receipt service model for cross-border data exchange.

We believe that this report can be used as an onboarding guide for both new policy officers and analysts joining RTE projects, stakeholder group representatives as well as other experts or researchers engaged in projects either as subject matter experts or in support functions. Among others, lawyers, solution architects and communications teams, that are involved in RTE development work, could benefit from the report.

Lühikokkuvõte

Aruande eesmärk

Käesolev “Aruanne Reaalajamajanduse (RTE) hetkeseisust ja valmisolekust Eestis ja Läänemere piirkonna riikides” on osa Majandus- ja Kommunikatsiooniministeeriumi ja Euroopa Komisjoni DG Reform rahastatud projektist “Eesti VKE-de tootlikkuse ja konkurentsivõime toetamine reaalajamajanduse ja ühtse kontaktpunkti digilahenduste kaudu” (REFORM/ SC2021/092).

Käesolev aruanne on ülevaade RTE hetkeseisust ja valmisolekust Eestis ja Läänemere piirkonna riikides.

Aruande eesmärk on kajastada reaalajamajanduse hetkeseisu ja lähteolukorda, et anda sisend ja hinnata võimalusi regioonis tihedamaks koostööks ja ühisteks algatusteks.

Projekti lõppeesmärk on toetada võimaluste loomist halduskoormuse vähendamiseks Läänemere piirkonna (BSR) väikeste ja keskmise suurusega ettevõtete hulgas, reaalajas äriandmete vahetamise tagamist Läänemere regioonis ning tehnoloogia kasutamist ettevõtete ja valitsuse vaheliseks produktiivseks dialoogiks.

Analüüsi ulatusse kuuluvad järgmised riigid: Eesti, Läti, Leedu, Poola, Soome, Rootsi, Taani, osaliselt oli kaasatud ka Norra.

Metoodika

Käesoleva aruande sisendiks on erinevate riikide materjalid, intervjuud ning korraldatud rahvusvaheline töötuba. Analüüs viidi läbi perioodil juuli-september 2022. Septembris toimus seminar-töötuba, kus osalesid kõikide analüüsi kuuluvate riikide esindajad. Seminar-töötuba sisaldas ettekandeid, individuaalseid ülesandeid ja regiooniüleste koostöövõimaluste-teemalist arutelu.

Aruande interaktiivsemaks muutmiseks loodi ka persoonad, kes osalevad Euroopa RTE ökosüsteemis ning esindavad valitsussektori, erasektori ja akadeemia peamisi väljakutseid, vajadusi ja ootusi.

Reaalajamajanduse valdkonnad

Andmepõhist, automatiseeritud, tõrgeteta ja turvalist andmevahetust, mis toimib sama sujuvalt avaliku sektori ja ettevõtete kui ka ettevõtete endi vahel peetakse uueks normaalsuseks. Seejuures oodatakse aina enam koosvõimelisi ja piiriüleseid e-valitsuse lahendusi ja rakendusi ning sellega võiks kaasneda ka piiriülene andmevahetuse tugi ettevõtetele nende äriprotsesside pinnalt RTE rakenduste kasutamiseks. Uus ja kaasaegne RTE lähenemine keskendub ettevõtetele, aga omab aina tugevamat osa finantsteabe ja aruannete kombineerimisest tegelike tarneahela protsessidega tellimusest, transpordist kuni aruanneteni, arvetest kviitungiteni, kataloogidest statistikani.

Käesolevas aruandes käsitletakse järgmisi RTE teenuseid: e-arved, e-kviitungid, e-CMR (elektroonilised saatelehed), reaalajas tooteteave (digitaalne tootepass), automatiseeritud ja reaalajas andmepõhine aruandlus, automatiseeritud kliendiandmete kontrolli (KYC – Know Your Customer) teenused, reaalajas e-hanked ja reaalajas tarneahelad (sh e-veoseleht ehk e-CMR), vähesel määral ka jätkusuutlikkuse aruandlus. RTE tööstusharuspetsiifilised rakendused (nt digitaalse põllumajanduse sektor või digitaalsed ehitused), ei kuulunud vaatluse alla, kuna aruandes keskenduti üldisele lähenemisviisile, mida saab üle kanda ka teistele tööstusharudele.

Hetkeolukord

Kõik RTE planeerimiseks, arenduseks ja rakendamiseks vajalikud tehnilised kompetentsid on piirkonnas esindatud ja olemas. Igal Läänemere piirkonna riigil on selged RTE valdkonna edulood. E-arved on kõikides vaatlusalustes riikides edukalt jõustatud, kuid rakendunud erineva edukusega. Samuti

on avaliku sektori tasandil edukalt rakendatud e-hanked. Ülejäänud käesolevas aruandes vaatluse all olevad RTE tooted ja teenused nagu e-kviitung või e-KYC on pea kõikides vaatlusalustes riikides võrdlemisi algusjärgus, kuigi üksikud rakendamise edulood on selgelt olemas. Online tootekataloogide, tarneahela ja e-CMR valdkonnas on algatused vaid osades riikides ning sedagi peamiselt prototüüpide tasandil.

Riikide erinevused ja valdkondlikud tugevused annavad riikidele võimaluse teineteise erinevaid parimaid praktikaid analüüsida, teiste kogemusi arvesse võtta ning kombineerides ühiste algatuste kaudu ellu viia. Ühiselt planeerimine ning ühine tehniline ja arhitektuune lähenemine aitab hoida kokku ressursse ning võimaldab planeerida koheselt piiriüleselt paremini ja sujuvamalt ühilduvaid lahendusi.

Infovahetus toimub kolme koostööruumi kaudu: Eesti-Soome koostöötelg (peamiselt e-valitsemise ja x-tee valdkonna koostöö osas), Eesti-Läti-Leedu-Poola koostöötelg (valitud RTE alateemade ühisprojektide ja e-CMR prioriteedi rakendamisel) ja Soome-Rootsi-Taani (Norra-Island) koostöötelg (Nordic Smart Government and Business projekti raames ärisektorile paremate e-lahenduste pakkumisel).

RTE arenduste sihtrühmad ja sidusgrupid piirkonnas on väikesed ja keskmised ettevõtted (VKE) ja isegi mikroettevõtted, raamatupidamis- ja aruandluslahenduste valdkonnas tegutsevad tarkvara pakkujad, avalik sektor (sh omavalitsused), akadeemilised ringkonnad ja ka teenuste lõpptarbijad (eraisikud). Nii teenuste arenduses, prioriseerimises kui ka tehnilistes küsimustes on oluline jääda kasutajakeskseks. Eesmärk on leida tasakaal raamatupidamissüsteemidele või muudele dokumentide halduse süsteemidele esitatavate nõuete ning teabe jagamise või jagatud kasutuse vahel, et tagada lahendustele tööprotsessidest, mitte aruannete esitamise loogikast lähtuv ehitusekesksus. Seejuures on RTE rakendamiseks oluline luua ja tagada usaldus nii teenuste sisus kui andmeturvalisuses.

RTE tegevuskeskkonda iseloomustab tugev juhtgrupp, huvi, valmidus, koostöömeelsus ja tegelik potentsiaal koostööprojektide arvu suurenemiseks. Lähiaastate põhitegevused/prioriteedid on väga sarnased kõikidel vaadeldud riikidel, sõltumata nende praegustest tegevustest, poliitikaraamistikest, võrgustikest või projektidest. Kõikide vaadeldud riikide RTE strateegia hetkeseis või selle praegused prioriteedid ei piira uute teemade kaasamist, sealhulgas uute piiriüleste tegevuste algatamist. Seda ka olukorras, kus laiem süstemaatiline piiriülene koostöö kogu regioonis ei ole ühelgi riigil seni olulisel kohal olnud.

Organisatsioon, kultuur ja talendid. Automatiseerimine ja digitaliseerimine ning piiriülene reaalajas andmete vahetamine on üsna uued valdkonnad, kus on suur puudus analüütikutest ja äriarhitektidest, kes suudaksid näha laiemat pilti. See tähendab vajadust spetsialistide järele, kellel on võimekust planeerida ettevõtete äriprotsessidest lähtuvaid siseriiklikke ning rahvusvahelisi sektorite-vahelisi andmevahetuse lahendusi. Rohkem tähelepanu peaks pöörama selgelt avaliku- ja erasektori juhtide ja otsustajate teadlikkusele ja kompetentsidele RTE valdkonnas, mis on vajalikud RTE laiemaks kasutuselevõtuks.

Tehnoloogia. Tehnoloogiad ja komponendid, mida on vaja üksikute RTE teenuste loomiseks, sõltuvad valdkonnaspetsiifikast ja –standarditest. Need on toetatud ka tavaliste e-valitsemise, koostalitlusvõime ja IT süsteemide võrgustike omavaheliste ühendamise töövahenditega, näiteks e-ID, e-allkiri, küberturvalisuse töövahendid. Teadlikkus olemasolevate ja uute lahenduste rakendusvõimaluste kohta on üheks eduka ühise piiriülese RTE teenuste võrgustiku loomise aluseks.

Õigus ja juhtimisraamistik. Tehnoloogia arengu taga on seadusandlus: mõnel juhul võivad aegunud mõisted raamatupidamis- ja tarbijakaitseseadustes takistada elektrooniliste dokumentide kasutuselevõttu. Selgeid määratlusi peaks toetama nähtavus õiguse tegeliku kohaldamise kohta. Seadusandlikke muudatusi peaksid toetama eetikareeglid, mis vähendavad tavakodanike hirmu eksimuste ees ning tagavad usaldusliku dialoogi valitsuse, ettevõtete ja tarbijate vahel.

Innovatsioon ja teadus. Teadmised RTE segmendis on avalikult kättesaadavad, kuid vajalike ehitusplokkide kombineerimine, võrdlemine ja joondamine võib vajada ühist prioriteetide seadmist, koostööd projekti või võrgustiku raames ning võib-olla ka välist tuge ja panust. Samuti on selge vajadus asjakohaste teadus- ja rakendusuuringute, analüüside järele, mida võiksid teha ülikoolid, konsultatsioonieettevõtted ja kompetentsikeskused. Lisaks sellele on tungiv vajadus kaasata rohkem ettevalmistatud eksperte, kes töötaksid RTE teemadel ettevõtluses, valitsuses, kui ka teistes

kompetentsikeskustes ja sidusgruppides. Samuti on vaja sidusgruppe RTE teemadesse kaasata ja nende teadlikkust RTE valdkonnast suurendada.

Rahastamine. Sidusrühmad näevad selge väljakutsena ka ühtlase või suuremahulise rahastamise puudumist. Samas ollakse teadlikkud, et ühiste eesmärkide seadmise, teekaartide ja projektiplaanide ning tasuvusarvutuse toel on võimalik väliste fondide ja Euroopa Liidu rahastust taotleda ning seda ühiselt efektiivselt rakendada.

Valmisolek regionaalseks koostööks. Kõik piirkonna riigid on samal tehnoloogilisel tasemel ja neil on ühine arusaam sihtolukorrast. Nad on valmis koostöövõimalusi kaardistama ning koostöövõrgustikuna infovahetust, parimate praktikate vahetust ning ühiste projektide võimaluste kaardistamist tegema.

RTE valdkonnad

E-arveldus ja e-arved on kõigis vaadeldud riikides kõige arenenum. Erilist huvi tuntakse PEPPOLi laiema kasutuselevõtu ja edasiarendamise vastu.

E-kviitungi arendamine on e-arvete lahutamatu osa ja prioriteet mitmele riigile.

E-KYC on enamasti seotud pangandussektoriga. Tulevikus nähakse seda aga usaldusväärsete ärisuhete tagamise võtmeelemendina erasektori ettevõtete endi vahel.

Automatiseeritud ja reaalajas andmepõhine aruandlus on tihedalt seotud eesmärkidega suurendada maksutulu ning samal ajal lihtsustada aruandlust ja vähendada halduskoormust. Pikemas plaanis aitab reaalajas andmete lugemine ja esitamine nii riigil kui ka ettevõtetel paremini oma hetkeolukorda ja mahte kaardistada ja prognoosida. Kui andmeturvalisus on tagatud, saavad ettevõtted infot edastada kartmata selle väärkasutust.

Reaalaja tarneahelad ja e-CMR lahendavad eeskätt tootmis-, kaubandus- ja logistikavaldkonna äriprotsessidega kaasnevate aruannete ja dokumentide digitaliseerimist, andmete vastastikku kättesaadavaks tegemist ning riigile ja pädevatele asutustele vajalikul hetkel ilma täiendavate operatsioonideta andmete esitamist või kuvamist. Selle teenusgrupi jaoks on kõige olulisemal kohal just piiriüleste sektoritevahelise RTE rakenduste ning muude toetavate e-valitsemise lahenduste olemasolu.

Reaalajas tooteinfo ja e-kataloogid on olulised reaalaja tarneahela võimaldajad. Samas on need olulisel kohal ka jätkusuutlikkuse aruandluse ja keskkonnajalajälje, digitaalsete tootepasside ja tarneahela analüüsi kontekstis. on kõigis vaadeldavates riikides rakendatud, kuid vähem kättesaadavad erasektoris. Tarneahela lahendused on hajutatud ja ei pruugi olla partnervõrgustikes rakendatavad, eriti kui need kombineerivad erinevatest riikidest pärit infovooge või kasutajaid.

Keskkonna- ja jätkusuutlikkuse aruandlus ning sellega seotud teenused on aina kasvava tähtsusega, mistõttu nende lahenduste integreerimine suuremasse RTE pilti on äärmiselt vajalik.

Teised lahendused ja toetavad rakendused. RTE arendus on tihedalt seotud e-ID, digitaalse rahakoti, X-tee-laadsete struktuuride ja ühekordse esitamise ehk „once-only“ põhimõtetega.

Peamised järeldused piirkondliku koostöövalmiduse kohta

Peamine eesmärk on kasutada naabrite lahendusi uhkusega ja luua koos uusi, et riigid ei teeks sama tööd erinevates kohtades samal ajal. Regioonina koos töötades, suheldes ja innovatsiooni luues kasutatakse ressursikogumit palju efektiivsemalt. Iga riik saab töötada mõne olulise elemendi/ploki kallal, mida kõik saavad kasutada. Seejuures on oluline rakendada intellektuaalomandi ja IT-õiguse parimaid praktikaid, et toetada juba väljatöötatud komponente.

Edukas piirkondlik koostöö saaks põhineda järgmistel seisukohtadel:

Mõtteviis: Usaldus on võti. Reaalajamajanduse arendamine võib tunduda tehnilise algatusena, mille eesmärk on luua ühtsed standardid, infrastruktuur ja tehnilised reeglid. Praktikas näeme seda ennekõike mõtteviisi muutusena, mis põhineb ennekõike usalduse loomisel valitsuse ja erasektori ning kodanike) vahel, et kõrvaldada hirmu digimaailmas vigu teha.

Mõtteviis: liivakasti (sandbox) lähenemine. Usaldus on selgelt seotud teise mõtteviisi nihkega: agiilne mõtlemine, mis teeb võimalikuks liivakasti lähenemise ja uute tehnoloogiate kiire testimise.

Oluline on luua protsessi paindlikkus ülesannete kontseptsiooni tõestamiseks ja koolitada õigusvaldkonnas tegutsevaid tiime peamiste õigusprobleeme tuvastamiseks sellistes tehnoloogiaprojektides nagu liivakasti juurutamine, standardite testimine, häkatonid ja piiriülesed piloodid ja katsetused.

Koostöö: ühine koostöö rahastuse taotlemisel ja fondide kasutamisel. Riigid peavad alustama koostööd juba piiriüleste RTE-ga seotud algatuste rahastamistaotluste koostamise ja esitamise hetkel, et tagada piisav rahastus.

Koostöö: laiem sidusgruppide võrgustik. RTE lahenduste arenduseks ja kasutuselevõtuks on oluline arendada ja kaasata RTE sidusgruppide võrgustikku. Lisaks avaliku ja erasektori esindajatele peaksid sellesse kuuluma ka omavalitsused ja akadeemiline sektor. Samuti on RTE teemad ja koostöövaldkonnad tihedalt seotud targa linna algatustega, targa liikluse ja tööstuslahendustega, kuigi need otseselt ise RTE teenusteks ei liigitu.

Teadus ja innovatsioon. Rohkemate ja koordineeritumate uurimisrühmade kaasamine RTE teemade uurimisse nii teadus- kui rakendusuuringute valdkonnas, nii siseriiklikult kui rahvusvaheliselt. Teemad, mida on vaja uurida, on seotud nii protsessi- ja andmeanalüütika, tasuvus- ja mõjuanalüüside, õigus-, poliitikakujundamise- ja sotsiaalteaduslike aspektidega. Lisaks on suuremas mahus tarvis RTE arenduste planeerimise juurde hea tehnilise ja mitmekesise IT, andmeteaduse, koostalitlusvõime, semantika, plokiahela, hajussüsteemide, küberturvalisuse eksperte, kes uutele nõuetele vastavaid lahendusi planeerimisse ja arendamisesse panustada suudaksid.

Koostöö: laiem RTE teemade teavitus ja infoväli. Ressursiprobleemi ja võimalike muudatuste lahendamiseks on oluline mitte ainult uutele ametikohtadele ja projektidele piisava rahastuse tagamine, vaid ka uute sidusgruppide kiire kaasamine RTE teemadesse. Käesolev aruanne on seejuures kasutatav RTE teemade sissejuhatuseks mitmetele alustavatele või kaasatavatele sidusgruppidele: ametnikele, teistele avaliku sektori esindajatele, ettevõtetele, erialaliitudele ja ka ülikoolidele või teistele haridusasutustele, kes soovivad lisada RTE teemasid oma koolitus- või tegevuskavadesse.

Kokkuvõte

Läänemere piirkonna vaadeldud riikides on olemas kõrge valmisolek leida koostöövõimalusi, leppida kokku ühistes valdkondlikes koostööprioriteetides ning töötada välja ühine teekaart. Erinevad avaliku ja erasektori sidusgrupid on valmis kaardistama võimalusi lähemaks koostööks erinevates kasutajate kaasamise, õigus-, juhtimis-, innovatsiooni- ja tehnoloogiavaldkonda koordineerimises, aga ka erinevate valitud ehitusplokkide koostöö planeerimises või arenduses, eelistades seejuures „kiireid võite“ võimaldavaid projekte. Aruanne teeb ülevaate erinevatest projekti teemavaldkondadest lähemalt ning aruande lisad sisaldavad täiendavat taustamaterjali ja kogutud sisendit.

Läbiviidud töö ja aruanne aitavad otseselt kaasa järgmistele projekti etappidele ja eeldatavatele tulemustele: ühine visioon koos teekaardiga RTE teemade koordineeritud prioriseerimiseks ja lahenduste arendamiseks Läänemere piirkonnas, RTE valideerimismudel uuenduslike algatuste/teenuste jaoks. Tehtud töö tulemused on olulised piiriülese andmevahetuse e-kviitungi teenuse mudeli väljatöötamisel.

Käesoleva aruande eesmärk on olla töövahend ja lugemismaterjal nii uutele poliitikaametnikele ja analüütikutele, kes liituvad RTE projektidega avalikus sektoris, sidusrühmade esindajatele erasektoris või erialaühendustes. Samuti teistele teemaga tegelevatele ekspertidele või teadlastele, toetavatele spetsialistidele (näiteks juristid, lahenduste disainerid ja arhitektid, kaasatud kommunikatsioonimeeskonnad), kes osalevad RTE arendustöös.

Table of Contents

Introduction

Background

Real-Time Economy, the digital, seamless and once-only-principle-led reporting and business operations supported by government services, is an emerging term to describe the **business-centric reporting and data exchange** between the businesses and government, as well as between businesses in an organised and **structured, trusted and secure** manner.

The government and Real-Time Economy communities in the Baltic Sea Region are on their path to discovering and applying SME-centric development of Real-Time Economy solutions. They also work on aligning cross-border approaches to implementation policies as well as possible harmonisation of standards. Such a common approach would allow the creation of a favourable regional operational space for SMEs and IT service providers who operate in several or possibly all countries in the region. Second, working in a coordinated way would help the governments to save both human and financial resources in preparatory works and analysis of possible solutions to the challenges of the Real-Time Economy and create a feasible set of regulations, standards and support measures.

Baltic and Nordic cooperation being brought together

Estonia, Latvia, Lithuania, Poland and Finland, Sweden and Denmark have set a high priority on Real-Time Economy – mostly nationally and with priorities on various topics in comparison to the others. In the background, international cooperation is maintained. However, the current experience of cross-border cooperation has often been based on projects and networking in the Baltic space or the Nordic space, followed by planning cooperation at the European level. The step in between, as supported by the current project, would be to merge and exchange best practices between the two spaces with each other, reflect the extendibility and enable learning from each other prior to developing new solutions, projects, legislation or standards.

Added value for the whole European community

Real-Time Economy strongly contributes to green transition, sustainability and competitiveness, digital agenda and efficient business, both in the Baltic Sea Region and in the European Union in general.

The European Commission, namely DG REFORM, has set a high priority for addressing regional Real-Time Economy challenges. It is looking forward to the replicability and extendibility of the best practices of the Baltic Sea region, the assessment of strong competencies and best practices, review of possible cooperation structures and networking principles. The work consists of different elements – trust, security, engagement and direct benefits for businesses, bigger and smaller corporations.

Key building blocks

Real-Time Economy building blocks should aim at creating a better business environment, increasing competitiveness and allowing business operations across borders in a harmonised and smooth manner. In exchange for onboarding digital solutions and contributing to policymaking, businesses are to expect favourable, trustworthy and organised digital services. In return for supporting the digitalisation efforts, the solutions would allow data gathering and improve data-driven decision-making both nationally, regionally and at the EU level. Together, secure and trustworthy digital services can be established for SMEs and consumers who might not necessarily be the pulling partners of the decisions or standards but are the ones who would benefit most from the harmonised cross-border approach. This approach will support conducting business and private transactions both in the country of origin and the destination country.

The building blocks that have a key role in further RTE development are **e-invoicing, e-receipts, digital product catalogues, know-your-customer (KYC) services, e-procurement, digital road transport waybills (e-CMRs), digital supply chain services.** We also look into an emerging topic of sustainability reporting.

Analysis domains

We analyse potential opportunities and key strengths in operational, technological, legal and governance domains. We see existing gaps not as a hindrance, but as a space for regional development.

Community engagement as a key enabler

Community engagement is a key enabler for continuous joint RTE development. We can already see a strong foundation for the cross-border RTE community consisting of representatives from government, business and academic sectors that are ready to seek options for the exchange of best practices and engage in practical joint activities. Real-Time Economy is not only a national effort. It requires strong networking with the aim of cross-border applicability in mind.

Analysis of the current three regional internal cooperation and operating spaces (Estonia-Finland, Nordics and Baltics with Poland) shows that their existing cooperation channels and network capacities make them ready to expand cooperation at the wider regional level.

Purpose of the report

The current report can serve as an onboarding tool and gathering of the most relevant statements on best practices and readiness of the observed countries regarding joint actions on Real-Time Economy strategy, building block development and cooperation.

1. Scope of the report and methodology

The current chapter introduces the project and its timeline as well as the methodology of the actions taken for the report.

1.1. Project and timeline

The report is prepared as a part of the project "Supporting productivity and competitiveness of Estonian SMEs through real-time economy and single contact point digital solutions". The project aims to address these problems by observing and suggesting how to apply wider usage of Real-Time Economy principles within the Baltic Sea region, by mapping existing and developing building blocks, priorities and best practices in the region and observing countries to lay out a selection of possible common goals and actions. In the long term, the project can support new common data standards in order to create efficient and automated business processes, and machine-readable data exchange, which will increase the use of the once-only principle in the public sector and make it easier to build new business models based on data sharing.

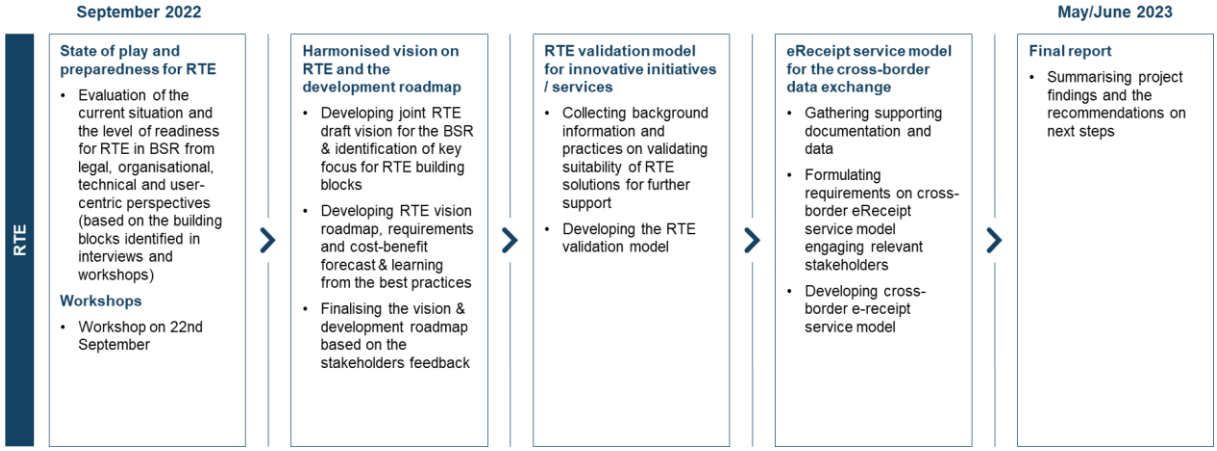
The project addresses key challenges of the public sector and enterprises:

- Various administrative operations and financial transactions are performed manually,
- Companies are struggling with paperwork congestion,
- Cross-border processes are obstructed,
- Use of public services and fulfilling obligations set by the state creates an additional administrative burden.

Project stages, as aligned with the beneficiary, consist of state of play analysis, harmonised vision on RTE and development roadmap, as well as creation of RTE validation model for innovative initiatives/services. As a case study, an e-receipt service model for cross-border data exchange will be developed.

The project's expected duration is from June 2022 until June 2023. See the project outline line in Figure 1.

Figure 1. Project outline/components on RTE

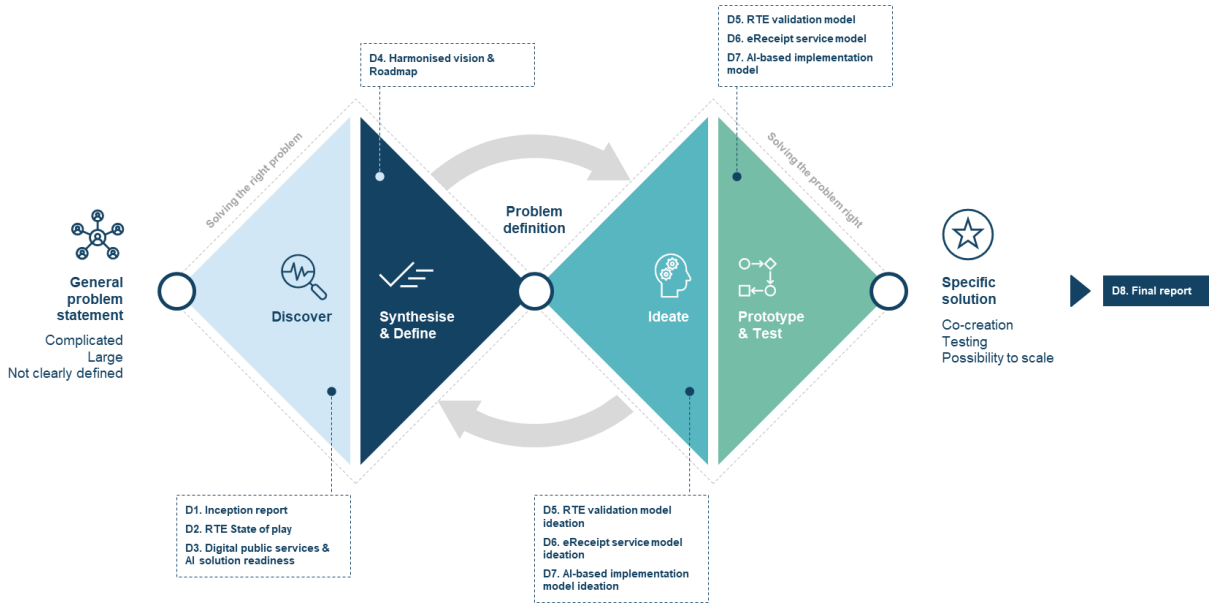


1.2. Design thinking approach across the deliverables

The project methodology includes action steps to collect input, strengthen stakeholder engagement and contributions, prepare and conduct a workshop, and prepare and present deliverables, following a **design thinking approach.** The co-creation work is based on the **Double Diamond methodology** – the design process model formulated by the British Design Council and widely used worldwide since 2005 to support the design thinking process in various disciplines.

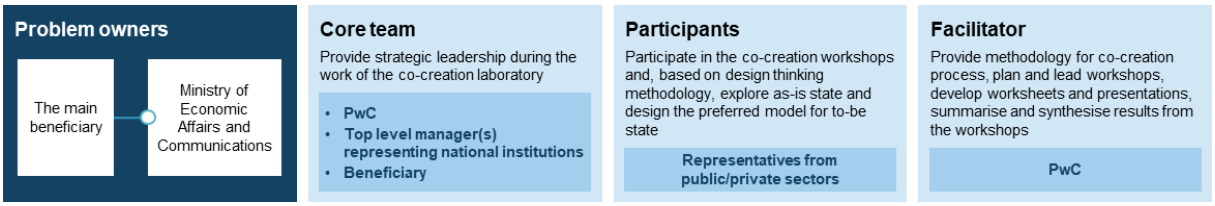
The design thinking process is divided **into two "diamonds ": (1) to find the "right problem" and (2) to solve it in the "right" way**. Throughout the Project, we will sequentially go through four stages of design thinking and engage stakeholders in the co-creation process.

Figure 2. Design thinking approach



Co-creation workshop approach. We involve stakeholders with different roles and responsibilities who actively support the development of RTE and have a mutual vision for the strategic and operational aspects. We have followed this organisational setup that will include delegated representatives from respective institutions.

Figure 3. Co-creation workshops: participants



For the RTE workshop, we prepared a preliminary analysis and developed initial proposals. Participants then contributed their insights from the user perspective and got engaged in analysing issues and validating hypotheses. In the co-creation work, we used a Mural ideation board for the group work as well as Microsoft Forms for submitting individual assignments.

1.3. Scope of the of the state of play and preparedness for RTE report

The current report serves as a state-of-play review of RTE in the observed countries. For compiling such a review, the team gathered relevant RTE documents, studies and legal documentation and reviewed

the priorities stated there, gathered information and insights through stakeholder interviews and an ideation and reflection workshop.

The current report serves as a state-of-play review as well as an input to next-step activities and reports.

Firstly, the work done in preparing the current report serves as input for **"Harmonised vision and a roadmap for the development of the RTE in the Baltic Sea region."** The report aims to combine national approaches into **a harmonised cross-border vision and roadmap for the Baltic Sea region countries**, covering aspects of e-invoices and e-receipt developments, automated real-time reporting, real-time product information, KYC automation, e-CMR, real-time e-procurement and real-time supply chains. After completing the as-is analysis, we aim to **formulate a clear draft vision for SME-centric RTE and the Baltic Sea region (considering building blocks of interest).**

Second, the current report serves as input to **"Report on an RTE validation model for innovative initiatives/ services**", which goal is to create a model that validates whether project ideas are RTE-related and how they can contribute to the RTE development in the Baltic Sea region.

Last, the report contributes to **"Report on an e-receipt service model for the cross-border data exchange",** with an aim to define a possible cross-border service concept for the public and private sectors that would cover different regulatory, technical and institutional aspects of introducing cross-border and interoperable use of e-receipt from the points of view of both the enterprises and citizens.

1.4. Analytical framework

We apply **PwC Analytics & AI transformation framework** in this project. The framework has the following domains: Organisation, Culture & Talent; Legal, governance, security & privacy; Operational environment; User-centred design; Technology & Infrastructure, Innovation; Processes & Integration.

Organisation, Culture & Talent

We analyse the stakeholder network and confirm the final list of stakeholders to be involved in the active analysis of the current RTE state of play. We look into collaboration approaches within the RTE ecosystem, as well as investigate current challenges associated with resourcing and upskilling.

Key themes:

- Key existing and lacking competencies for RTE development.
- Expectations from the cooperation in the Baltic Sea region (priorities and cooperation methods).
- Current main cooperation channels and partnerships.
- Involvement of the private sector in RTE development.
- Other key stakeholders/ contacts in the country we could approach on those topics.
- Experience and expectations from the EU level cooperation and support.

Legal, governance, security & privacy

We look into key legal concepts behind the regulation of RTE, existing regulatory aspects and approaches to the legislative proposals. We also investigate ethical considerations behind the further development of RTE.

Key themes:

- National legislative framework (data privacy, consumer protection, competition law and other considerations).
- Ethical challenges and considerations.
- Needs for legislative changes to facilitate RTE development.
- Governance framework on the Baltic Sea region level.

Operational environment

We analyse current RTE projects and initiatives, as well as look into processes for piloting new RTE solutions and related technological development.

Key themes:

- Current RTE projects, initiatives and research: key achievements and challenges.
- Existing processes for piloting RTE solutions.
- Mechanisms for selecting innovative solutions for further support and testing.
- Best practices from the country's RTE projects to share with other Baltic Sea Region countries.

User-centred design

We develop personas that help us to analyse the strengths and challenges of the RTE state of play in more detail from the perspectives of government, business and consumers.

Key themes:

- User needs and expectations.
- Changes in user behaviours.
- Potentially overlooked user needs.

Technology & Infrastructure, Innovation

We look into current challenges and strengths from the perspectives of cross-border data exchange, interoperability and technical standardisation.

Key themes:

- Potential quick wins.
- Current and upcoming pilot and proof of concept projects.
- Technical preparedness for the cross-border data exchange.
- Technical support needed.
- Existing technology building blocks for a cross-border economic model.
- Digital ecosystem to support cross-border cooperation.

Processes & integration

- We identify and analyse current processes of collaboration, communication and piloting new solutions and recommend ways to improve them.
- We do not present processes & integration as a separate chapter of the report, but we analyse processes & integration questions under each of the other domains listed above.

1.5. Methodology frameworks for stakeholder engagement and interviews

We engaged all relevant stakeholders in state-of-play analysis to determine existing challenges and preparedness for RTE solutions. We will further involve them in the development and harmonisation of the common vision and roadmap of RTE in the region.

We used the following approaches to engage stakeholders through the project:

- Interviews that worked as two-way stakeholder engagement sessions.
- Workshop including the individual assignments, presentations and group ideation work.
- Set up a LinkedIn group for RTE Community for distributing the RTE content among stakeholders.
- Creating a foundation for informal networking that can continue after the completion of the project.

The interviews covered the following groups of topics: a) Background of RTE for participating countries, b) User experience, c) Organisation, Culture and Talent, d) Operational environment of RTE, e) Legal, governance, security & privacy, f) Innovation and technology: current situation and plans g) Expected outlooks and regional cooperation. The sample of the interview comprised 16 organisations from the private and public sectors.

1.6. Building Blocks in the current report

We analyse the following building blocks: e-invoicing, e-receipts, e-CMR, real-time product information, automated and real-time reporting, automated KYC services, real-time e-procurement and real-time supply chains. We have presented the RTE building blocks to the RTE workshop participants in the following way:

Figure 4. Building Blocks of the current Project

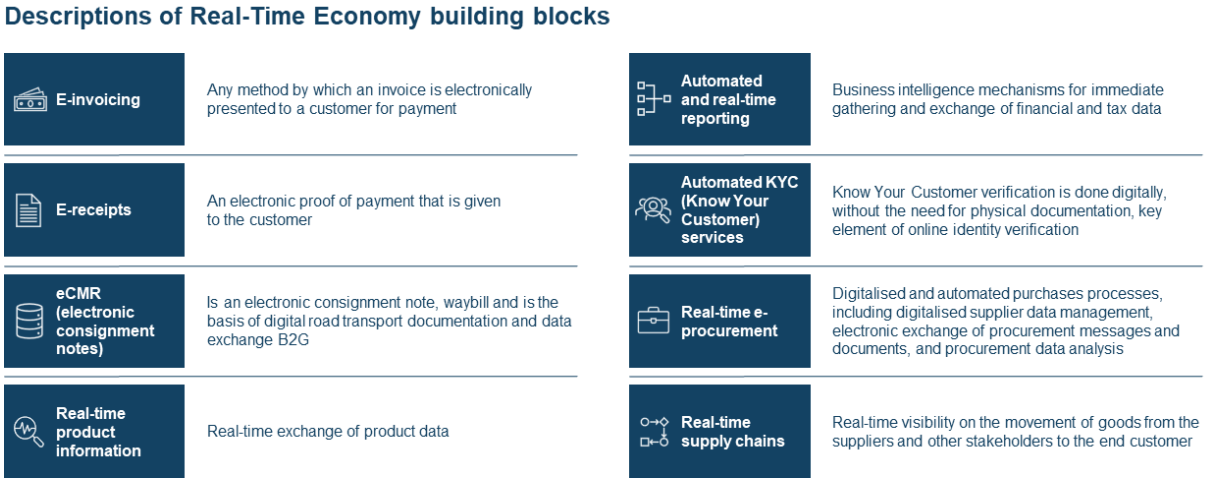


Table 1. Building blocks and definitions

Building blocks	Description
e-Invoicing	Any method by which an invoice is electronically presented to a customer for payment, functioning in a machine-readable format-based information system exchange
e-Receipt	An electronic proof of payment that is given to the customer
Automated and real-time reporting	Business intelligence mechanisms for the immediate gathering and exchange of financial and tax data
Real-time product information	Real-time exchange of product data, in many cases a digital product catalogue, e-catalogue
Automated Know Your Customer (KYC) services	Know Your Customer verification is done digitally, without the need for physical documentation, the key element of online identity verification of identities and track record of customers to a service
Real-time e-procurement	Digitalised and automated purchases processes, including digitalised supplier data management, electronic exchange of procurement messages and documents, and procurement data analysis
Real-time supply chains	Real-time visibility on the movement of goods from the suppliers and other stakeholders to the end customer
e-CMR	An electronic consignment note, waybill and is the basis of digital road transport documentation and data exchange in B2G (business-to-government)

1.7. Building Block Priority/Maturity map

We provided each country with a list of questions to address in the country-specific presentations and a template to self-declare the priority and maturity of the RTE building blocks mentioned above.

Figure 5. RTE Building Block Priority/Maturity template[1]

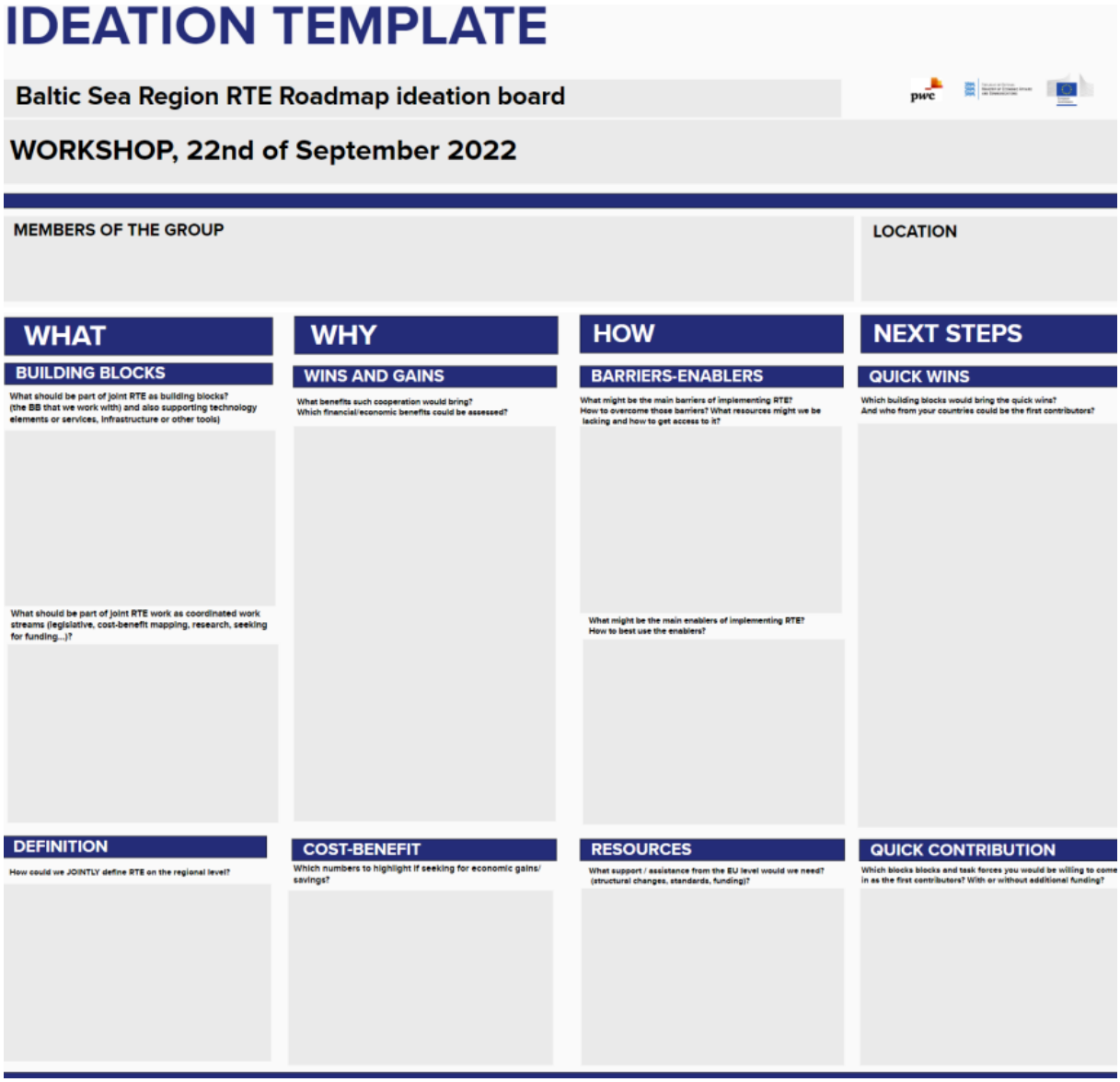
1.8. RTE Roadmap vision ideation sheet template

During the workshop, we used the **Roadmap vision template,** which we developed for the particular use case based on the vision roadmap ideation board prepared for e-CMR roadmap studies[2] by the e-FTI Experts Team.

The Roadmap vision template answers four key questions: **What? Why? How? Next steps?**

[1] Specially developed for the current project.
[2] Project website: https://www.singlewindow.ee/ecmr

Figure 6. RTE Roadmap vision ideation sheet template[3]



The vision ideation worksheet was completed in MURAL[4] online co-working space.

1.9. Personas

We introduce the personas to support the illustration of the use cases. We will use the same personas throughout the project. We might add additional personas during the project.

We use multiple personas that represent the needs, expectations and challenges of the government representatives, businesses and end consumers. Below we show a short summary of the personas.

- **Maria** – an entrepreneur
- **Heidi** – Maria's grandmother
- **David** – an authority officer, specialising in legislation and data standards needed for e-receipt application

[3] RTE Ideation worksheet, developed based on the e-CMR roadmap studies template, www.ready4eFTI.eu
[4] Mural.co, https://mural.co/

- **Jane** – an officer responsible for RTE implementation and yearly goal setting in the Ministry
- **Martin** – a business owner of an IT service and platform provider
- **Thomas** – a legal officer
- **Andrea** – a researcher at the university
- **Mary** – a tax lawyer in an accounting company
- **Hanna** – a semantic interoperability, data modelling, process mapping and e-ID expert
- **Peter** – vice-chancellor in the Ministry of Economics
- **Olav** – industry owner in chemicals and oils
- **Tom** – a consultant in an international consulting company
- **Gertrud** – a senior developer and team lead in KYC and e-service company

User Stories of the Personas:

Maria is an entrepreneur who is running her own business producing environmentally friendly cosmetics (soaps and face care products). She uses an e-invoicing solution to send invoices to her clients. In her free time, she is actively using digital applications to track her purchases and diet to become more environmentally friendly. She is based in Estonia and is actively visiting Finland. In Finland, she visits a big grocery store chain and gets e-receipts directly to her mobile phone application in order to analyse her carbon footprint.

Heidi is Maria's grandmother. She is not proficient with modern technologies such as e-invoicing. She is used to visiting a bank office in person. She asks her family members for help with paying paper invoices that she receives by mail.

Jane is an officer responsible for RTE implementation and yearly goal setting in the Ministry. Jane has recently started her role in the RTE team. She graduated with a master's degree from the business school in 2016 and did not study RTE back then. It is quite a new domain for Jane.

Martin heads an IT service and platform provider company based in Europe. The service has to combine product orders, e-invoices and transport documents, the latter being obligatory to be made visible to competent authorities. The company is present in one European country but would like to extend its solution to cover new national markets.

Thomas is a legal officer and assists Jane's RTE team with data protection and legal compliance matters (e.g., contractual review) related to RTE projects. He has not previously worked with RTE topics as he advised on data protection matters for more "traditional" fields. Thomas is a bit sceptic about the risks associated with RTE pilot projects and the limitations that GDRP might bring.

Mary is a tax lawyer in an accounting company helping clients with VAT and e-invoicing matters.

Andrea is a researcher at the university able to contribute to cost-benefit analysis or stakeholder studies. However, Andrea has no funding. Her department manager is asking whether there is any money or academic research potential in that topic to allow the allocation of Andrea's time to the events and studies.

Personas that we will use in further RTE reports:

David is an authority officer working on the legislation and data standards required for e-receipt application. David would particularly benefit from cross-border peer support as he has long worked on data semantics. David has recently been transferred to RTE from internal security interoperability affairs.

Hanna is a semantic interoperability, data modelling, process mapping and e-ID expert, who works in the state information office and knows nothing of the building blocks' potential, she is working with RTE, as she has no knowledge of what business-to-business information flow in the services or goods industries and supply chains really looks like.

Peter is a vice-chancellor in the Ministry of Economics who needs to make decisions on action priorities, Memorandum of Understanding (MoU), ministerial meeting priorities, financing of initiatives and co-financing of cross-border projects (writing and co-financing). Peter is also responsible for opening conferences and delivering priority speeches on the topic.

Olav is an industrial owner in chemicals and oils, having operations in nearly all countries. He is currently deciding upon switching ERP and accounting software providers.

Tom is a consultant in an international consulting company. Tom travels a lot and has to claim travel expenses on the regular basis. For each travel, he spends more than 30 minutes preparing the travel expense claim (gathering and scanning paper receipts, as well as entering manual descriptions on the content of the receipts).

Gertrud is a senior developer and team lead in an ICT company, representing developing KYC and e-service catalogues, has an extensive working experience with ERP integrations and represents her 2000-person company in the board of the ICT association.

2. Real-time economy (RTE) concept in the Baltic Sea Region

The current chapter introduces the Real-Time Economy concept and indicates the slight differences across the observed countries.

The term Real-Time Economy (RTE) means the digital, seamless and once-only exchange of business data and seamless submission of government reporting,

The first ones to use the term were Finnish and Estonian ICT communities. Even though the term has not been consistently in use across the region, it has proven to provide the most illustrative description of the concept. For example, terms such as digital government or digital economy, silicon economy or smart government are narrower and fail to show the business centricity of the RTE development goals.

The RTE goal is to be a booster for businesses and the economy whilst the government can deliver supportive functions via regulations or technical tools. At the same time providing better services allows for reducing the administrative burden of the companies, as well as reaping the benefits of visibility, transparency and detection of fraudulent actions.

* The concept of RTE has been initiated by Finland and then taken up by Estonia.

* The term has been picked up and can be used by Latvia, Lithuania and Poland as these countries have not yet come up with their own umbrella term to cover RTE development.

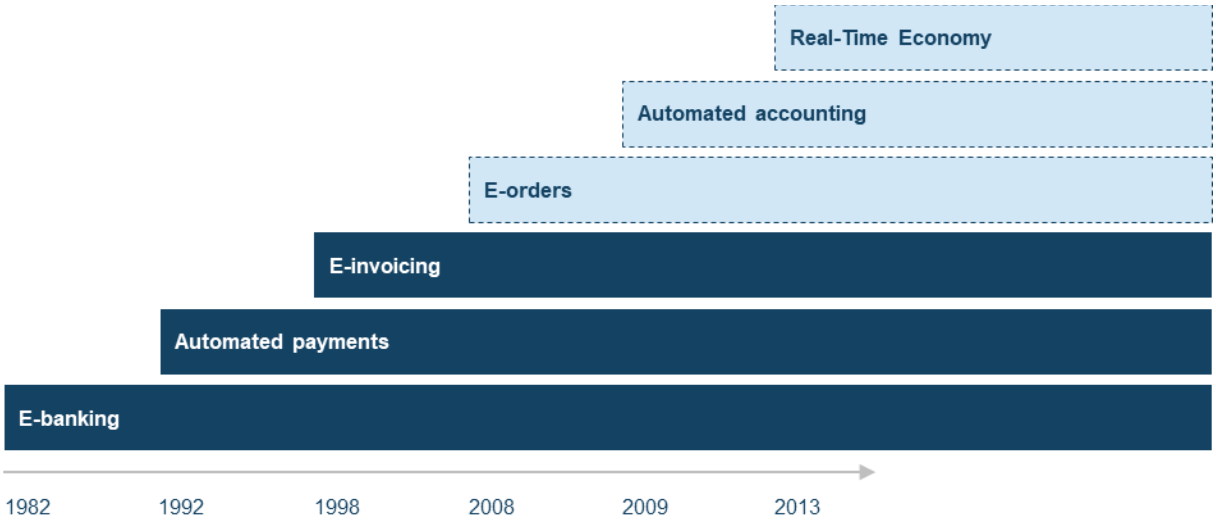
* The term can be also used across the Nordics to illustrate a wider approach to RTE development. Terms such as “smart government”, “business reporting” or “Nordic Smart Government and Business” can be used in connection with existing projects under the RTE umbrella term.

2.1. Real-Time Economy concept

The term “Real-Time Economy” was initiated and taken into use as an umbrella concept for digitalisation and automation of reporting and orchestration of integrated processes around business actions with the purpose of seamless, real-time data and information exchange between businesses and government.

Esko Penttinen, one of the first Real-Time Economy experts from Finland, pioneered in the region in identifying key RTE building blocks and pathways to RTE application already back in 2008. With e-banking as a foundational block, followed up by automated payments, e-invoicing, e-orders and automated accounting in place, finally, Real-Time Economy could be reached.

Figure 7. Steps on the way to the Real-Time Economy[5]



Full application of RTE would mean that all transactions are digital, automatically generated and completed in real-time.[6] Provided support structures and applications for Real-Time Economy include various processes that simplify everyday transactions of entrepreneurs. Such processes include the easy digital signing of agreements; joint use and delivery of e-documents; moderation of registering and upgrading orders; real-time credit or company record availability; real-time accounting and real-time reporting.[6] In addition to that, online and effortless procedures for establishing or editing company details, user-friendly online submission and application for licences, accessibility to public registries, electronic submission of annual reports, standards-based and widespread use of digital signatures, e-seals and e-stamps support the application and evolution of RTE. While those solutions become more and more integrated, interoperable and automated, further steps in real-time interaction between databases, processes and systems can be launched nationally and at the cross-border level to digitalise the whole supply chain.

The digital application of invoicing, issuing of receipts/documents of commercial actions or submission of reports functioning seamlessly between businesses allow real-time information flow and immediate reflection of accounts. The availability of records and statuses both on private and public databases allows immediate validation of business entities and their activity statuses providing certainty. RTE itself is based on a high level of trust and transparency. Successfully implemented RTE solutions have a huge potential to provide trust to the operators, businesses and governments.

RTE will give companies more possibilities to run their business in a fully digitalised environment supporting their digitalisation processes in other domains, such as digital steps taken in production, planning or logistics operations. Additionally, the availability of RTE solutions "supports companies' transition to fully digitalised and automated financial administration" [7], allowing accounting and financial management to reap the benefits of paperless options, real-time visibility and instant reporting insights.

RTE aims to support productivity, minimise costs and waste on paper-based processes, lower the amount of waiting time, and allow reduction of financial, operational and labour costs. The vision of the Nordic Smart Government and Business project underlines the same – "to create value for the SMEs by making real-time business data accessible and usable for innovation and growth across the region, in an automatic, consent-based and secure manner".[8]

[5] Original RTE building blocks, http://epub.lib.aalto.fi/pdf/hseother/b95.pdf

[6] Finnish Technology Industries, https://teknologiateollisuus.fi/fi/node/3224

[7] Finnish State Treasury, https://www.valtiokonttori.fi/en/service/real-time-economy/#finland-to-become-a-forerunner-in-real-time-economy

[8] Nordic Smart Government and Business, https://nordicsmartgovernment.org/

The Real-Time Economy concept has been approached from different angles (based on an academic literature review of more than 300 academic articles conducted during an RTE concept and application study of 2019 by TalTech[9]):

- **Financial and accounting perspective**, that focuses on the benefits of one single business entity from the RTE application.
- **Network of businesses perspective,** that focuses on the benefits of savings via integrated systems and information exchange in networks of businesses.
- **Extended business benefits from a government inclusion perspective,** that takes into account public benefits as well as government-led priorities supporting the businesses and competitiveness of the economy.

Below we provide a mapping of analysis perspectives with motivation elements.

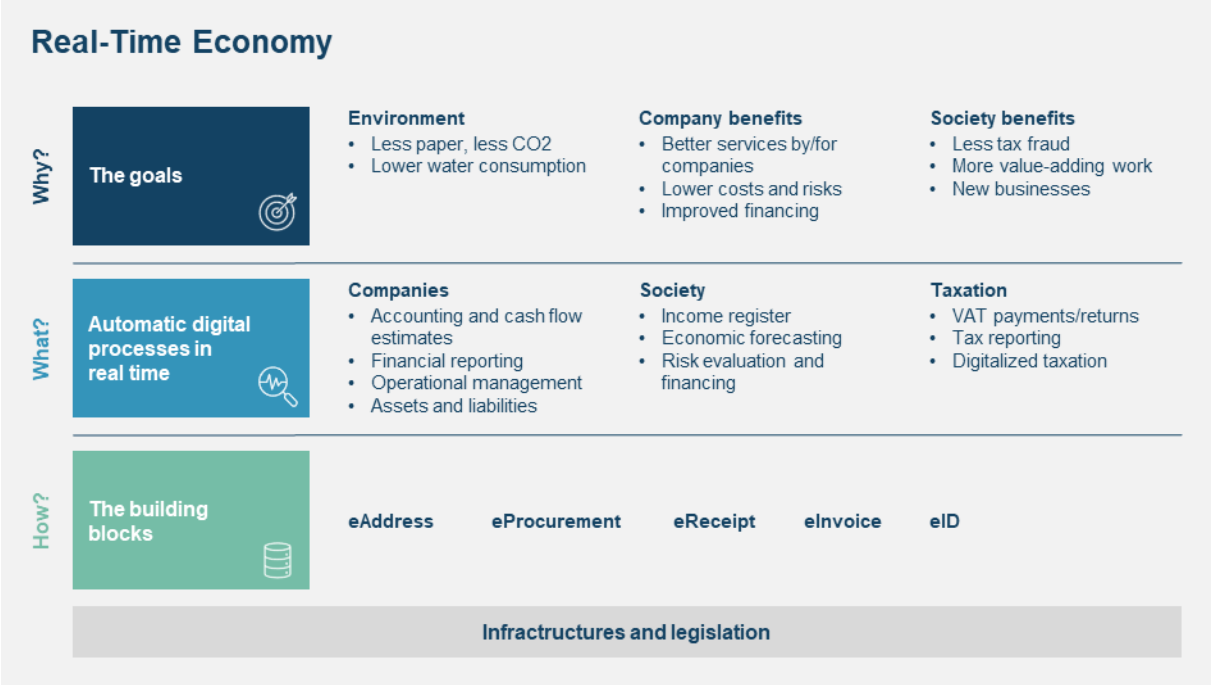
Table 2. RTE levels

Perspective	Level	Motivation elements (examples)
Financial and accounting	Enterprise level	Acceleration of organisation and gathering of business financial data, acceleration of business processes, savings on working hours, facilitating information gathering on business and financial operations
Network of businesses	Supply chain level	Seamless exchange of financial data and records, reduction of time on accounting and order information exchange, business operations visibility
Ecosystem level	Businesses + Government level	Government-supported exchange of financial and business data within supply chains, reporting to the government seamlessly and based on harmonised standards. Additionally, value-added services can be set up to serve both public and private sectors, as the availability of such services encourages the production and exchange of quality data as well as increases the motivation for the development of RTE services

From the associations' side, the Technology Industries of Finland has summarised the RTE concept by addressing the **main questions of RTE: Why, What and How** (see Figure 8)**.**

[9] Access report, https://realtimeeconomy.ee/sites/default/files/2021-12/taltech_rte_lopparuanne_ee.pdf

Figure 8. Nordic conceptualisation of RTE[10]



- In the "**Why"** dimension, the goals of the RTE are presented, from the perspective of the environment, company benefits and social benefits.
- The "**What"** looks into the automatic digital processes in real-time from three viewpoints: Companies, Society and Taxation.
- Thirdly, "**How"** incorporates the following building blocks: e-address, e-procurement, e-receipt, e-invoice and e-ID. Lastly, according to this framework, infrastructures and legislations are seen as horizontal processes and will be able to contribute to the development of all RTE building blocks.

The long-term expectation would be that the structure would work flawlessly just like e-government works in most European countries entailing seamless collaboration between government and citizens. This approach highlights that **Real-Time Economy should not be viewed solely from the perspective of financial benefits and direct time/cost savings**. There are also significant social benefits associated with **improving the mutual trust between government and businesses**, as it becomes easier for businesses to comply with their administrative burden.

The Nordic (Finnish) conceptualisation of the Real-Time Economy is defined through digital processes in real-time mainly for the businesses to run their operations more smoothly in support of the government services/enablers.

In the Nordic Smart Government and Business (NSG&B)[11] project, the main RTE building blocks are set across the following solution areas:

- Digital Business Documents and Product Information.
- Open Accounting and Simplified Reporting.
- Born Digital.
- Reliability and Data Quality.[12]

[10] Technology Industries of Finland,

[11] Nordic Smart Government and Business, https://nordicsmartgovernment.org/roadmap

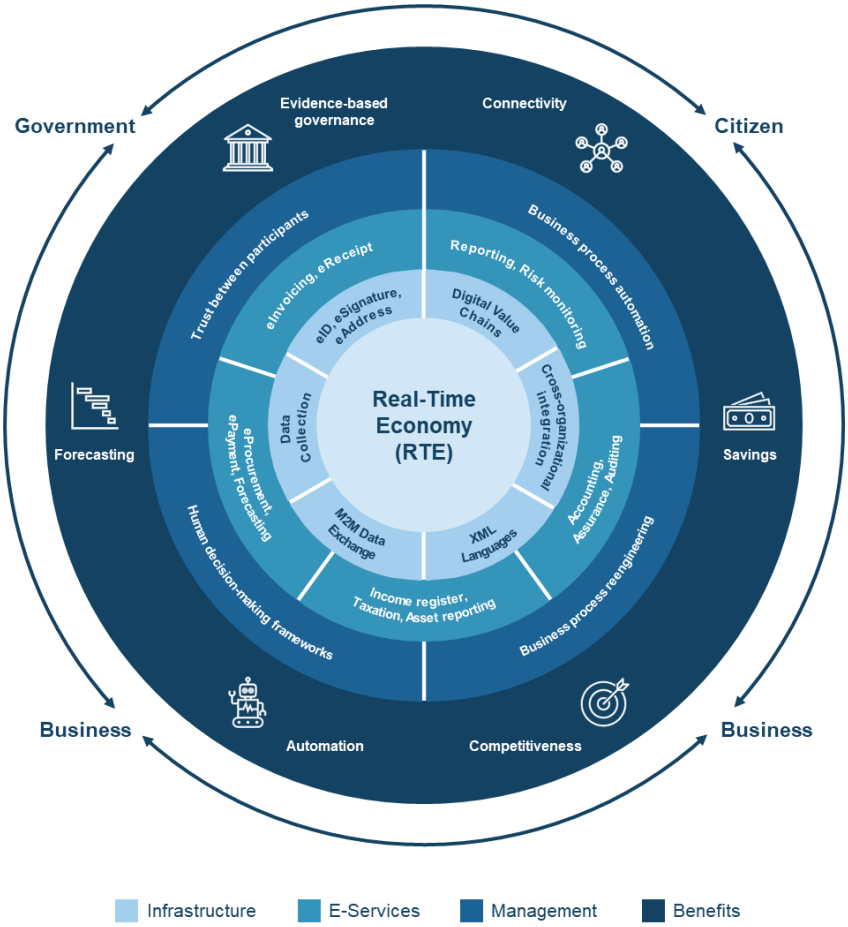
[12] https://nordicsmartgovernment.org/solution-areas

Researchers have proposed an integrated model for RTE digital ecosystem (see Figure 7). In this model, the RTE ecosystem builds on core enablers at three levels: **basic technological infrastructure, e-service layer and management layer**.

The model is encompassing the following elements:

a) RTE building blocks (the three internal layers in the figure below).
b) Benefits that RTE applications create (outer layer).
c) Stakeholders and interactions in the RTE ecosystem (the outer circle on the figure below).

Figure 9. Integrated RTE ecosystem model [13]



The core technological enabler for RTE is the collection and availability of structured digital data, which could be exchanged through machine-to-machine (M2M) communication seamlessly and without human intervention. M2M communication is facilitated by uniform and widely used data standards, which are not yet available for consistent use in the RTE domain. Digitalised value chains and cross-organisational integration constitute additional preconditions for RTE-based services, whereas generic digital infrastructure components, such as e-ID, e-signature and e-address, are also supportive building blocks, which enable fully digital and seamless transactions' implementation.

[13] Alishani, Olesk, Soe, Kadak & Krimmer, [to be published]

3. RTE in the region: playground

The current chapter introduces the current playground of the RTE actions in the region and documents some of the key projects and priorities the Baltic Sea region countries have taken.

The State of Art can be well observed throughout the documentation but is nevertheless scattered to several domains and groups:

- **The Nordic Smart Government and Business group** would hold strong to the government-led and government-coordinated strategic stream for RTE. However, they also understand the importance of a strong collaboration with the business stakeholders to onboard the best practices and co-create the best plans.
- **The Baltic countries – Estonia, Latvia, Lithuania** – would see a community-led cooperation network and projects to be the drivers behind the RTE development. They see the governments as project coordinators in the financing and policy evolution domains, whilst the potential developments, pilots and solutions could be run by the private sector.
- In **Poland**, the stakeholders and government representatives support government-led RTE development, based on getting well argument input on different improvement suggestions.

3.1. Real-Time Economy storyline in the Baltic Sea Region

The Real-Time Economy for cross-border use can be traced back to 2014 when the technology associations of Finland and Estonia (Technology Industries of Finland[14] and Estonian Association of Information Technology and Telecommunications (ITL[15]) signed **a joint Memorandum of Understanding** that also provided the first joint harmonised concept and some hints on the building blocks, mainly from the perspective of companies[16].

Around the same time, the concept has also attracted broader interest. Having RTE prioritised, the Finnish-Estonia technology associations started to collaborate also with the Latvian Information and communications technology association (LIKTA)[17]. The three technology associations also started a joint one-year Interreg project in 2016 (Internet of Business) to enable Real-Time Economy in the Baltic Sea Region. This later led to several projects tackling with Real-Time Economy in the Baltic Sea Region starting from 2017.

Studies and projects

A project covering cross-border e-government services and the Once-Only Principle – OOP[18] was also related to the RTE project. Namely, the **Once-Only Principle Project (TOOP)** was launched in January 2017 as an initiative of about 50 organisations from 20 EU Member States and associated countries. Its main objective was to explore and demonstrate the once-only principle on a cross-border pan-European scale, focusing on reducing the administrative burden of businesses.

In 2019, as part of Estonia's efforts to foster digital innovation in government and business, the Estonian Ministry of Economic Affairs and Communications commissioned a study to take a snapshot of the existing ideas and visions on RTE and to provide a basis for discussing possibilities for developing RTE in Estonia[19]. This study was the first exploratory attempt in Estonia to get a wide analysis of the RTE concept. The main aims of this inquiry were:

[14] Technology Industries of Finland, Association, https://teknologiateollisuus.fi/en
[15] ITL, https://itl.ee/
[16] Technology Industries https://teknologiateollisuus.fi/fi/node/3224
[17] LIKTA, https://likta.lv/en/home-en
[18] TOOP project, TOOP.EU | providing data once-only.eu
[19] Real-Time Economy Study, https://realtimeeconomy.ee/sites/default/files/2021-12/taltech_rte_lopparuanne_ee.pdf

- to learn how RTE is defined in academic literature and by the Estonian stakeholders.
- to map the expected benefits, drivers, enablers, barriers and potential risks of RTE solutions.
- to identify opportunities for Estonia to advance RTE and propose the first steps which could lead the way towards RTE.

The project had the following packages:

- Industry 4.0 – Digital Transformation of Industry.
- Digitalisation of cross-border G2B public services.
- Digital policy network for the Baltic Sea Region.

According to this study, 'Real-Time Economy" is defined as an emerging concept which refers to the idea of transferring standard business transactions and administrative procedures from paper-based human-to-human communication to digital, automated machine-to-machine data exchange. It promises various opportunities for saving time, money and human resources and for creating new economic value.

The study discovered that stakeholders' understanding of the benefits, building blocks and barriers of RTE largely correspond to the ideas put forward in academic literature. The RTE benefits are mainly associated with efficiency, acceleration of information and financial flows, and improved quality of decision-making. Estonia's high level of digitalisation and the recent emergence of key RTE enablers puts Estonia in a good position to advance RTE nationwide. In this context, the study identified three key areas in which RTE solutions have a high potential to yield savings and create benefits:

- Real-time accounting and reporting.
- Real-time economic forecasting.
- Real-time supply chains in business (in a particular industry).

Wider European collaboration project attempts

In 2017, there was also one attempt to bring the initiative to the European level with the involvement of key industry and research partners from 15 EU countries via putting together a proposal for Horizon 2020 funding. This consortium was led by the Danish Technological Institute and involved the mentioned three Estonia-Finland-Latvian technology associations (ITL, LIKTA and Technology Industries of Finland). It also included other key partners from Europe like Fraunhofer in Germany, IBM Denmark, Invinet Sistemes, Internet Institute of Slovenia, SAP, The Agency for Digital Italy, Bundesrechenzentrum from Austria, Institute of Logistics and Warehousing of Poland, General Secretariat for Digital Policy of Greece, among others. Some parties acted as associated partners, for example, the Danish Business Authority, the Government Shared Services Entity of Portugal, the Norwegian Agency for Public Management and eGovernment, the Ministry of Economics from the Netherlands, the Swedish National Financial Management Authority and OpenPeppol[20], among others. At that time, the project was not funded by the European Commission.

DIGINNO and DINNOCAP projects

In 2017, the Estonian Ministry of Economic Affairs and Communications involved partners from most of the Baltic Sea Region countries through coordinating two Interreg projects – DIGINNO[21] and its follow-up project DINNOCAP[22].

Within these projects, the Lithuanian ICT Association INFOBALT[23] acted as an active contributor. The Polish Chamber of Commerce for Electronics and Telecommunications KIGEIT[24] joined the project later but also took an active role. Danish, Norwegian and other partners were a part of the project but did not

[20] OpenPeppol, https://peppol.com/
[21] DIGINNO project, https://www.diginnobsr.eu/
[22] DINNOCAP project, https://www.dinnocapbsr.eu/
[23] Infobalt, https://infobalt.lt/
[24] KIGEIT, https://kigeit.org.pl/

participate in the prototype development side project (DIGINNO-Proto[25]), which delivered the main results.

The DIGINNO project resulted in a roadmap white paper for the Nordic/Baltic Sea region[26], stating the steps to be taken with e-invoices, e-receipt, e-CMR and e-KYC. A side project evolved from DIGINNO, allowing the cross-border piloting of e-CMR indexing within the DIGINNO-Proto[27] project serving as a proof-of-concept project in the digital supply chains domain.

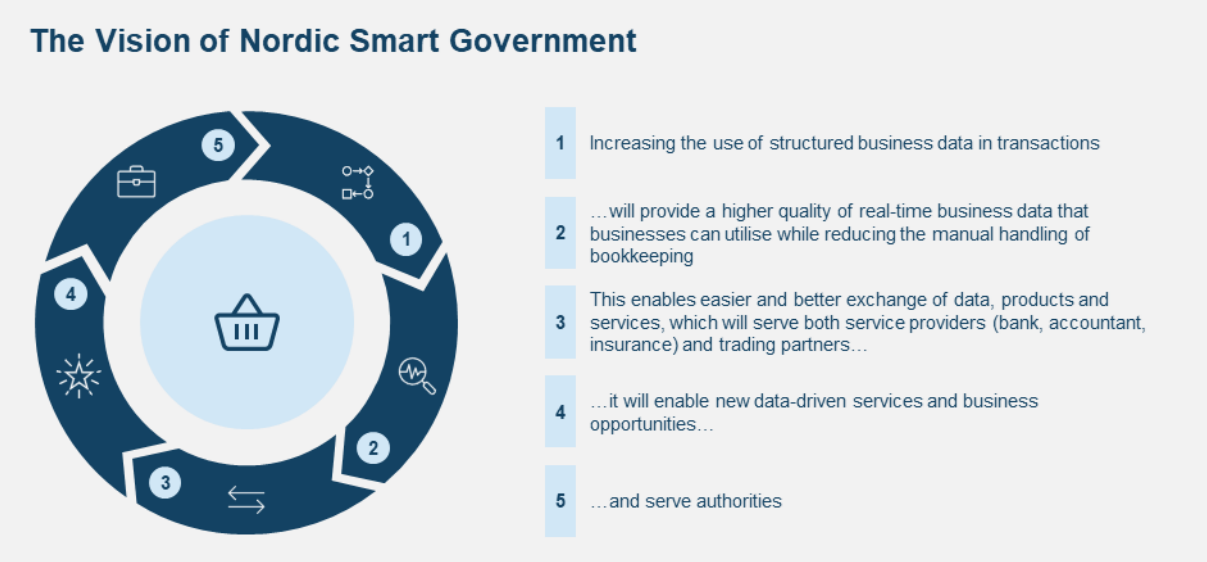
The follow-up project DINNOCAP lasted one year. Its main goal was to build on DIGINNO outcomes and empower the use of ICT opportunities among SMEs, industry organisations, and public sector authorities.[28] Based on tools developed in DIGINNO, DINNOCAP worked on improving digitalisation methods and their practical use.[29] Development and testing of the e-CMR cross-border prototype were the focus of the project. More information about the DINNOCAP project and the results is available on the project conference website[30] and YouTube Channel[31].

Nordic Smart Government and Business (NSGB) project

After some preparation[32], in **2021**, Finland, Sweden, Iceland, Norway, and Denmark jointly started the implementation of the roadmap with the goal of becoming the most digitally integrated region(s) in the world as part of the **Nordic Smart Government and Business (NSGB**) programme[33], launched in 2016.

Such a cooperation stream is a great use case for international strategic cooperation on domains that are directly connected to smoother business operations for the industries, as well as allows the government to reach its own aims on transparent, digital and seamless operations.

Figure 10. Nordic Smart Government Roadmap, priorities[34]



[25] DIGINNO-Proto Project and Prototype, https://www.diginnobsr.eu/diginno-proto
[26] https://www.diginnobsr.eu/
[27] DIGINNO-Proto – https://www.diginnobsr.eu/diginno-proto
[28] https://www.diginnobsr.eu/dinnocap
[29] https://interreg-baltic.eu/project/dinnocap/
[30] DINNOCAP project final conference https://realtimeeconomy-bsr.eu/news/dinnocap-final-conference-real-time-economy-here
[31] Youtube for Ministry of Economic Affairs and Communications, 2022 conference
[32] Valtiokonttori https://www.valtiokonttori.fi/en/uutinen/the-nordic-smart-government-project-meets-the-government-programmes-objectives-on-making-use-of-financial-information/
[33] Nordic Smart Government and Business, https://nordicsmartgovernment.org/roadmap
[34] https://nordicsmartgovernment.org/roadmap

The RTE motivation and key users are considered to be businesses whilst the authorities/administration and government would preferably be the drivers and users of the data.

The Nordic Smart Government Roadmap[35] explains the business centricity of the affairs as well as the holistic approach to support digital tools.

Finnish Real-Time Economy project

In Finland, a national Real-Time Economy project[36] was initiated using the Recovery and Resilience Fund (RRF) resources. It brought RTE on the priority list. The project duration is three and half years starting from June 2021.

The project aims at creating interoperability and technology of the digital ecosystem, supporting the functioning and processes of financial administration and setting up of organisation and management models. One of the project goals is also to assess the legislation required to support the operating models.

3.2. Legal and policy space, current key roadmaps

The playground for the Real-Time Economy is based on international and national policy documents and specific legislation that covers RTE solutions. The latter is limited and is only covering the cross-border state applied in the domain of e-invoicing as per Directive 2014/55/EU[37] on electronic invoicing in public procurement.

The key sources to additionally observe the developments on e-invoicing is the European Commission CEF website on European legislation on e-invoicing[38] and annual country factsheets available via the dedicated European Commission website[39].

There are various studies done to map the RTE domain and identify possible cooperation and governance frameworks to support RTE development. We would like to highlight “Principles of Real-Time Economy and Possibilities of its application[40]” as the most relevant contribution.

For the DINNOCAP project, the suggestion on “**Operational and Governance Framework for Cross-Border e-Services delivery**”[41] was created as an aggregation of suggestions and contributions from 130 public and private stakeholders from the Baltic Sea Region on **their vision for e-CMR, KYC and e-receipt.** This document is not authoritative but contains proposals on the way forward. SMEs and public authorities from Lithuania, Norway, Sweden, Latvia, Denmark, Estonia, Kaliningrad (Russia), Poland, Estonia and Finland provided inputs through stakeholder workshops and surveys.

Nordic Smart Government has published its **“Roadmap for the realisation of the Nordic Smart Government ecosystem”[42]**

3.3. Playground and regional cooperation spaces

Some of the countries in the region have been more actively working on the joint strategy than others. However, they are all still active in delivering RTE solutions and working towards setting functional structures.

Based on the background study and interviews, we have identified **three cooperation spaces** in the region:

[35] Nordic Smart Government (and Business) Roadmap (2021), https://nordicsmartgovernment.org/...

[36] Real-Time Economy project, https://www.yrityksendigitalous.fi/en/general-information-about-the-real-time-economy-project/

[37] Directive 2014/55/EU, EUR-Lex - 32014L0055 - EN - EUR-Lex (europa.eu)

[38] European Commission, European legislation on eInvoicing (europa.eu)

[39] e-Invoicing country spreadsheets (2021), 2021 eInvoicing Country factsheets - Digital Knowledge Base

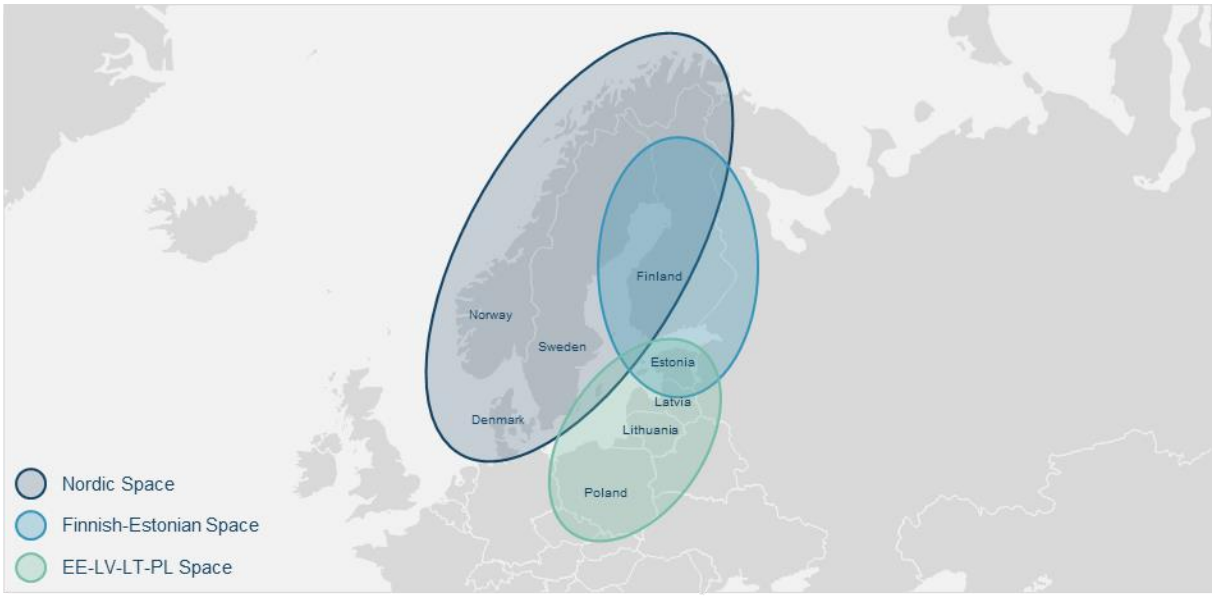
[40] Report available at Realtimeeconomy.ee https://realtimeeconomy.ee/sites/default/files/2021-12/taltech_rte_lopparuanne_ee.pdf

[41] Report available at https://www.dinnocapbsr.eu/_files/ugd/8cf6e6_3910ad5343da4e2799e025e48a6c54cc.pdf

[42] Report available at Samlet NSG roadmap og appendix (nordicsmartgovernment.org)

- The Estonia-Finland space.
- The Estonia-Latvia-Lithuania-Poland space.
- The Finland-Sweden-Denmark space.[43]

Figure 11. Cooperation spaces in the region as mapped for the outlooks of real-time supply chains [44]



ready4eFTLeu (2022)

The Estonia-Finland bond and efficient e-government integration create a strong basis for aligning RTE innovations based on the needs of the business community, eagerly looking for ways to improve the legislation and successfully seeking funding for the high-priority RTE building blocks.

The Estonia-Latvia-Lithuania-Poland collaboration space shows experience with stakeholder management, roadmap development coordination and common policy alignments to drive business-centric RTE development. Namely, e-invoices, e-receipts, KYC and e-CMR have been the key topics. The cooperation space also encourages the cross-border IT testing and community engagement of e-CMR visibility and business-to-government data flow via the DIGINNO-Proto solution that also included the use of real-time data from the business stakeholders.

The Finland-Sweden-Denmark-Norway cooperation space works together on Nordic Smart Government and Business project. This project focuses on building a joint strategy and vision for the Nordic countries, competence sharing and coordination.

When discussing the opportunities and possible benefits of joining forces in the RTE development, **the readiness to seek options for such extended discussions seems attractive to all.**

At first sight, the motivation for active engagement in joint RTE development might be limited by the current state of low preparedness for joint actions (no priority set, no strategy in place, no perks assessed, no person or financial resources allocated to extended international cooperation). While taking a closer look, **the readiness to explore such options is appealing to each country.** Every participant sees value in filling in gaps that they might feel having while working towards a more functional and balanced RTE application. Coordination between countries would allow cost savings on preparatory work, impact assessments or standardisation specifications.

Common priorities would allow better coordination of business process-centric and impactful solutions to be developed by both the government and IT service providers. The coordination would also allow a joint approach to the standard alignment and possible joint work on legal and technical matters that

[43] Finland, Sweden and Denmark closely cooperate with Norway and Iceland, the latter two yet are not in the scope of the current project

[44] Ready4eFTI.eu (2022). Report on the launching point for eFTI within the cooperation clusters in the region [report in progress]

should be addressed the same way in every country. Coordinated space would also ensure better alignment for SMEs and service providers who might need to adjust to minor differences in national requirements but **have their operations run on the interoperable platform(s) with the same rulebook and infrastructure security levels across the region.**

3.4. Trust shift

The regional spaces also reflect the **multi-dimensional government control vs. business data flow with government support** approaches in applying RTE developments.

Under **the trust shift,** the expectation is that companies would be trusted in their operations and RTE solutions would be built to support the business operations when the information flow is run through or with the support of public sector services.

For example, if the government authority needs information on a monthly/weekly basis or real-time information on trade volumes of specific goods or an overview of the amount of invoices for tax purposes, it should be possible to extract numbers from the business operations data streams smoothly and have integrated submissions. If possible, the updates should be seamless and take place in trusted environments. The generalised or anonymised data should be sent to the government authorities when necessary. Reports to the government sector could be sent automatically from the source systems. Such system-generated reports would be trusted by authorities without the need for double checking or without the necessity of keeping duplicates of business data in government service.

Table 3. Trust shift layers

State	Description	Examples	Enablers
Pre-trust-shift	Government databases request all relevant data to be submitted	e-invoices duplicated or kept in government servers as a mandatory action to review business operations	Government IT structure, e-ID, trusted service providers, simple government reporting structure (and connectivity such as X-Road or alike)
Mid-level applied trust	Government requests reports to be delivered in a specific format but does not process data further	Report on the number of invoices issued and e-invoices issued as full amounts and VAT calculated in a separate report	Government IT structure, e-ID, trusted service providers, simple government reporting structure (and connectivity such as X-Road or alike)
Applied trust	Government can collect and accept reports generated from businesses' systems or dedicated software or platforms	Reports on freight in transit	Government IT structure, e-ID, trusted service providers, simple government reporting structure (and connectivity such as X-Road or alike)
Trust shift	Government can moderate standard and hold part of the data for reporting, collect it regularly or in real-time if made available by businesses	Automated and streamlined reporting	Government IT structure, e-ID, trusted service providers, simple government reporting structure (and connectivity such as X-Road or alike)
Automated and real-time reporting in trusted ecosystem	Government synchronisation allows pulling necessary reports from private systems on the due dates	Fully integrated reporting	Government IT structure, e-ID, digital stamps, timestamps, trusted and coordinated IT systems, certification of solutions

The development of business reporting and B2B (business-to-business) implementation (such as e-invoicing) have been mostly driven by the objective to detect tax evasion and fraudulent activity. Such activities are mainly well-coordinated by tax and customs offices, backed up by the European general trends on Value Added Tax (VAT) declarations and cross-border availability of information for the authorities on VAT exemption or reverse charges.

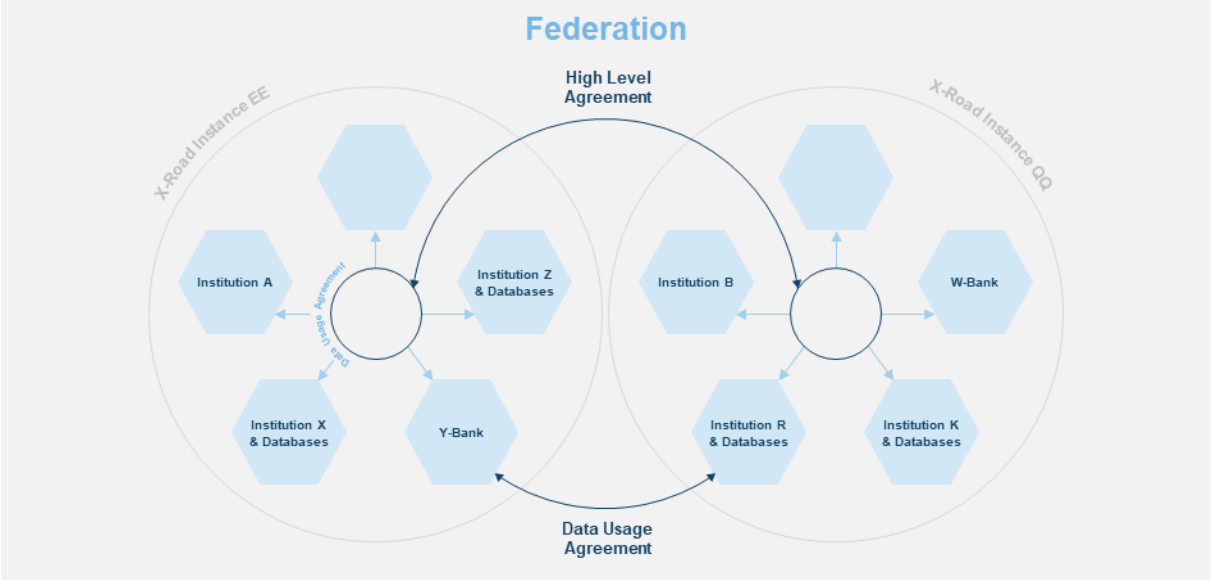
Even though such reporting caused reluctance by the companies at first due to the difficulty of reporting procedures as well as technological complexity, companies have eventually accepted the government's ambition to gain control and visibility. In return, they can become more trusted and could also run their operations more smoothly.

As for some other domains, such as e-invoicing, the uptake on the visibility for the government sector has been twofold. In some of the Baltic Sea Region countries, such as Sweden, e-invoicing is seen as an opportunity to improve government visibility of all e-invoices issued and keep track of business operations. In contrast, Estonia's objective for further uptake of e-invoices is not to control and review the content of e-invoices, but rather to make life easier for the small and medium enterprises, as well as get quality statistics at the macro-regional level (instead of the detailed transaction analysis).

3.5. Data governance

The structure of data flow between the government and private sector would need to run securely and in a trusted manner. For that, the Estonian government has used X-Road for a long time, which unites well-organised components and distributed approach.

Figure 12. Federation of data platforms – X-Road architecture [45]



Quite alike to the X-Road, the German-originated **GAIA-X** and its European Union-wide Association initiative – one of those solutions that aim to create a data-sharing ecosystem with an open and secure approach, creating trust in an ecosystem.[46] Additionally, the European Data Spaces Initiative brings new opportunities to the cross-border space.[47]

The European Union Connecting Europe Facility (CEF) building blocks for e-governance data exchange as well as the other building blocks such as digital wallets, verifiable credentials and digital identity or signature/sealing/stamping solutions would be the key to running interoperable cross-border services. Some of the conventional blocks allow the established cross-border solutions to function and some of the newer ones are to be implemented after some further piloting has taken place. The CEF building blocks are under constant evolution and review by the European Commission partners, community and are integrated into projects.[48]

[45] Estonian Information System Authority, https://e-estonia.com/solutions/interoperability-services/x-road/

[46] Gaia X. https://www.data-infrastructure.eu/GAIAX/Navigation/EN/Home/home.html

[47] European Data Spaces Initiative, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12491-Data-sharing-in-the-EU-common-European-data-spaces-new-rules-_en

[48] CEF Building Blocks, https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/2018/11/08/Meet+the+new+CEF+Building+Blocks

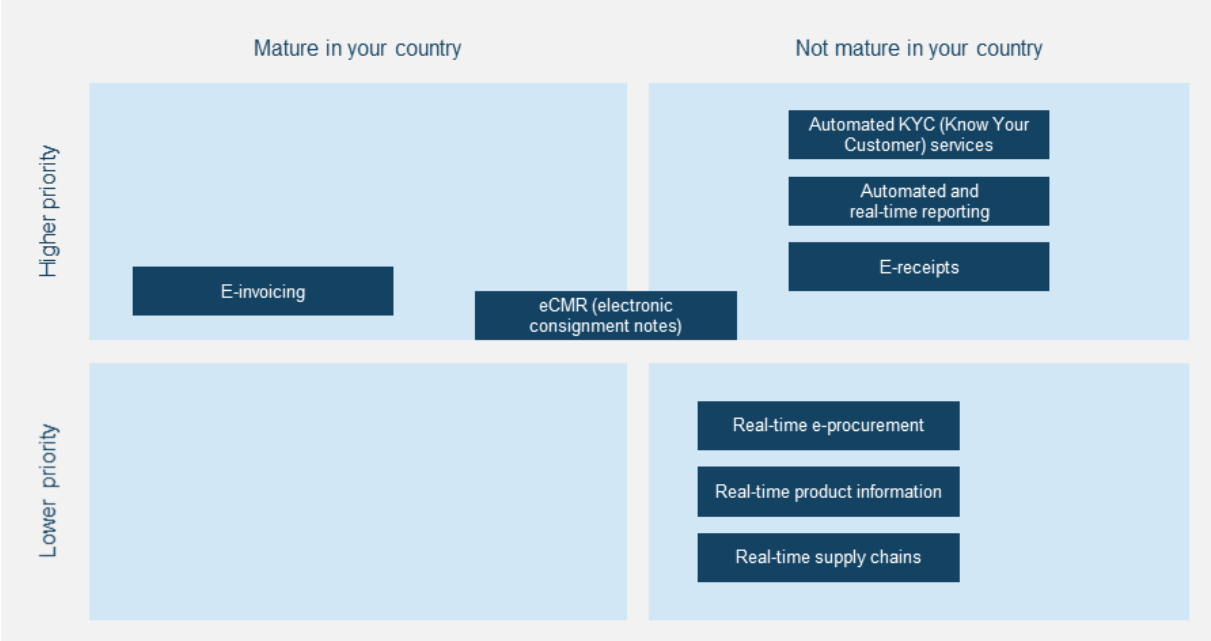
4. Country review: status of RTE and RTE building block maturity map

The current chapter provides input from the summaries of the self-declared RTE building blocks priority/maturity map alongside countries' highlights on the motivation behind RTE development, success stories from the past 12 months and expectations towards learning from each other through cross-border cooperation.

In addition to the observed countries (Estonia, Latvia, Lithuania, Poland, Finland, Sweden and Denmark), Norway was also invited to make a presentation as a guest presenter.

4.1. Estonia

Figure 13. Self-assessment RTE Building Block Priority/Maturity for Estonia[49]



Development and status of RTE building blocks

E-invoicing. Estonia self-declares to be not as successful as it would like to be when it comes to the uptake of e-invoicing, although it already has mandatory e-invoicing in place for business operations with the public sector. The aim is to raise the usage percentage in the B2B area whilst, in total, e-invoicing coverage is as high as 45% from all invoices across all sectors. Considering this, e-invoicing is mature and comes high on the priority list.

E-receipts are also a very important building block to be developed for Estonia as it is seen as a complementary service alongside invoicing, especially in the B2B domain.

Automated and real-time reporting. Estonia is actively working on dedicated standards, as the uptake of the services relies on these standards when it comes to automated and timely data reporting. Estonia is working on a concept where it will have a unified taxonomy across agencies, meaning that all

[49] RTE State of Art Workshop in Tallinn, 22 September 2022

the data fields that are used across different agencies' reports should be standardised. Estonia also pays strong attention to cases where the requests for submitting the same data are duplicated and sets rules to prevent such situations. It would mean that an entrepreneur will **only enter their data into their public sector reporting once.** Currently, Estonia has already 15 government agencies working on this end goal. **In long term, RTE should allow businesses to use the same principle in their own networks of data exchange (ERP or another software systems) once**.

Regarding e-KYC, Estonia is working towards a government-led solution for wider use and is looking for value-added services. There is also overall consent-based business data sharing to third parties as a part of e-government solutions in place, and the method is being extended by piloting and testing e-KYC solutions as public service.

e-CMR is a mid-level priority and is heading towards becoming a mature building block in Estonia. E-CMR development has a high priority because the private sector is interested in developing these standards and related cross-border services for supply chains and e-FTI applications. E-CMR data is also interlinked with the e-invoices building block.

E-procurement has slightly lower priority and lower maturity in the all-sector view, despite being well-advanced in the public sector domain and being considered of high importance. Some of the above-mentioned building blocks can solve certain private sector e-procurement process challenges as the data is partly the same in all building blocks.

Real-time product information is gaining attention and will support further development of sustainability reporting. The application of digital product passports (DPP) is to serve as a basis for the real-time and interoperable exchange of product information. DPP data will be attached to e-orders, e-invoices and e-CMRs, giving root-based quality information and input for automated non-financial reporting, e.g. sustainability reporting.

Estonia's main motivation behind RTE development

First, the main motivation is that the Real-Time Economy is seen as an umbrella vision. **The goal is to get the public and private sectors to collaborate more** and exchange information automatically using all available and newly established building blocks, possibly and most extensively also across borders. This is the main key driver behind the developments and priorities.

Second, Estonia is paying attention to new requirements, such as sustainability and digital product passports, and preparing for the developments, supporting the reporting duties for the business sector. Estonia believes it is the public sector's duty and role to implement RTE tools that will make it easier for companies to be compliant with their reporting obligations, may those requirements be of national or international origin.

RTE success story from the last 12 months

Estonia highlighted great cross-border projects like DIGINNO, DIGINNO-Proto and DINNOCAP (built on DIGINNO outcomes). In the DINNOCAP project, alongside networking activities, Estonia participated in a cross-border live **e-CMR prototype allowing** freight transport information controlling by competent authorities digitally via digital gateways (both when stopping the truck and without stopping the truck). Estonia has also successfully approached the business case for e-KYC.

Estonia has several RTE-related financial support measures planned for the next two years. For instance, two measures have been opened for SMEs in support of the Recovery and Resilience Fund (RRF): one for the development of e-invoicing services and the other one for the development and uptake of e-CMR services addressing the future requirements for e-FTI platforms. In parallel to support measures, there is also extensive training for SMEs, accountants, and the public sector being conducted as part of strategic communication. Strategic communication is especially important in building awareness and achieving the RTE objectives on large scale.

Possible contribution to developing & extending regional cooperation

A common use of standards must be agreed upon, especially on the semantics, which is the key to the success and requires international collaboration. Estonia expects good outcomes from the collaboration.

Joint projects are definitely important. Networking is always important, but prototype development and testing within the private sector should be done in parallel. The focus can be on setting up the RTE community with the commitment letters or official working group after finalising this project.

2-3 next steps in Estonia in the next few years regarding RTE

First, Estonia is aiming to increase the usage of e-invoices. After the EU e-receipt standard creation is completed, Estonia is aiming at the fast uptake of the e-receipts together with supportive legal amendments. Today, Estonia has some legal acts that are not supportive of e-receipts, and some changes are needed. The same applies to widening e-CMR usage.

Second, data-driven reporting will be the most notable change. It is going to change Estonian businesses' lives and make them easier. The goal is to provide the best alternative for fulfilling reporting obligations by businesses. For data-driven reporting, unified standardised taxonomy will be developed across agencies. XBRL GL technical standard is a preferred option in all cases where possible.

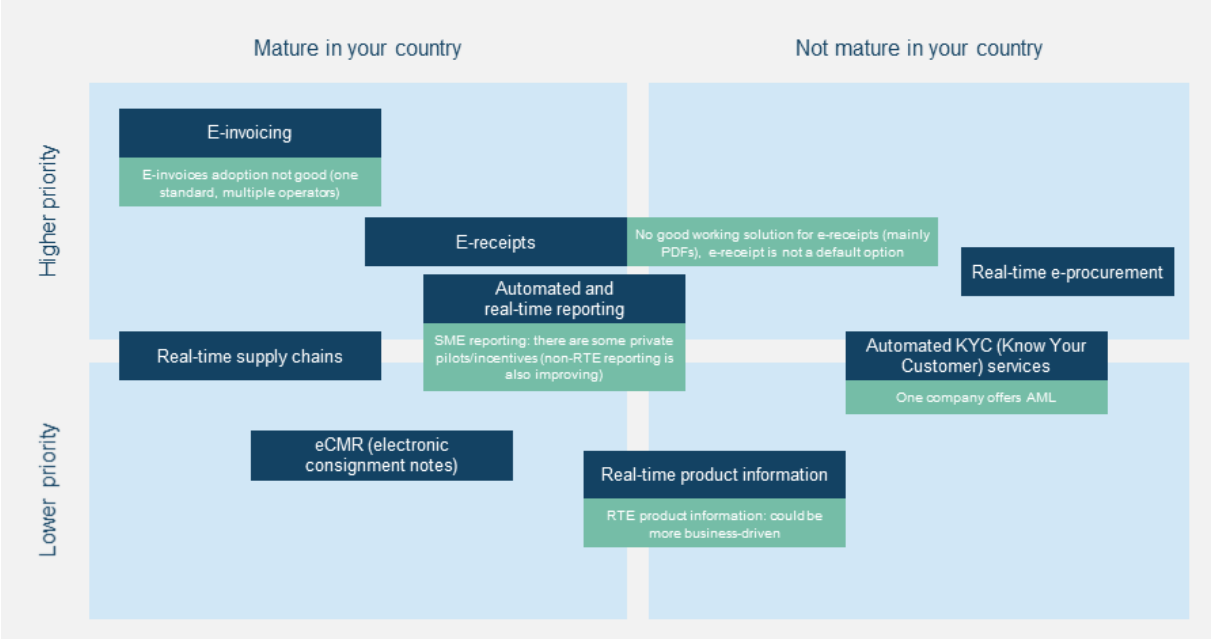
Third, clear semantic relations in data generation in business documents, meaning that the interoperability and the standardisation of the data field should be done in all the transactional level processes, not only on the basis of documents but also on the basis of the supply chain. The key is to start providing more and more value-added services based on quality data as data is our businesses' asset. Extensive training and support measures are ongoing and planned for the next years to speed up RTE development.

The best practices Estonia wants to learn from

Estonia would really like to hear more about the e-procurement part and the product information part. For example, a digital product passport is one of the initiatives driven by the European Commission, but Estonia sees that it might not be sufficient for everything. Estonia would like to be part of that information sharing and learn how other countries approach it.

4.2. Latvia

Figure 14. Self-assessment RTE Building Block Priority/Maturity for Latvia[50]



[50] RTE State of Art Workshop in Tallinn, 22 September 2022

Development and status of RTE building blocks

E-invoicing. Talking about e-invoices, the **big challenge for Latvia is awareness raising** especially for SMEs because Latvia has the standards in place. In connection with Peppol, all legislation is available; therefore, it is possible to use e-invoices. However, there is still a lot of work to do when it comes to communicating with companies, especially micro and small companies. Latvia has to do a lot of communication work explaining directly to companies about structured invoices and what are the benefits that they can get from them.

e-CMR. Latvia is glad about successful pilots in the framework of the DIGINNO and DINNOCAP projects. They form a good basis for further work. However, all the companies, Latvia has involved, are looking forward to the next steps. There should be some regulation in place to enforce electronic documentation as a single way of doing things, instead of having to run paper documentation in parallel. Such double work would not add any value for the logistics companies, senders and recipients of goods.

It is important that **Latvia has quite significant funding for digital transformation in the coming years**.

Key policies

Talking about the benefits of the Real-Time Economy, it is important to communicate with stakeholders and users. In Latvia, they see that there is **a lot of work in communication with people and organisations**. If they do not talk and do not see these benefits, they are not so interested in this. In general, Latvia is open to new cooperation initiatives and projects to drive Real-Time Economy in Latvia and the Baltic Sea region.

National Industrial Policy 2021-2027. First, when it comes to the background of regulation and policy in Latvia, it has a national industry policy with several directions until 2027. It includes ICT as one of the smart specialisation strategies. Due to its importance, Latvia has also set targets for experts and R&D.

Data-driven nation. This is a concept that Latvia elaborated already a few years ago and it is based on **three pillars: data democracy, data-driven society involvement and data-driven innovations**. These pillars focus on using open data smartly and innovatively.

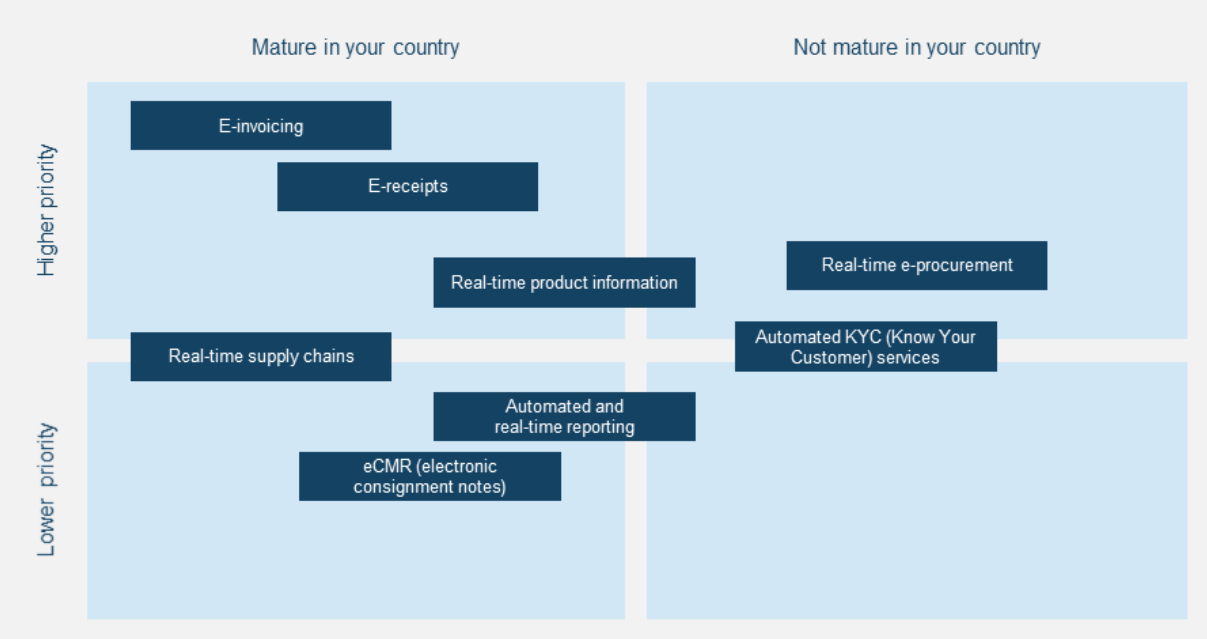
Different needs of the companies – artificial intelligence, robotics and other support tools. Ministry of Economy is stressing that the needs of companies are very different. Some of them may need additional support through artificial intelligence, robotics and other tools.

Latvia has **a digital maturity test for each company.** It helps to find out what are the needed activities or support instruments for this particular company, whether any skills and software are missing, and what are available grounds and financial instruments. It also helps to do some testing and experimenting to find out what are the results for this company in the application of such a solution. There are also digital innovation hubs. Two hubs will take place in Latvia to ensure that funds are wisely invested.

The aim of the Ministry of Economy is to give Latvia full support for digital transformation. To sum it up, Latvia has skills, process digitalisation, new digital products and services. Moreover, the RTE ecosystem includes e-invoicing, e-Commerce, other applications and Industry 4.0. The Ministry of Economy supervises the digital transition projects that received funding of 183.5 million EUR.

4.3. Lithuania

Figure 15. Self-assessment RTE Building Block Priority/Maturity for Lithuania[51]



Development and status of RTE building blocks

E-invoicing. As everywhere, e-invoicing matters in Lithuania and is highly prioritised, as are e-receipts. E-invoicing is present in B2B and B2C areas. E-procurement and real-time product information, real-time supply chains, and automated real-time reporting have a slightly smaller presence.

Lithuania's motivation behind RTE development

There is a certain number of residents, who want to change the quality of their lives. Here Lithuania sees the possibility to compete with other states. **Lithuania wants to improve the quality of the citizens' lives**. Transparency in this field is especially important. From the state's side, it is important to streamline the process and stand in the competitiveness of Lithuanian business in the region and European markets. Increasing the quality of information is key. Helping the private market to comply with the laws and regulations is important. Lithuania is motivated to give information for automated reporting to the authorities and to coordinate and cooperate with all partners in the ecosystem.

Lithuania's RTE success story from the last 12 months

Lithuania states the DINNOCAP project and successful pilots in the framework of the given DINNOCAP across neighbouring countries. There are **real-time public services at various municipalities**. For instance, it is important for citizens that the **real-time penalties from the police** come to email during the same day when the traffic violation occurs, because years ago it was different: penalties could be sent after a few months.

However, if Lithuania needs to share one success story, it is **real-time data exchange at the city level. KPIs at Vilnius city municipality** can be seen on the Internet.[52] It analyses the reliability and performance of services provided by Vilnius municipality. The quality of the communication channels has led to an assessment of the quality of customer services in Vilnius. The evaluation showed some mismatch in the municipality services and customer satisfaction. As part of service and customer service

[51] RTE State of Art Workshop in Tallinn, 22 September 2022

[52] Link to Power BI dashboard: https://kpi.vilnius.lt/

quality improvement efforts, the municipality aims to develop and implement a set of innovative and ongoing measures to continuously monitor and improve customer service satisfaction. Data is flowing to the dashboard regularly. Data covers customer services, administrative services, health environment, urban development, mobility, education and tourism.

Contribution to developing & extending regional cooperation

It is very important to implement a joint project. It can be a pilot project or a new project. Lithuania wants to develop a joint service system that the whole Lithuanian society can benefit from.

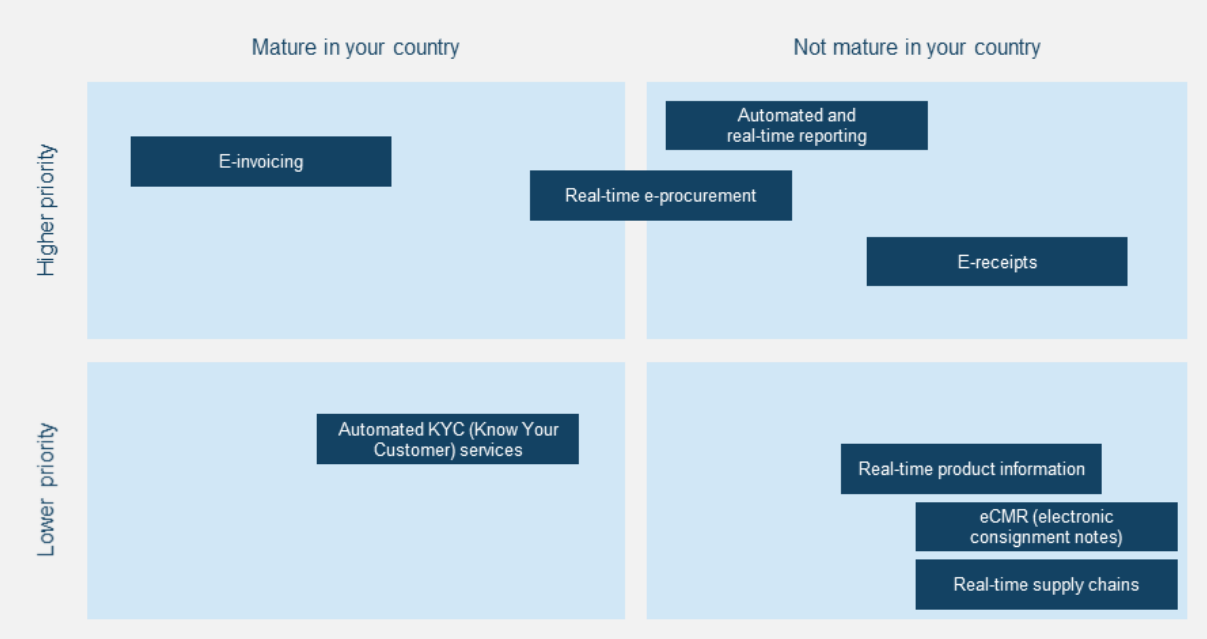
2-3 next steps in Lithuania in the next few years regarding RTE

Lithuania's next steps are about the **need to open more and more data** to develop more Real-Time Economy public services and start cooperation between different delegations.

Lithuania wants to learn from all the practices across the region.

4.4. Poland

Figure 16. Self-assessment RTE Building Block Priority/Maturity for Poland[53]



Development and status of RTE building blocks

Poland's most established RTE building block is e-invoicing.

Poland's motivation behind RTE development

Poland highlights the following motivational factors:

- Lowering the costs incurred by the administration for handling orders and invoices.
- Shorter time for payment.
- Greater financial liquidity of enterprises.
- Lower costs of enterprises related to accounting services.

[53] RTE State of Art Workshop in Tallinn, 22 September 2022

- Improving the operation of public administration.
- Positive impact on the environment through using digital services.

One RTE success story from the last 12 months

In April 2019, the **national E-invoicing platform (PEF)** was launched to handle invoices issued as part of the public procurement process. Other types of documents, such as orders or dispatch advice, are also supported on the platform. PEF was built from the scratch based on the Peppol framework and within the SaaS model.

In May 2022, the service was expanded with the possibility of handling new types of documents and mechanisms for contacting the contractor. Additionally, a database of contractors has been made available – the **PEF Address Book.**

Contribution to developing & extending regional cooperation

Poland participates in the works of the **OpenPeppol association** which covers a large part of European countries. Moreover, it actively participates in RTE initiatives and workshops at the EU level.

2-3 next steps in Poland in the next few years regarding RTE

Poland plans to launch an obligatory system of electronic invoices, both for B2B and B2A (business-to-administration)/B2G. Arrangements for the model of such a system are underway.

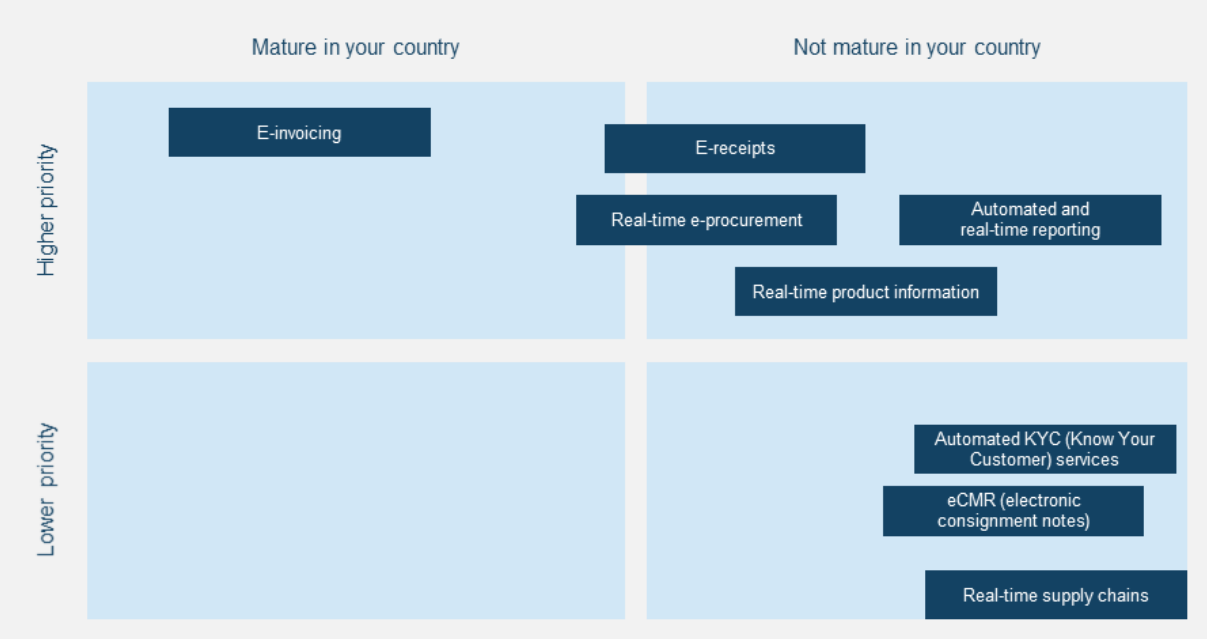
The best practices Poland wants to learn from

Poland intensively uses the experience of more developed countries in the area of e-invoicing – both at the real-time reporting level (Italy, Spain) and at the OpenPeppol level (especially in the Nordic countries).

The **OpenPeppol framework** was used to make it easier and more reliable to prepare the electronic invoice environment in Poland.

4.5. Finland

Figure 17. Self-assessment RTE Building Block Priority/Maturity for Finland[54]



Development and status of RTE building blocks

E-invoicing. Finland has their own national Real-Time Economy project. Finland works in five main working areas, namely, the advancement of e-invoices, e-receipts, e-procurement messages, standardised reporting and data sharing, and digital identity for businesses.

The e-invoices are clearly the most developed single element within the project. Finland is aiming for 90% coverage by 2024 and is looking at the possibility to make e-invoicing mandatory. Finland is considering moving towards the Peppol standard instead of national e-invoicing standards and perhaps setting a portal for small and medium-sized enterprises as well.

E-receipts. The level of development e-receipts and e-procurement messages is clearly lower. The goal is to increase the volume of e-receipts up to 20% by 2023. Finland agreed upon the rule book for e-receipts earlier this year.[55] The work on the standardisation is still ongoing. The e-procurement follows the Peppol standard, and Finland is pushing it forward with the government as the spearhead for that development. A national Peppol Authority has been established just recently.[56] Finland is also considering a portal for small and medium-sized companies regarding procurement messages.

Automated real-time reporting is perhaps an even less developed area, but it is currently established by the common taxonomy for all the participating government agencies or financial reporting. Finland is also moving towards using the XBRL GL as a data format perhaps later this year. Within the project, there is a clearly lower priority on product information, KYC and real-time supply chains. These RTE building blocks have a lower level of maturity as well. The KYC area can be something that perhaps the Finnish Tax Administration will look more into in the future.

The e-CMR is not currently in the Real-Time Economy project scope in Finland.

Motivation behind RTE development

[54] RTE State of Art Workshop in Tallinn, 22 September 2022

[55] https://www.yrityksendigitalous.fi/en/news/the-real-time-economy-project-published-the-first-version-of-the-e-receipt-rulebook/

[56] https://www.valtiokonttori.fi/uutinen/valtiokonttorista-suomen-peppol-viranomainen/

Finland's key motivation is to lower the administrative burden related to any financial administration or reporting for businesses and to move towards a seamless flow of business documents. Improvements in the data quality result in less need for inquiries by different government agencies and other service providers and therefore minimises administrative work. These activities aim to increase the efficiency and competitiveness of Finnish businesses. Particular attention is paid to small and medium-sized and perhaps even more to micro-sized companies, which by volume represent a vast majority of a number of companies. Finland certainly focuses on their capabilities and needs and benefits for digitalisation in general. All of this creates a basis for the enhancement of public and private services based on the seamless transfer of high-quality data.

RTE success story from the last 12 months

The greatest achievement during the last year was the setting up of the national cross-governmental project that brings together a number of government agencies, businesses, and service providers. Finland has managed to push forward the message of the importance of the development of the Real-Time Economy throughout society and even in the political sphere. Even if this topic is not the most desirable one, the buy-in starts to come up in more general terms. This will allow Finland also to continue the work on the RTE ecosystem even after the project ends in 2024. All in all, Finland is getting everybody or almost everybody on board to work on the build-up of the working ecosystem.

Contribution to developing & extending regional cooperation

The key way of contributing to regional cooperation is the Nordic Smart Government and Business as has been mentioned by other countries. Finland also does its best in developing cooperation on the interoperability of Finnish RTE solutions within the European Union and globally.

In terms of interoperability, Finland looks at the European Commission in assisting with this within the internal market. Interoperability should be further supported by other collaboration incentives.

2-3 next steps in Finland in the next few years regarding RTE

First, when it comes to the digital identity of businesses, there will be pilot solutions that Finland will analyse and test during the coming years. Transition to PEPPOL especially with regard to e-invoicing is something that Finland is looking for. Widening the use of e-receipts is important. As also mentioned, standardised business reporting is something that will develop actively during the duration of the project.

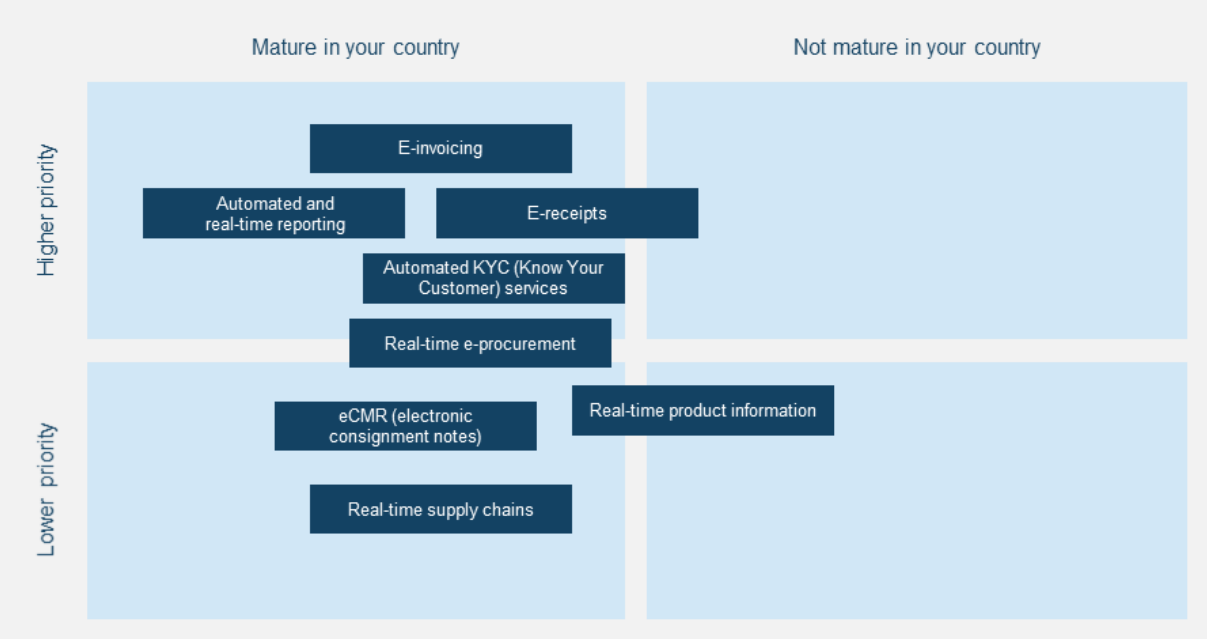
Finland will put emphasis on cooperation and coordination with all ecosystem partners. Finland is now working with Basware mainly on the technical aspects of the differing working streams. The rules and roles should be established. It is important to clearly align the responsibilities of different ecosystem participants to ensure the continuance of the ecosystem. In terms of importance, we can compare the ecosystem with the moving railroad network. Finland needs to make sure that is something that will remain alive and going on also after the programme ends.

The best practices Finland wants to learn from

Cross-border interoperability is a key focus for Finland. It is important to ensure that Finnish businesses can grow across the internal market and globally. It is about motivating and pushing smaller and medium-sized businesses towards digitalisation. That is something that Finland could use the best practices for. Finland is keen to learn about the management models and ways of maintenance for the RTE ecosystem from experiences in Europe and throughout the world.

4.6. Sweden

Figure 18. Self-assessment RTE Building Block Priority/Maturity for Sweden[57]



Development and status of RTE building blocks

The most mature and prioritised RTE building block is e-invoicing closely followed by other building blocks.

Real-Time Economy in Sweden

In Sweden, it is not called “the Real-Time Economy” because this concept does not exist in Sweden. At least there is no umbrella term called Real-Time Economy.

SWEDEN’S VISION goes back to the Swedish Government that says that **everything that can be digitalised should be digitalised** – Digitalisation first. That is what Sweden is working on within all sectors of society. It is not only about financial information, but also about health and school affairs. There is cooperation ongoing with several public authorities in Nordic Smart Government and Business. The vision is to create value for small and medium-sized businesses by making the point business update accessible and usable across Sweden and the Nordic region. It would be great to automate it from the beginning to the end. There should be no human interaction in between.

Sweden’s action plan

Cooperation is a key factor. Sweden has a strong tradition of cooperation between the public and private sectors. Many initiatives come from the bottom up instead of being steered top down.

Swedish Setup

The authorities in Sweden are autonomous, so it could be quite difficult to cooperate from time to time. It takes time to reach agreements, but once it is done, Sweden is committed to implementing them quickly.

Standard business reporting

[57] RTE State of Art Workshop in Tallinn, 22 September 2022

In Sweden, there is a national program or project called **SBR – Standard Business Reporting**. It started in 2016 when the reports were digitalised in Sweden with the help of taxonomy. It is done together with the tax agency and Statistics Sweden (a government agency) and the Swedish Companies Registration Office in lead. In 2018, the first service was opened, digital language reporting. The statistics and the services for tax declaration have also been accomplished. Everything is established and functioning. There is standard business reporting in place, but it would be great to develop it further. Sweden is putting up a roadmap that they should reach by 2027. Sweden is going to collaborate with other private and public stakeholders to implement the roadmap.

In the beginning, Sweden **defined what standard business reporting is**. They defined it as a methodology for the digital exchange of structured business information. Every kind of information can be used that is needed. There should be a focus on **semantic interoperability.** When it comes to technical interoperability, it is easily done with the help of IT. Sweden would also like to establish infrastructure.

Sweden has many digital ecosystems and they are functioning quite well, but it is thought that something even better could be done. What Sweden is trying to do with the help of DIGG – Agency for Digital Government is that **all 400 Swedish governmental Portals, all 21 regions and 290+ municipalities are going to come together in one unified infrastructure, digital infrastructure**. The goal is that data could be exchanged between each other in a very simplified way. In Sweden, there are 11 different building blocks of concept: identity, authorisation, security, data sharing, etc. 14 authorities are working on these topics today.

Changing paradigm with new technology, the businesses in the middle

Sweden is considering **digital wallets for organisations**. Sweden has a quite good understanding of the technology stack and the toolbox for the revision of the e-IDAS. Sweden and Finland have been asked by the European Commission to set up the Group for organisational identity. Digital identity is one of the main building blocks for making the ecosystem work. Sweden needs to be sure that it is working. It is necessary to be sure that everyone is trusting each other; otherwise, no one will want to share the data in it. **Sweden wants to move away from siloed ecosystems**. Using new technologies, the paradigm can be changed a bit. There are still some blockchains in this, but that is not the main point.

A natural place in the EU Ecosystem – “eIDAS 2.0”

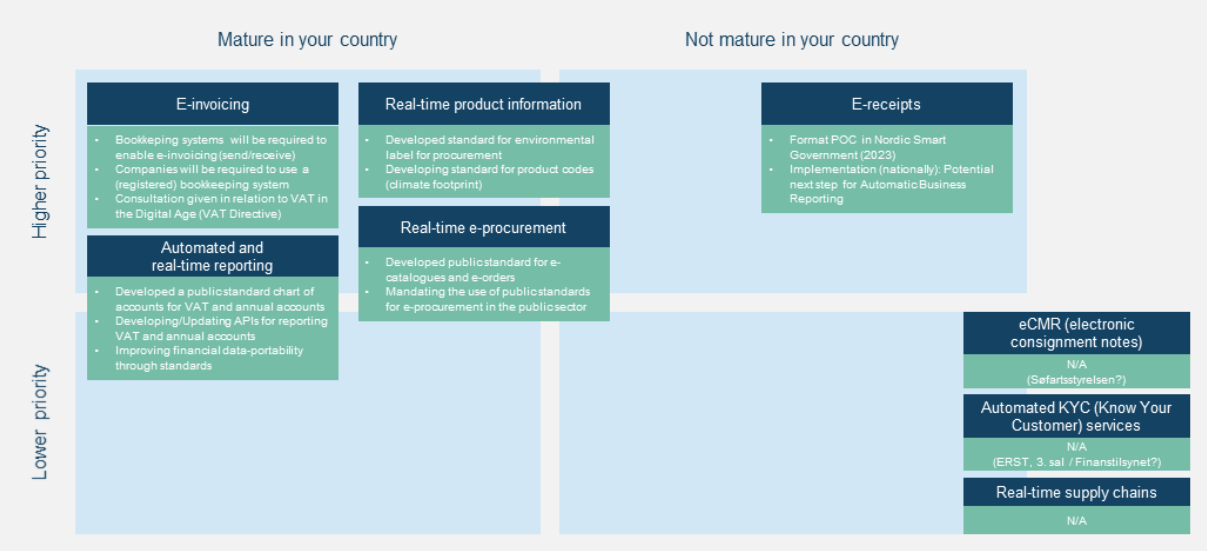
Sweden joins forces together with the Finnish Ministry of Finance for one of these large chain pilots. The main case here is actually the **digital travel credentials**. When someone is travelling, they meet natural and legal persons.

The best practices Sweden wants to learn from

Something can be learned from the Nordic context. Using architectural structure from the e-IDAS 2.0 toolbox and further piloting in that domain is important. Hopefully, if that works out, Sweden will be able to provide at least some part of the building block for digital identity, which would then create more trust in the ecosystem. This, in turn, will enable data sharing, which is one of the main purposes of this development.

4.7. Denmark

Figure 19. Self-assessment RTE Building Block Priority/Maturity for Denmark[58]



Development and status of RTE building blocks

E-invoicing and real-time product information are the two strongest building blocks in Denmark, shortly followed by automated and real-time reporting and real-time e-procurement.

The e-CMR, e-KYC and real-time supply chains are not currently in the Real-Time Economy task force focus in Denmark.

The best possible conditions and framework for Danish companies

Denmark works on giving Danish companies the best possible conditions and framework for doing business in Denmark. They do this by working with the Real-Time Economy, where the focus is on what goes on in the businesses and how the government can support the development of the Real-Time Economy. For Denmark, the key to this is the sharing of data between businesses and between businesses and the government.

Sharing of data between businesses can happen, e.g., through the use of e-invoicing, which contains data such as price and product codes. Without standardised formats for transportation and data, it is difficult to share data between different bookkeeping systems and report to different government institutions. With these standardised formats, Denmark can enable automated bookkeeping, automated reporting and improved business intelligence.

Since 2005, it has been mandatory for businesses to send e-invoices to public authorities in Denmark (i.e., B2G), which requires the use of an IT infrastructure for e-invoicing. This has worked extremely well, and Denmark has saved over 80 % of administrative expenses in this way.

Denmark now wants to carry on this success to the B2B sector and have data shared through the same IT infrastructure as used for B2G. Denmark sees it as an important part of their role as government to support this development.

Based on the above, Denmark wishes to make it easy to share data (B2B and B2G), supporting the portability of companies' data. However, this will not solve everything. To make use of the transferred data, it is necessary that the data can be read by the systems receiving them, i.e., mapping the data to a standard chart of accounts.

[58] RTE State of Art Workshop in Tallinn, 22 September 2022

Apart from portability, it is therefore important to talk about **interoperability and automatisation**. Sending an invoice from one bookkeeping system to another bookkeeping system directly (automatically) goes into the standard chart of accounts of the recipient system, without any (or with much less) manual typing, as seen today when businesses send each other emails with PDFs.

Next is the **reporting to public authorities** (B2G). If Denmark regulated the use of a standard chart of accounts, and this was matched with reporting requirements, automatic reporting would be possible to some extent directly from bookkeeping systems. On top of this, Denmark could start to put other kinds of data into e-invoices and make automatic reporting possible for green product data that is expected to come into force from the EU within a few years in the form of the Ecodesign Directive. The Ecodesign Directive is estimated to have a regulatory burden on businesses of between 30 and 60 bn EUR annually. This is extremely high compared to other burdens in the EU. Naturally, Denmark wants to automate this.

Possible contribution to developing & extending regional cooperation

There is a new bookkeeping law in Denmark as of May 2022. It states a set of minimum requirements to become a registered bookkeeping system. The law also makes it mandatory for businesses to use a (registered) digital bookkeeping system, which most companies already do. Obligation starts in 2024 for most companies and in 2026 for smaller companies.

The set of minimum requirements will cover 1) registration of transactions and storage of transactions and appendixes, 2) IT security, 3) requirements enabling automation of administrative processes and more.

2-3 next steps in Denmark in the next few years regarding RTE

The next step in Denmark is e-invoicing, which is seen as a vital element to develop the Real-Time Economy. The new bookkeeping law only requires bookkeeping systems to make e-invoicing accessible for companies – not for companies to use e-invoicing. Denmark will first work on widening the use of e-invoicing. Next, Denmark will work on data sharing (including portability) and see how it can be implemented in public digital standards. Denmark will need to work together with the bookkeeping system providers to ensure successful implementation.

It is estimated that the regulatory change will have a burden reduction of 3 billion DKK annually from 2026, thanks to B2B invoicing, automated bookkeeping and automated reporting.

The main takeaway is that the new bookkeeping law helps to path the way for the Real-Time Economy in Denmark, but it is only the beginning.

4.8. Guest presentation by Norway – key statements from the workshop

Norway was invited to present their positions alongside observed countries.

Figure 20. Self-assessment RTE Building Block Priority/Maturity for Norway[59]

Development and status of RTE building blocks

E-invoicing. E-invoicing in Norway is highly mature both in B2G and B2B. Norway performs national transactions throughout the Peppol network and cross-border transactions with European countries. Cross-border standardisation is also needed to communicate efficiently, especially as there are many foreign companies present in Norway. **E-invoicing ranks high in terms of maturity and priority**. It is strange that quite often the focus is put on the end of the e-procurement process, which is an e-invoice. Norway is working with catalogues, ordering, dispatch advice and reminders in addition to e-invoices. It does not have a high level of maturity, but Norway has a lot of transactions for all those formats, both nationally and cross-border.

Norway is moving to a fully digital process that allows **reuse of information from all process steps**. The goal is to increase the quality of the information exchanged between buyer and seller to streamline processes and capture data for analysis. A major efficiency gain is being able to match orders and invoices. The information process starts with the exchange of product information through the catalogue and ends with an invoice and a payment to the seller.

E-receipts. The e-receipt is addressed in Nordic Smart Government & Business. The goal is to find use cases covering cross-border transactions and do a pilot. In the pilot, we use standard format via the Peppol Network. The approach also includes the refunding process and matching of invoices towards e-receipt. It makes the government processes more efficient.

Nordic Smart Government & Business has chosen to use the **Peppol BIS billing 3.0** as the basis for the technical work with the standard, since a lot of countries have already implemented PEPPOL BIS billing. It is much easier for service providers to start using this format. It also has a lot of information elements. The approach is to add some information elements and reduce the number of actions in the billing towards the e-receipt.

Motivation behind RTE development

For Norway, the main motivation is to **increase the quality of information throughout the entire process**, not only in the invoicing stage. Norway believes that it is not a good practice to have a lot of

[59] RTE State of Art Workshop in Tallinn, 22 September 2022

irrelevant information in an invoice. It is better to capture this information throughout the procurement process instead of putting all information into just one process step.

There is a need to **streamline the process both for buyers and suppliers**. It includes governmental entities and the private sector in Norway. Norway is trying to influence the system provider or the ERP system to create good services that **make the user satisfied, because the satisfied users are needed to use the systems and capture the data**. The purpose is to capture machine-readable information for automated reporting to the authorities. It is very important to capture those things because then a lot of different processes can be gathered based on that machine-readable data. The result is an increased ability to analyse data so that managers of different entities can make the right decisions about their future.

It is very important to have good governance processes for the standards that ensure that they are in accordance with laws and regulations. If the systems can be implemented following the standards, then the users (private and public sector) can be sure that their processes follow both European and national regulatory frameworks.

RTE success story from the last 12 months

Norway highlighted NSG&B work because it is an important cross-border development. Some pilots have been performed between all the Nordic countries, and it is discovered that the VAT information (codes and rates) was not harmonised, and incorrect codes and rates were used. During or as a part of Norwegian work, the paper has been finished to guide these means and the service providers using the right codes and rates throughout the Nordic region and the European region. Reporting products and services towards the European Commission can be automated, as now this process has many manual steps.

The second thing that can be highlighted is the pilot that has been performed: sharing product information and the use of the Peppol BIS catalogue for cross-border transactions. Three kinds of environmental and sustainability information have also been included. VAT information and other information are present in the catalogues. **Reporting the environmental footprint will have a huge impact** on all the parties in the process, and if they must report manually, it is time consuming. During this pilot, it has been proved that label information could be shared amongst the Nordic countries. The label information does an insufficient job of measuring environmental footprint, but it can indicate that a product or a service is provided according to a label. Detailed information level was a second focus of the pilot. Users have the opportunity to use their own systems to analyse the specific product and can calculate the environmental footprint.

The third thing is linked to external databases. It is known that everyone should have an environmental product certificate. Nordic countries can share links to external databases so that the receiver can download the specification and perform analysis in their own system based on how many products they are buying during the year. One of the goals is to provide customers with purchase information before they order something to reduce the footprint. Before placing an order, they choose the right products that give a smaller footprint towards the environmental objectives.

Possible contribution to developing & extending regional cooperation

Collaboration with Nordic Smart Government and Business is a wise thing to do. **Open Peppol** should receive significant development focus as well.

2-3 next steps in Norway in the next few years regarding RTE

Norway is working on the legal requirements for public entities to stimulate using digital processes. Norway is also working towards increasing the number of public entities that use ordering systems, the private sector and the sellers in the public sector to increase the possibilities for promoting different products across Europe.

Norway is also aiming to **increase the number of systems that are compatible with the standard formats (EHF and PEPPOL BIS)**. There should be more systems that can perform the functions of catalogues, ordering, advanced ordering and dispatch advice. Norway supports public entities in the

adoption of systems in all processes and promotes them to use the systems for all purchases performed in the organisation with the goal to achieve digital processes. If someone does not use the systems, why do they need to invest in systems? Norway works towards **collecting structural information in the so-called data lake** to provide public entities with good statistics on an aggregated level.

Best practices Norway would like to learn from

It is very important for the public sector to collaborate with the ERP system providers in the private sector to achieve their goals.

The managers on the different levels must **fully understand what digital processes can do**, so they can take advantage of the systems. Good management of standard formats is important to ensure that everyone is heard and different systems that use the standards are predictable.

5. Organisation, Culture and Talent in RTE Operations

This chapter analyses existing strengths and competencies for RTE development in the countries and elaborates on the existing competencies in the Baltic Sea Region as a whole. Second, it investigates the competencies, that the region is possibly missing, and analyses which of these competencies could be obtained or developed locally or regionally. Third, it discusses priorities the region might be lacking at the moment.

The key **existing strengths and competencies** for RTE development in each of the countries are based on strong experience in the flexible development of solutions and efficient implementation of individual building blocks on the priority list. The outstanding strength of the three Baltic countries, namely Estonia, Latvia and Lithuania, is a strong capacity in creating good and functional solutions primarily driven by business needs. The strength of the Nordic countries lies in experience in coordinated analysis, planning and preliminary work that is being done prior to the execution.

Cooperation between the public and private sectors in developing RTE solutions has been strongest in Finland, whilst engagement of private actors is strong also in Denmark, Estonia, Sweden and Lithuania.

The **existing competencies** in the Baltic Sea Region are focused on **strong ties and extensively strong regional cooperation**. Second, engaging the private sector in government policy planning in an inclusive and non-hierarchical way is a clear strength of the region. Proven cross-border community engagements and networks of private organisations alongside the government RTE networks are a strength that is acknowledged also outside the region.

What might be lacking is **the overall awareness of each other's activities and action plans.** There is limited dissemination of best practices and coordination of possible quality input gathering for developments. Such coordinated information gathering, exchange of research results or arrangement of joint studies would strengthen the regional knowledge base, which could be used at the EU level for policy-making or setting regional technical agreements.

Any competencies that some individual countries **lack at a national level, can be obtained or developed locally or regionally**. Typically, the missing competencies are often available in neighbouring countries. The neighbours' resources are also available for filling the gaps that are hindering specific components or analysis works in an individual country. It means that not only resources but also a component or knowledge can directly be transferred or implemented.

A general and widely understood picture of large-scale IT and cross-border interoperability knowledge and awareness is missing. It means that although there is a high level of national **awareness about tools for e-governance, business-to-government or business-oriented tools**, the region does not sufficiently engage in discussion on how those could be set up in a cross-border manner for functional RTE solutions with the users – the businesses and end consumers – in mind.

It is important to develop more awareness of tools, technologies and solutions which in future would be applicable for the RTE domain management, both from business-to-government and business-to-business perspectives. For that matter, **e-IDAS and other European Commission CEF or interoperability tools** are the topics that Baltic Sea region countries should look together at, specifically through the RTE prism. In addition to that, there is not enough assessment taking place on what new technologies would be compatible with the expected seamless business-to-business data exchange.

There are some countries in the region that feel that stronger priority should be set on RTE in general and that support coordination of actions to reach quicker and better results.

The approach to national and regional cooperation should allow the filling of the gaps via neighbours' best practice implementation or joint work on affairs that are relevant for several countries. **The biggest strength in the region is nevertheless a strong digital mindset and applications.**

The Baltic Sea region countries should look into each other's priorities before taking any individual strong steps or engagements. It is important to avoid developing some concepts or, even worse, planning some solutions in silos instead of considering compatibility from scratch or at least starting from the state of art at the moment.

6. Legal, governance, security & privacy of RTE

The current chapter covers the legislative framework (data privacy, consumer protection, competition law and other considerations), ethical challenges and considerations and the need for legislative changes to facilitate RTE development.

Second, it reviews the governance frameworks in place, reflects on which governance is needed at the Baltic Sea Region level and which standardisation is needed and by whom to support the successful RTE application.

In the discussion section, some of the main governance principles are explained through the example of the fictional character Maria (a beginner entrepreneur and at the same time a modern consumer using digital apps for shopping). After discussing examples, deeper insights into some key legal, ethical and governance aspects are provided.

Key observations

"Technology develops faster than the law".[60] In other words, **legislation is behind the technology development**: in some cases, outdated definitions in accounting and consumer protection laws can be a blocker to further deployment of electronic documents. Clear definitions should be supported by visibility on the actual application of law and adapt to the modern application of the real solutions that might be new to the current regulatory domain.

The legislative changes should be supported by ethical rules that **minimise the fear of mistakes** among usual citizens and ensure a trustful dialogue between the government, enterprises and consumers.

Data exchange between multiple stakeholders**, including government authorities and private stakeholders** is one of the key concerns. It is difficult to strike the right balance between minimising data security and data privacy risks and at the same time ensuring flexible and open data exchange.

Both businesses and consumers are concerned about **data privacy, data security and data ownership**, as RTE solutions can include quite sensitive data (such as information on consumption habits and health) and business secrets.

The interoperability of systems is a key enabler. To ensure interoperability, rules and external harmonised tools and standards should be made available. The integration of ERP systems and accounting software/platforms should be supported by international standards, even though it cannot be fully guaranteed by already available frameworks and IT structures (e.g., PEPPOL for e-invoices, proposed national access point networks for international freight transport).

Gaps in adaptable terminology and applicable legislation – "Technology develops faster than the law".

Interviewees have raised concerns about outdated accounting and consumer protection legislation that prevents stakeholders from the compliant implementation of new RTE solutions. The private sector expects the government to be a driver of regulatory development. Namely, it is important to drive legislative changes at the national level to adjust to the new reality of the digital economy.

In cases when the current legislation – in accounting and consumer protection legislation – is paper-centric, the requirements might need to be revised. For example, if the consumer protection law is stating that it is mandatory to issue proof of your purchase to the customer, then it is considered mandatory to always print out the receipts and give them to the customer. The cases, when paper receipts are certainly needed, should be defined. Otherwise, the receipts should just be available electronically, and

[60] https://www.sztucznainteligencja.org.pl/en/trust-can-be-sold-a-conversation-with-robert-kroplewski/

consumers should have the trust that their receipts are always reachable, for example, via apps, bank accounts, etc.

The current legislation often does not say anything about machine-readable receipts. It is important to state that the electronic machine-readable proof of purchase is preferred and accepted as the legal proof of sales and purchase. The first step is to find the balance between the demands of the bookkeeping system and information sharing and collaboration. It is also important to figure out solutions where accounting companies would also be certain that the collected digital proof is sufficient and equal when auditing and controlling take place. The cross-border acceptance should be addressed centrally.

The acceptance of digital documents should be ensured. It is important to start addressing the developments from the perspective of the supply chain processes as well as to support the direct business operations and encourage the RTE uptake among SMEs.

Finally, the actual application of laws should be ensured both at national and international levels. For example, for procurement, everything is in place, but the practical application is missing.

An additional limitation to be overcome with legal implementation is the digital identification and authorisation as well as electronic signatures, and the cross-border seamless use of them. Currently, the lack of a wider common approach poses additional challenges when running any pilot implementations. The most important issue is typically identity check/signing of documents, as well as the ability of public institutions to receive electronic documents. Implementation of digital solutions requires identity verification. From the legal perspective that is the main challenge. In some countries, the tools are not available as a public service. As a result, the requirement to buy a qualified electronic signature service and the lack of interoperability are often seen as an unnecessarily heavy burden by entrepreneurs. Therefore, the development of the "trusted profile" at the national level would speed up the implementation of digital solutions.

Incremental development and pilots are important not only for technology but for legal regulation as well

Regulatory development should follow the agile approach of gradual changes. Namely, the development should be approached via **sandbox and test-before-invest logic**. It means that the proposed legislation, standard or technology implementation should be supported by pilots and iterative testing. It might be risky and time-consuming to have systematic changes without pilots, as it is not known what is impacted by large changes.

Private sector enterprises should be actively involved in the legislative process. For example, ITL Estonia has given suggestions in terms of the legislative framework.

Interoperability and competition between Real-Time Economy platform providers

"It is also about thinking about how the different systems should be connected. "

Interoperability covers legal, organisation, semantic and technical interoperability elements.[61] From the legal perspective, interoperability is an important competition law aspect. Whereas small platform providers might favour interoperability to gain market share, larger companies might disfavour operability in order to maintain their market share.[62] Ensuring interoperability is thus not only a question of smooth technology but also a fair competition market.

Legislation should also be **technology-neutral**, meaning that it should avoid referring to any specific technology.[63]

For example, Finnish Public Administration API Principles promote the provision and use of public sector information and functionalities primarily through APIs.[64] Their goal is to "increase customer orientation,

[61] https://www.dimecc.com/wp-content/uploads/2018/05/2_Olli-Pekka_Rissanen_Role-of-the-Government-in-Real-Time-Economy%5EJ.pdf.

[62] https://www.europarl.europa.eu/RegData/etudes/STUD/2015/542235/IPOL_STU(2015)542235_EN.pdf

[63] https://joinup.ec.europa.eu/collection/interoperable-europe/legal-interoperability

[64] https://www.avoindata.fi/en/api-principles

cooperation, semantic and technical interoperability, reusability, attention to information security and data protection, and quality in API development".[65],[66]

Data privacy

Using collected personal data for the agreed purpose

It is important to provide private sector players with sufficient guidance on how innovative solutions can be used. According to an investigation carried out by a watchdog organisation called **Which?**[67], private businesses mistakenly used e-receipts they send to their clients by email as an additional marketing opportunity. Namely, one shop sent a marketing email with the e-receipt attached, while others included prompts to sign up for a newsletter or invitations to complete a survey in return for money off a future purchase.[68]

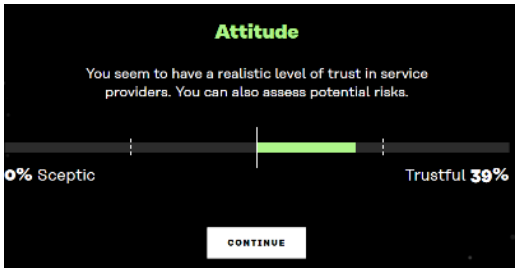
Data hosting aspects

Schrems II decision[69] has a significant impact on managing real-time economy pilots that might have an association with software providers hosted in the United States. Namely, as a consequence of the Schrems II decision, data exporters wishing to transfer personal data outside the EEA based on Article 46 GDPR are preliminary required to carry out a case-by-case assessment of the legal system of the recipient country to verify whether it "ensures adequate protection, under EU law, of personal data transferred pursuant to standard data protection clauses, and in case of a negative assessment, adopt "additional safeguards to those offered by those clauses" to satisfy the EU level of protection.[70] This can slow down or even block the onboarding of certain software providers to the development of RTE solutions in the European Union.

Case study

Finnish Innovation Fund Sitra has developed an interactive test that helps to answer the question "Is your personal data valuable enough for you to protect it?". This test raises important data privacy topics and explains them in simple English.

Figure 21. Excerpt from the test: progress tab [71]



Data security

Real-Time Economy is about managing financial data, including pricing information. The leakage of such data might distort the competition and affect the whole economy. Such leakage might happen as a result of a cybersecurity attack or even based on the intent of the government official to trade the data.[72] Legislation should provide sufficient safeguards for enterprises and consumers.

How to make the real-time exchange of data ethical?

[65] https://www.avoindata.fi/en/api-principles
[66] https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/163866/VM_2022_14.pdf?sequence=1&isAllowed=y
[67] https://www.which.co.uk/about-which/who-we-are-azQ8t7R93VDg
[68] https://www.theguardian.com/business/2018/dec/11/e-receipts-from-major-retailers-may-break-data-protection-rules-which
[69] https://curia.europa.eu/juris/liste.jsf?num=C-311/18
[70] https://blog.pwc-tls.it/en/2020/12/10/the-edpb-recommendations-international-data-transfer-after-schrems-ii/
[71] https://digiprofiletest.sitra.fi/
[72] http://kluwertaxblog.com/2021/03/04/how-modern-technologies-can-help-to-efficiently-implement-real-time-reporting/

"Small and medium enterprises tend to do things on paper. When they make a mistake, they throw the paper away and print a new one, and everything is fine. They are afraid that all mistakes are visible when they move towards digital. It takes some time to overcome this fear in favour of efficiency."

The government should take ethical considerations into account to ensure that enterprises and consumers are not afraid of digitalisation and do not perceive it as a tool solely designed to pursue the government's own objectives of control and crime prevention. The digitalisation journey for small and medium enterprises might entail unwanted mistakes and technical challenges. In this case, clearly formulated ethical principles can ensure that companies and citizens are not afraid of moving away from paper documents.

European Commission has issued **Ethics Guidelines for Trustworthy AI** that cover aspects of human agency and oversight, technical robustness and safety, privacy and data governance, transparency, diversity, non-discrimination and fairness, societal and environmental well-being and accountability.[73] Even in cases when the real-time exchange of data does not include an AI element, these ethical aspects are important for the Real-Time Economy, especially as the Real-Time Economy is aiming for supporting businesses in data-driven decision-making.

Australian Taxation Office data ethics principles are a good example of a clear and simple explanation of how user data is used for the purposes of tax compliance analytics, as well as what the authorities are doing to ensure transparency and fairness.[74] Namely, the ethical principles clearly state that "data and analytics provide us with a real-time view of your tax and superposition, current circumstances, previous history with us. As a result, the service you receive is tailored to your circumstances." In addition to that, the principles clearly state how data privacy and data security are ensured, which shows that ethical questions of the Real-Time Economy come hand in hand with legal certainty.

Use cases

For the explanation of the regulatory affair, we have introduced additional personal examples to illustrate some key concepts. Legal, ethical and governance aspects of Real-Time Economy development cover multiple aspects.

- **Data exchange between multiple stakeholders, including government authorities and private stakeholders.**
  - Example case: Maria has started a new business and has purchased a basic ERP module for beginner entrepreneurs. Maria now can press the button to confirm the transaction (when reporting is done at a transactional level), and the data will be automatically sent to the Tax Administration via this ERP module through seamless integration. If Maria needs to send aggregated transactional data for a specific time frame, the aggregation can be done via the ERP module before sending out the information to the Tax Administration. However, there should be a clearer legislative basis for transferring and processing such data for a defined scope of purposes, aligned with the rules of the VAT Act.
- **Data privacy.**
  - Example case: Maria has opted in for a service that analyses the data about her purchases as a consumer in the grocery stores chain and draws conclusions on how healthy Maria's diet is solely based on the amount and types of purchased products. For Maria to use this service, she should be confident that this data is not transferred as a result of a data privacy incident or a malicious intent to the insurance company that might lower her insurance score.
- **Interoperability of systems.**
  - Example case: Maria's business is growing, and Maria wants to switch from a basic ERP module provided by Company A to a more advanced ERP system provided by Company B. Legislation should create incentives for making systems interoperable, preventing the ERP system providers from developing the real-time reporting solutions that the client cannot easily transfer from.

[73] https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines/1.html#top

[74] https://www.ato.gov.au/About-ATO/Commitments-and-reporting/Information-and-privacy/How-we-use-data-and-analytics/

- **Ensuring fair competition and protection of consumer rights in B2C transactions.**
  - Example case: Maria's grandmother has received a text message stating that from the next month, she will receive e-invoices directly to her online bank account instead of paper invoices that she was used to paying at the local bank office (as she is not very proficient with modern technologies). If she wants to opt out of this system, she should timely respond to the message and send a reply message "No" to her insurance provider. Legislation should ensure that the consumer can easily implement her or his rights regarding the choice of invoicing approach and prevent the unfair burden on certain categories of consumers.
  - Example case: Maria receives an e-receipt directly to her mobile phone after completing grocery shopping at a large retail chain in Finland. An e-receipt should be easily accessible and readable and should not contain extra information that Maria has not given consent to, for example, a marketing newsletter attached to the e-receipt.
- **Data security.**
  - Example case: Maria's transactional data contains business secret information, such as client lists, pricing decisions and discount system approach. In case this information is leaked as a result of a cyber-attack, her competitors might get a competitive advantage. If there are no sufficient safeguards in place, Maria might be favouring paper accounting and tend to keep papers securely in the safe.

7. Operational environment of RTE

The current chapter focuses on providing the background for the current RTE framework – strategies, structures, priority in general in the observed countries, map and explain current RTE priority streams, currently active projects, initiatives and research, key achievements and challenges, key upcoming prioritisation outlooks and key actions/priorities possibly weighed.

The operational environment for all the countries observed is allowing a strong playground and potential for a growing number of cooperation projects.

There are countries which are more limited in resources (human capital and financial) or limited to their current attention-consuming priority actions.

Seemingly, all countries are open to new priorities and are ready to arrange the priorities flexibly being able to adjust the priority and manpower to the set agenda.

The current RTE framework – strategies, structures and priority in general – are available to support the possible engagement of all the countries in individual national or international projects for RTE building blocks or governance matters. Most of the Baltic Sea Region countries have a strong will and policy domain for RTE. Even if dedicated strategies might not be in place, the priorities have still been taken and motivated work on real-time economy space is taking place.

Finland, having the strongest framework for RTE in place, is the strong frontrunner in strategically placing all RTE-related activities into a single project. Yet, the supply chain domain and transport remain beyond the focus of the Finnish project as well as outside the scope of the NSG&B project. At the same time, Estonia, Latvia and Lithuania have developed several combined solutions and a valuable cross-border prototype, especially in the e-CMR domain.

A number of developments and projects (such as KYC and e-CMR) so far have emerged from the opportunity of having the project and not as much based on a reason of having long-term strategies behind them. Yet, those have served as a quick win and a positive showcase to build strategy elements upon. As priority has been given to **certain international projects or national studies, the strategic priority can be set and implemented without the national framework strategy in place**. The projects so far show the lead on which topics have been more prioritised and which of the directions would suit best for the joint work.

The current RTE priority streams would therefore be well-mapped within the projects that have taken place and are currently in progress. For the Nordics, priority is on the business-to-government information exchange on the user as well as at the platform/service levels. In the Baltics, priority has been given to topical projects such as e-KYC or e-CMR, with the needs of business primarily in mind.

Current active projects, initiatives and research as well as key achievements and challenges are well in line with the financing perspectives. For the Baltics and Poland initiatives are relatively lower and limited to the scope of a single or few building blocks at the time, whilst for the Nordics, the initiatives are combined to a larger framework programme and project covering many topics in a coordinated way.

The experience and coordination of cross-border cooperation, networking, updating, aligning priorities and negotiating for European-level policy is well in place and could be considered a great asset. Yet, we can see **strong segmented cooperation spaces**. For the successful emergence of new common topics and projects, those regional spaces need to meet each other, combine their strengths, grow a joint community and benefit from the cross-exchange of practices.

Key upcoming prioritisation outlooks so far have been the extension of topics and growth in the amount and budgets of projects within the already existing networks. During the current study, more and more reflections were given on **possible extension of the current projects to other networks of countries in the region** aside from the internal growth. Even for ongoing projects, external learnings would be beneficial and useful, as they can fill in gaps in solution planning, support in validating the

pathways that perhaps are being weighed or assess the already evolved or applied policies or solutions with external benchmarking.

Key actions/priorities for upcoming years are nevertheless very similar to all the observed countries independent of their current actions, policy frameworks, networks or projects.

Though the European Union level has been the first external level of cooperation that each individual country should look at when thinking of international standardisation or common rules for some building blocks, local regional cooperation has been a tool to support the coordinated opinion. As the European Union has only set a group of standards for e-invoicing, might set some standards for e-receipts and will set for some supply chain operations, **a good understanding of best practices and workable solutions** becomes helpful when negotiating or planning the actual implementation of such standards nationally.

Between national and European levels, the **regional interoperability** in joint understanding as well as **compatible standards and application validation** should be addressed even in cases where the European Union regulations seem to set guidelines.

8. Technology and standards

The current chapter observes the potential quick wins, current and upcoming pilot and proof-of-concept projects, technical preparedness for the cross-border data exchange, technical support needed, existing technology building blocks for a cross-border economic model, digital ecosystem to support cross-border cooperation of the countries in the Baltic Sea region.

For potential quick wins, countries welcome small solutions that have been already applied or are quick to set up. It is important that businesses can easily take such solutions into use and that it is easy to communicate the benefits of such solutions. For example, businesses can clearly see an added value from accounting software features that are aligned with e-invoicing.

There are current and upcoming pilots and proof of concept projects in each of the observed countries.

Technical preparedness

In regard to technical preparedness for the cross-border data exchange, interviews with the stakeholders and case studies reviewed **proved a high technical preparedness.** All countries indicated a strong **ICT competence,** IT planning and process-centric approach which takes into account the origin and creation of data within the whole business cycle on the one hand and cybersecurity and distributed systems competencies on the other.

The Estonian, Latvian, Lithuanian and Polish strong experience with e-governance and high-level uptake of e-IDAS and Connecting Europe Facility (CEF) tools such as e-ID and e-signature and the interoperability of them to each other proves a **good foundation to build cross-border solutions immediately when applying new rules and setting up solutions**. The best practices of business-centric and integrated application of e-invoices in Finland and Denmark, for example, contribute to technical input on the business process and integration technologies. New methods such as semantic interoperability as well as new CEF tools such as digital wallets can also be referred to as technological competencies that, for example, Sweden can bring and lead.

Technical support needed

The stakeholders indicated the necessity of reflecting recommendations on architecture analysis of technological components as well as information systems connectivity. It is also important to utilise the potential of cooperation among national experts. Onboarding additional experts, possibly from other domains or external competence centres will make it possible to adjust or onboard IT tools with greater strength and analytical decision-making basis.

Stakeholder interviews and cases analysed show that the **technology building blocks for a cross-border economic model are available**. The key building block of a distributed network of government and private registries and information systems (X-Road concept) has a strong regional capacity. However, the technological X-Road structure might not be applied wider than in Estonia and Finland only. Sweden, Denmark and Latvia are observing the implementation of the components to mitigate the public registry or public-private connections, identification of users, authorisations, evidence and logs, and cyber security affairs.

International and European Union level integration of dedicated registries that fall under EU regulations on interoperability is desired in all the observed countries. For that matter, customs systems, specific tax registries, Maritime Single Window or vehicle registries, internal security databases and services are already interoperable across the EU at the highest levels and tools requested by EU e-governance interoperability rules.

Despite the need for some evolution in the digital infrastructure and related rules upgrade, the basis for technical and governance ecosystem to support cross-border cooperations is well present.

In the Baltic Sea Region countries, there are **tools and standards in place making technology foremost an enabler.** From a technical space perspective, there are no major problems in terms of Real-Time Economy services as several companies are skilled and ready to contribute to developing Real-Time Economy building blocks. However, the **bottlenecks are more related to collaboration networks**, including also agreements on standards. There is a need for robust and budgeted project plans for the RTE implementation.

According to the data gathered, the observed countries have relatively good **infrastructure for e-invoices**. One of the reasons for this is a strong lead by the EU on harmonising the e-invoice processes and agreeing on one joint umbrella standard for e-invoices. Therefore, **Baltic Sea Region countries are compatible with the EU-wide e-invoicing standard PEPPOL BIS, which is based on the EU e-invoicing standard, but also has some more detailed specifications.** The strength of PEPPOL is that it has a common core, and each country can have specific additions. In the case of other Real-Time Economy building blocks, there could also be a backbone, that also allows local variations. In addition, EU-wide standardisation in the case of Baltic Sea Regions has also made incentives for national e-invoice standards further developments like the case of the Polish national standard.

Similarly, the EU has put a lot of effort into harmonising the **electronic identification (e-ID)** processes within the EU. From the technological and standardisation perspective, the e-IDAS framework makes the use of e-ID possible also in the cross-border context, at least conceptually. However, the issue lies with a very diverse adaption of e-ID in the Baltic Sea Region – some countries (like Estonia and Latvia) have made e-ID a core part of everyday transactions that is also indicated by very good take-up rates. However, in some other countries (like Finland), the e-ID has been technologically implemented but with lower levels of take-up rates.

In addition, **electronic business data** has become much better and integrated both at the country and regional levels. For example, tax authorities have started to benchmark tax data against how other similar businesses operate.[75] Sweden has invested in a dashboard[76] to bring together various data related to government information and services for business owners and aspiring entrepreneurs that have 3-4 million visitors annually. In addition, thanks to the collaboration with business registries, there is some evidence of corporate data being exchanged also cross-border.[77]

In terms of **digital receipts**, there are several good examples from the region but most of them tend to be one-retailer based and with no or limited way of access to machine-readable data. Finland is quite active in getting e-receipts standardised at the EU level: "If everyone has their own national standards, nothing changes." As an illustrative example, a start-up company based in Stockholm has managed to integrate receipt data from several retailers with a combined view on expense management for corporate clients. Although the service has been incubating in Sweden and has over 30,000 clients, the company recently raised additional funding to start operations also globally.[78] From the technological perspective, e-receipts are similar to e-invoices (e-receipt = paid invoice) and both standards can be harmonised.

In terms of Digital Product Pass, Nordic Smart Government and Business is actively looking into product and service information standardisation, which set an example for the Estonian government – the Estonian Ministry of Economic Affairs and Communications sees **the standardisation of information on products and services** as the next big thing.

Furthermore, a universally important component for most countries and organisations interviewed is **data interoperability**. Technically, this covers various sub-topics ranging from data privacy to data-driven reporting and better data analytics. According to the Estonian example, there is proven evidence of how different organisations can exchange secure data via a data exchange layer, the X-Road. It is important to note that the X-Road is not extraordinary because of its technological features (there are plenty of enterprise-service bus platforms available following the same logic) but mainly because it is a case of successful implementation, both organisationally and legally. It follows a rule-based approach, and all these rules need to be defined (e.g. who can make inquiries to a specific database and how). Briefly, in Estonia, over 3,000 government sector databases are interlinked via the Internet using the

[75] https://maasikas.emta.ee/rating/search
[76] https://www.verksamt.se/
[77] https://toop.eu/pilot-area1
[78] https://arcticstartup.com/findity-raises-nearly-e5m/

transport layer. However, the X-Road has mainly been used as a simplified access point to the registry data. The level of data-based reporting and analytics has not been that mature. For example, only 5% of all Estonian businesses declare their VAT reports directly from their ERP to the Tax Administration over X-Road and in a machine-readable way even though at least 20% of companies have the access to X-Road connectivity.

Technically, if the data would be exchanged also among the business sector and cross-border, we could have federated data exchange layers between various organisations and countries. Currently, most countries and many organisations operate as “digital islands”, but the federation of data exchange platforms could effectively lead to joint digital services based on real-time data requests. In addition, better and more secure access to data could also lead to better data analytics, data-driven reporting and real-time data-based services.

According to the Danish Business Authority, it is very difficult to find the business case, especially at the cross-border level: “One of the recent pilots on having e-receipt moving between two countries – Norway and Denmark – sounds easy, but it has to comply with regulations in two systems.” In this light, the principle of **technology neutrality** could be applied before specific choices are made. One option for this is semantical standardisation that helps to be technologically neutral, according to the Estonian Ministry of Economic Affairs and Communications: “We have preparedness and technical possibilities, but we need to agree at the levels of different technological parts. /--/ Everything should be API-based. The private sector is used to working with it.” According to the Swedish Business Authority, Sweden has been progressing well in terms of semantic interoperability and understanding taxonomy in more depth.

9. Innovation and research

The current chapter investigates innovation and research, mechanisms for selecting innovative solutions for further analysis, as well as support, development and testing of proof of concepts, research cooperation and collaboration with universities in the Baltic Sea region countries.

The mechanisms for selecting innovative solutions for further analysis, as well as selecting projects for development and testing might lack long-term regional-level strategic thinking. The preselection of priorities has been taking place based on two streams of decisions: the European Union priorities or national decisions and priorities.

For motivation for innovation or research based on the recent or upcoming changes in the European Union regulatory space, e-invoicing or e-FTI developments are pushing for more work, both at national, regional and international levels leading to works and studies related to the dedicated building blocks. The European Union's developments in e-governance tools, such as e-IDAS or digital wallets also strongly contribute to the evolution of RTE projects. Such developments as e-ID or access to public registries, interoperability of business registries across the EU or allowing the VAT calculations to be followed across borders are also directly enabling the development of the specific RTE building blocks. For such developments, it would be wise to conduct wider studies that take the regional aspects into account. It would be also important to identify solutions whose potential has been overlooked earlier.

For the **motivation for innovation and research based on national interests**, case studies, analytics, cost-benefit models, guidance, regulation templates, project plans have been evolved locally, perhaps in a limited and tailor-made manner, using a lot of resources and potentially setting limits on the number and scale of such initiatives. If joint research and innovation were set as a priority at the regional level, it would create the foundation for reflecting the best example applications, improvements in documentation, transferring lessons learned and combining the outcomes into a pool for joint use. The knowledge in that segment is publicly available, but **combining, comparing and aligning across the necessary building blocks might need joint priority taking, collaboration within a project or network and possibly also external support and contribution**. Such support again can be provided by consulting and research communities which might already have experience in sectoral dedicated studies or the observed projects directly.

For the evolution of the solution, preparatory work on information exchange and information system connectivity architecture has to be done. To support the assessment of alternatives, scenario modelling and cost-benefit analysis can be applied.

The business sector can also benefit from the **research and big-picture assessments presented from a third-party view**. Experts and consulting companies, research centres and universities become important partners and invaluable contributors. It is important to collect both national, regional and international expertise as in several cases there are no easily transferable benchmarks. For several RTE solutions, for example, cross-border e-invoices or functional e-receipts, a set of rules for national services and file standards is often not sufficient. Stakeholders would like to avoid making many national standard adjustments to their business management, accounting and enterprise resource planning software.

Several of the representatives of stakeholders in the countries observed also highlighted the direct need for **topical research at universities**. In that matter, several sub-domains or building blocks were highlighted: among them most importantly the general understanding of **RTE, the RTE cost-benefit or impact assessment studies, RTE-related competencies in analytics of enterprise architecture or business processes, intersections of e-governance and business IT, standards and data models, semantics, interoperability, policy and legal affairs.**

There is also an urgent need to engage more prepared experts to work for the RTE in the government and private sector, as well as in the associations. Universities, vocational schools and training centres, after familiarising themselves with the RTE concept, could develop training programs and case studies

on RTE topics. It would help to get a qualified workforce (e.g., business analysts and system analysts for RTE proof-of-concept projects) for the RTE-themed projects much faster.

The application of e-invoices has been the most radical innovation in the field of RTE. For example, in most of the Baltic Sea Region countries e-invoicing is mandatory in the public procurement processes and transactions that involve the public sector or national authorities. In a number of countries (like Denmark and Finland), take-up rates of e-invoices have been very good thanks to the systematic support from the government and ensuring that the integration with main bookkeeping systems and services is working well. In Latvia and Estonia, the adoption of e-invoicing could be better, according to the stakeholders interviewed. However, the current problem is about how e-invoicing could be more widely used in business-to-business transactions.

Another domain that has provided a good potential for radical innovation is the **digitalisation of taxes** in several countries. For example, several countries in the region have upgraded the process of VAT declaration and reporting, as well as the cross-border extension of the returns on VAT based on the EU legislative space. The application of transaction-based VAT reporting has also become a useful tool. In Estonia, RTE has also contributed to the efficiency of VAT tax collection rates when the Tax Authority started to automatically connect all transactions over 1,000 euros that significantly reduced the potential fraud level. In Finland, there has been a significant upgrade of the tax authority software – instead of 17 separate software solutions, there is now one software. This has noticeably reduced the reporting time and effort of citizens – filing the pre-filled income tax report takes now just around 6 minutes. However, at the cross-border level within the BSR, this is much more complex – each EU country has sovereignty in taxes. The VAT reporting could be much more simplified, as was stated by the tax expert working for the Technology Industries of Finland: “Everybody understands that it is not useful to file 26 VAT and income reports.” According to them, most EU countries could digitalise their taxation within the next 5 years. There is also further potential for RTE solutions not only to simplify the process of reporting but also to handle the reporting in real-time.

During the interviews, also potential case studies of future RTE were suggested. For example, similarly to income tax reports, **VAT forms could be prefilled** for companies. Even 70% of automation coverage saves a lot of administrative burden. There is already some evidence in the case of automated salary taxes payment and reporting to the tax authority. One Estonian bank (LHV) has created a service where customers can declare their salary payments to Tax Authority directly from the bank allowing them automatically to pay all taxes and do tax reports with one transaction.[79]

In addition, there is also **a lot of potential around e-receipts**. In most BSR countries, key retailers are offering digital copies of receipts, whereas paper-based receipts are slowly disappearing. Nonetheless, often those “electronic” receipts are copies of paper-based receipts (e.g. in PDF version). They need to be digitalised for making those machine-readable and integrated with accounting software. However, a retailer in Finland, S-group, has introduced an S-business card where purchase data will automatically be processed into the most common accounting software and to the specific accounts (e.g. purchases, VAT etc). Ideally, this type of service could be extended also to smaller companies.

There are also several cases pointed out by the interviewees related to **digital transport data** in the region. For example, Lithuanian and Estonian industry associations pointed out real-time passenger data pilots and e-waybill pilots as success cases. For example, in the case of automated vehicles, one operator could manage up to 12 vehicles in real-time. The Lithuanian industry association representative pointed out the need for a more agile government as the current **latency in services** is too long: “Significantly more public services could be provided in real-time. Instead of 20 working days, some services could be provided in real-time.” **Sandbox approach** – start with small pilots and then scale up – **can help the government to become more agile**. Danish Business Authority has already taken this approach.

Most interviewees also agreed that the Baltic Sea region is well positioned for cross-border piloting thanks to the good digital infrastructure. In general, there is also an increased demand for automated reporting for RTE.

[79] https://www.lhv.ee/en/salary-payment

From the research perspective, there is some evidence of RTE research both in Finland and Estonia. In Finland, Aalto University has established a Real-Time Economy Competence Centre[80] jointly with software company Tieto. This Real-Time Economy Competence Centre has contributed to the research on RTE standards and methods. It has also been organising annual RTE conferences. The fifth (and most recent) RTE conference took place in the end of 2019.[81] In Estonia, the Ministry of Economic Affairs and Communications has developed a Real-Time Economy portal[82], for covering and supporting RTE activities in the Baltic Sea region. The annual research award for the promotion of real-time economy can serve as an example of such support.[83]

[80] https://www.aalto.fi/en/department-of-information-and-service-management/real-time-economy-competence-center
[81] http://conference.rte.fi/
[82] https://realtimeeconomy-bsr.eu/
[83] https://realtimeeconomy-bsr.eu/research-award

10. Readiness for Regional Cooperation

The current chapter explores the expectations from cooperation in the Baltic Sea region countries (priorities and cooperation methods). It also reflects some of the main current cooperation channels and partnerships and maps the experience and expectations from the EU level cooperation and support. In addition, it provides some insights into the involvement of the private sector or associations/networks in cross-border RTE development already and potentially in the future.

Second, it looks at what would be the top regional priorities regarding Real-Time Economy, automated real-time reporting and seamless administration that should be applied at the national, regional level or EU level for supporting the RTE developments in the Baltic Sea region.

The expectations from the cooperation in the Baltic Sea Region (priorities and cooperation methods) focus on direct wins and opportunity to **"use neighbour's best practice with pride" and "create new joint solutions"** ensuring that countries do not do the same work at different places at the same time is a key objective. By connecting and innovating together as a region, it is possible to use the resource pool much more effectively. Each country can work on a few important elements/blocks for everyone to use. Intellectual property and IT law best practices should be also implemented, especially to support more advanced RTE development.

There is a strong hesitance and observatory position held by some of the countries in the region (Sweden, Denmark and Poland), especially when looking into options for engaging in international projects or hands-on development. At the same time, the necessity of coordination of discussions on policy setting is prioritised by every country in the region.

In a number of countries, there is **a strong willingness to collaborate on a joint regional priority agenda on RTE affairs** which would be setting the importance (for example, working on vision documents). However, these countries would not be as ready for detailed cooperation plans or joint region-wide roadmaps that impose priorities too early.

Even though the countries have a good understanding of the RTE concept, they would benefit from the **creation of a documented system of RTE elements in a form of a library** and concept framework explanatory, developed specifically for the Baltic Sea region. Such documentation is considered helpful also for setting and structuring national priorities, developing agendas and strengthening the decisions on international priorities, project engagement and joint work.

The experience at the EU level cooperation in the region on RTE is rather limited. Most of the coordination had taken place for the e-invoicing preparation. Some work is also being undertaken for e-receipt preparation. Cooperation on supply chain building blocks (e-CMR and e-FTI) has strong networking and coordination in some regional spaces, but not across the whole region either. At the same time, for example for Estonia, Latvia, Lithuania and Poland, the key stakeholders for supply chains and RTE building blocks largely overlap.

The **countries' expectations from the EU level cooperation and support in standardisation are very high**, yet suggestions to be made and solutions expected do not have regional backing nor clear national support. The countries that often have hoped for the EU to be the external coordinator for international standardisation, see the value of regionally organised work on building blocks, exchange and proof of best practices. Regional projects would serve as the safe testing area, allowing to elaborate on alternative options as well as to validate concepts prior to making actual legislative decisions.

Such soft cooperation is seen as a safe way to test out standards and business processes, which might need adjustment during the implementation process. In such a way, it is possible to achieve savings on the preparatory costs, development costs, and costs of reorganisation for both businesses and governments in case they need to rework the solutions several times.

The current main cooperation channels and partnerships cover joint projects that have included a high number of stakeholders from a relatively big number of the countries involved. The second important channel is **direct contact between organisations**, both public and private sector representatives, which often are maintained on an individual contact basis.

The involvement of the private sector or associations/networks in cross-border RTE development has been very high and is seen as a key for both national and international successful RTE implementation. As government cooperation and engagement often needs dedicated decisions and structural frameworks, the associations, networks and projects can serve as the mediating method to keep the topic organised and to receive support in the dissemination of news, updates lessons learned and best practices.

While the countries in the region would be needing to set the top five joint regional priorities in regard to RTE, automated real-time reporting and seamless administration, the **majority of the countries would prioritise exchange of understanding as well as possible alignment of potential quick wins and joint obstacles**. The first action the countries would be ready to engage with would be networking to reflect their positions to others and potentially understand the bigger joint picture of RTE in total.

Mapping the gaps would be the second activity. It can be done through observing the options to exchange their best practice knowledge and components, also described as “copying”, which understandably has to also be coordinated in a respectful and financially backed manner.

Third, the countries would be ready to discuss options **to develop standards, architectures and solutions for cross-border RTE application** in quick win domains at first to prove a success story for a building block, but also test out and prove that international cooperation is also handy to coordinate. After the testing, countries are ready to engage in large-scale projects including coordinated research, innovation, large-scale building blocks, possible legislative changes and more advanced EU technical or policy building blocks.

The countries are expecting international cooperation to support businesses and ICT developers in their works for bringing better services and interoperable solutions to the market. In order to achieve that, the countries are ready to observe the best standardisation and process modelling options that might not require too many resources but would greatly support the organisation of the service provider market.

National level works taking place to support international cooperation should work on dedicating some manpower to starting regional RTE ecosystem development, as well as to working on roadmaps and next steps in projects or policies in general. It would also be important to attend weekly or monthly update events and organise the update streams both ways, in order to communicate success stories, bottlenecks and improvement suggestions.

Regional level work should be dedicated to standardisation, e-governance and EU-level building blocks review, RTE success story mapping and gap analysis, as well as discovering options for joint funding and projects. Such projects could be taking place with the initiative of the public or the private sector. Most importantly, they should carry the same general aims, strategic steps and selected components that help with setting a big picture.

EU-level coordination starts from regional cooperation and can result in better regulatory space if the work starts first with the regional clusters and then moves to the level of the whole European Union.

In summary, all observed countries reflect a high potential for cooperation needs. All countries in the region are at the same technological level and have a shared understanding of the target situation. For example, they share an understanding that the government should not be controlling everything. The digital mindset and trust towards government IT is also similar across the region.

Sweden and Denmark see the main cooperation in their current network project, Nordic Smart Government and Business, potentially would be ready to seek the extension of it across the region. Estonia, Latvia and Lithuania see a strong potential in common vision-setting and wider use of the term for the competitiveness of the region as a whole. Finland has not been seeking too extensive external cooperation in projects beyond the NSG&B, but still would see value in exchange for best practices.

To facilitate the coordination, there is a need to actively engage national stakeholder networks.

11. Priorities for cross-border cooperation

A strong focus is being kept on the best streamlining of the methodological approach across the works and deliverables. In addition to that, minor upgrade specifications are being applied to add value and strengthen the results.

RTE in the Baltic Sea region. For example, the community and stakeholders reflected the need to organise the possible cooperation options without strong current policy framework limits or gaps. Therefore, the concept of BSR was replaced with “region” to shift the space of operations from governmental cooperation to organisational.

Roadmap preparation to explore alternatives and parallel streams, scenarios of different combinations or strength levels of cooperating. For the countries that in general have no governmental or stakeholder agreements behind the state of art statements and engage in such discussion for the first time, the roadmap should seek options to suggest alternatives or implementation options of “menu” items to engage in a stronger or milder way.

The roadmap should serve as a basis for further discussions and common ground for priority setting, establishing foundations for more detailed discussion. The countries would possibly like to use the roadmap as a tool to negotiate the next steps and agenda setting. Therefore, the roadmap has to allow alternatives and different streams of work, but not strongly impose any specific way of doing it on the countries. Still, the roadmap should be able to convene a strong message on the way forward, supported by cost-benefit analysis and stakeholder consultations.

RTE best practices from the European Commission.

As an option, Commission DGs (DIGIT and CONNECT) can be consulted with as potential sources of best practices as they provide enablers for cross-border interoperability. For the observation of the building blocks domains, DG MOVE developments on real-time logistics and freight transport information would be worth exploring to showcase a variety of standards and platforms that are prospectively brought together around cross-border harmonised government reporting.

The current chapter looks into the key findings on the RTE development priority setting within the region. It will act as a basis for further gap analysis during the development of a joint RTE roadmap and vision.

11.1. General takeaways

- E-invoicing is a building block that is based upon a dedicated set of Regulations.
- E-receipts are the integrated part of e-invoicing and are actively on the table for several Member States.
- E-CMR is supported by e-logistics regulation (e-FTI regulation) allowing the standardised approach.
- Sustainability reporting is of growing importance. Quick evolvement is foreseen in that domain.
- The region is ready for joint implementation.
- There is a clear need to form a discussion forum to bring all the silos to one single space.
- Day-to-day or weekly conversations in a non-official manner are very important.
- Cross-border working groups that try to achieve mutual/common goals are key to success.
- It is important to acknowledge the fact that not everyone is not fully aware of the current state of art.
- Local working groups should be supported by regional efforts (bottom-up and coordination).
- Governing body/network/project could be established.
- External kicks are needed for the development of each building block.

11.2. Regional strengths

Baltic Sea Region countries have the following strengths:

- All respondents and country representatives were highly optimistic about the availability of resourcing to pursue the best practices.
- Lithuania and Finland strongly highlighted their best practice of government-business cooperation and methods to build strong cooperation between stakeholders.
- Sweden highlighted their strength in high-quality structure work in planning the RTE work on a bigger scale (such as data analytics and ontologies).
- Latvia highlighted the strongly integrated and homogenous IT background (at least in the Baltics) as their own regional best practice and strength.

11.3. Opinions on setting priorities in the observed countries

Estonia:

- Business-centric approach to RTE coordinated by the government.
- All building blocks have been set as priorities, not all are developing at the same pace.
- A variety of methods is assigned, and no aligned methodology is applied across the building blocks.
- Key players are the Ministry of Economic Affairs and Communications, Tax and Customs Board and Statistics Office, as well as the Ministry of Environment and Centre of Registries and Information systems.
- Estonia practises a “prioritise-test-pilot-develop” approach that is based on the actual needs. It has helped Estonia to make huge progress on several building blocks by not waiting for all other elements to become clear.

Latvia:

- There is strong process-centric development in many domains.
- There has been one strong strategy (from 2017) that has induced the use of public databases and open data approach.
- The key drivers behind developments have been tax and financial reporting aspects based on the easy processing, but also transparency-aimed motivation.
- Key players are the Ministry of Economics and the Ministry of Environmental Protection and Regional Development alongside the Tax Inspectorate.
- Latvia stresses and underlines the importance of research and academic input as well as the engagement of universities and research communities in the discussion.

Lithuania:

- The work has been motivated by the government’s understanding of the perks of e-governance opportunities to support businesses and ease the processes.
- The key drivers have been tax and financial reporting aspects, and key procedures have been digitalised to a great extent to host full visibility (namely, iVaz platform, where transport documents must be uploaded; e-invoicing solution, where government database stores full invoice information for VAT calculation).
- At the same time, the stakeholders express a strong feeling that the current and upcoming developments should not focus on government control-based solutions but would allow more solutions to be developed in a way, that businesses do not need to upload or publish all their data to government authorities.
- Lithuania highly stresses the necessity of finding ways to cooperate in brainstorming what should be done and how.

Poland:

- Some work on digitalisation has been empowered by the opportunity to support the visibility of business operations and tackle the fraudulent, but also fuzzy and burdensome reporting procedures for businesses that sometimes cause delays and limits the business cost-efficiency due to difficulties in reporting procedures.
- The shift of trust from digitalisation to gaining control and support the businesses is very high in Poland. It is higher than expected or assumed by looking at the communication and documentation only.
- Out of the countries in the region, Poland is the most regulatory and hierarchical both in terms of strategy as well as operations. There are no developments taking place prior to strong background work. Soft cooperation measures with the private sector and associations are applied, but only in an emerging state.

Finland:

- In Finland, the Real-Time Economy-related actions are aimed at building a national digital ecosystem for business actors that would be compatible with similar systems in other Nordic countries.[84]
- RTE concept is limited to some business accounting and reporting domains. E-invoices, digital receipts and procurement messages are in focus.

Sweden:

- In Sweden, the government tries to sort out all the possible options to find the best application by the workforce and within the Nordic Smart Government and Business project.
- Sweden is the frontrunner in **semantic interoperability.**

Denmark:

- In Denmark, the key best practice is e-invoicing success that will be supported by legislative changes to strengthen the use of digital accounting.

11.4. Suggestions on the roadmap

The general suggestions for the roadmap setup are the following:

- Potentially, not all the countries might be ready to engage and promise a roadmap setup based on their current contribution.
- Potentially, some countries are ready to work on common vision-setting agenda, as well as to take part in the implementation of a project in key areas to be defined later.
- Some of the countries are eager to engage in quick-win cross-border projects. Estonia, Latvia, and Lithuania are among these countries.
- Several countries highlight the need to learn from the best practices of other countries (Finland, Lithuania).
- Setting common solution-seeking as a priority in the roadmap would serve a higher purpose and allow a strong common playground.
- A roadmap could be built on the basis of scenarios. This approach would assist in mapping options of potential action plans without putting pressure on choosing a single pathway.
- The ideation board used in the RTE state of play workshop in September 2022 can act as a discussion basis for the further development of the roadmap.

[84] https://www.yrityksendigitalous.fi/en/

12. Target group and users of the RTE

The chapter reviews the understanding and focus of the RTE services' users in the observed countries that are targeted nationally. We analyse who should be considered as RTE users in the Baltic Sea Region countries.

Second, we analyse considered and addressed user needs and expectations from the perspective of both the public sector and associations. Several user needs are currently overlooked and should be paid more attention to.

Third, this chapter provides a review of what changes in the users' behaviour are needed for the better uptake of RTE development, and what would change or impact the user behaviour.

The key users of the RTE services across the countries are the same for every observed country. **Retail companies are present as more advanced users,** as they have digitalised the purchase and order processes via dedicated solutions. They are integrating e-invoicing in the background. The other group of advanced users are enterprises in the service sector.

Young business owners and start-ups are considered to be the target group of both the largest user groups, but they are also frontrunners in improving the services and showing the best example. The targeting of well-established industries is important. Large and small companies are different in actions and successes but do not vary significantly across the region.

The users of RTE in other Baltic Sea Region countries generally are the accounting firms that process the invoices, reports and documentation in the background.

The user needs and expectations are **focused on the overall company business process and life cycle of an order, service or path of goods from its order to delivery**. The users would expect that the solutions would support their interactions seamlessly with each other and with public sector databases in an organised, but logical manner based on agreed rules. The users also expect that the use of RTE solutions would not set additional technical or administrative burden. The **promise to release resources from reporting tasks and associated paperwork** should be a realistic deliverable already when planning the implementation of a solution, not only when using it.

The users also expect that solutions would be operational across borders, and the same/similar operations should be well transferred to operations in each country.

Changes in user behaviours are expected. For example, users are expected to stop keeping extra copies or printouts of digital records just in case. To promote this change, authorities should communicate **a clear message that digital records in a database or external service are sufficient.** Moreover, authorities should have a regulatory fit for controlling purposes, so that records remain available despite possible changes in service ownership. The mindsets of managers and accountants have to change towards trust in digital records.

The service providers should create visualisation tools and dashboards for management to track and review financial reports.

The potentially overlooked user needs are the **need for interoperability of various business information flows**. Currently, several RTE services run on very different software solutions, that are not smoothly integrated. **ERP solutions, accounting software, order catalogues, e-invoicing tools and transport documentation platforms do not necessarily interact with each other**, and data exchange integration might be needed to be done manually causing mistakes and time or data loss. Businesses and business owners also often doubt that new solutions would be efficient enough to solve all the challenges. Consequently, they are not eager to switch from old solutions to new ones.

The communication of best practices and development of coordinated solutions rules would impact user behaviour. The more trustworthy, or certified systems are in place, the more successful the uptake of RTE solutions would be.

All countries in the region strongly agree that the RTE should support the businesses in their operations and should not impose stronger government control. It is an absolute necessity that the users – businesses and consumers – must be in the middle of the developments and set up after Real-Time Economy solutions.

Some of the observed countries have a strong positioning in the government services framework, that is also backed with trust in government IT systems registries and services among businesses and citizens. Therefore, adding more functionalities, layers or datasets to be exchanged would only be welcomed by the community.

- The main aim is to be user-centric and business-centric.
- The authorities are digitalising for their own cost-efficiency and through doing so, provide businesses with immediate benefits.
- Registries and submissions are set up in a way that double submissions are not required for at least the registries under the same authority. However, the goal is to reach full integration in order to support the businesses efficiently.
- The RTE initiatives' ambition is to reduce administrative burden.
- The aim is to find the balance between the demands of the bookkeeping system and information sharing and collaboration.

The businesses are taken as key users, but there is no ambition to intervene directly in their operations or regulate the standards too deeply. In addition to setting some standards as mandatory, there should be alternatives and space for evolution available.

Early adopters are important for engagement, **but in the end, those who have the better service will win**. Governments should provide the framework.

It is important to understand that software development comes down to what is the "**cost of the button or a click"**.

In community engagement, **communication with people and businesses** plays an important role: explaining the functionalities of interface/processes, informing on the benefits and increasing awareness of data handling and security aspects of a solution.

Additionally, the government's role is to support a **good network and engage the community and** stakeholders in the development of the rules.

Sharing best practices to develop the network is one of the keys to the encouragement of further RTE development.

13. RTE user stories

In order to support the state of play analysis of RTE development, we have developed the following user stories:

- As an entrepreneur, Maria sends over 20 invoices to her clients per month. The current e-invoicing solution that she uses has increased the fees. She is looking into the possibility to switch to another solution, as **cost efficiency is a key to her business success** in producing soaps and face care cosmetics (especially, as the cost of raw materials increased in the summer of 2022).
- Heidi, Maria's grandmother, thinks that **e-invoicing is not user-friendly for older people**. She prefers to get a paper invoice and ask her relatives to pay it at the local bank office. She got several text messages from the insurance company that suggests her to switch to the e-invoice, but she was not able to figure out how to do it on her own (it required visiting the bank once more to make the regular automated payments for future invoices or adding online banking and making changes to some settings manually).
- Mary works in a VAT team of a large consulting company. She received enquiries from her clients regarding the assistance of e-invoicing implementation (e.g., Peppol). Mary wants to be able to get **fast access to up-to-date information about countries' priorities and next steps connected with e-invoicing implementation** to ensure that her clients can start preparing well in advance. She might also need to follow up on some questions with the tax authorities and needs up-to-date contact information.
- Martin as an owner of an IT service provider is concerned if the standard and regulatory changes will come at the short notice and without prior sandbox and proof of concept projects. Namely, he is concerned that **such sudden changes will create a high regulatory burden for his company**. In case of such changes, he might have to hire several more developers to work on the software updates (which also includes additional work associated with testing, updating documentation and user guidance as well as training the clients – users of the software).
- Thomas finds it **difficult to strike the balance between flagging each possible legal risk that might arise from the piloting of new RTE solutions and giving the RTE team enough freedom to experiment** with new solutions. David is quite new to the RTE topic and feels that his colleagues expect him to be very knowledgeable about it, but he still needs some support with clarifying technical terms he sees in the software contracts and data protection policies.
- Andrea is interested in **incorporating a design thinking approach in her RTE research**, but her academic supervisor is a bit sceptical about using new methodologies in RTE research, especially as user surveys are very time-consuming, and she has not yet secured the budget for it. Lack of funding also prevents her from extending her RTE research to some interesting case studies in the digital construction industry. She also does not have funding to attend in-person events in other countries to strengthen her RTE network, and online events were mostly done in local languages. Andrea speaks English only and struggles with finding sufficient relevant information on local initiatives.

Below we provide an overview of the main needs, challenges and expectations of our personas for each analysis domain.

Operational Environment

- Jane has recently started her new role as an officer responsible for RTE implementation. As she took her role in the middle of the financial year, she **did not receive sufficient onboarding on RTE topics**. She has previously worked with the XBRL topics and automated tax reporting, but she is not yet fully sure that she understands some RTE concepts correctly. Especially, she is not sure what are the priorities of other countries and what can be a quick win.
- Thomas has previously worked with data protection topics at the Ministry of Employment. He has recently transitioned to work at the Ministry of Economics, working closely with Jane. He does not

yet fully understand what key priorities the Ministry of Economics has and whether they are realistic from the regulatory perspective.

- Peter has a lot of things on his table as vice-chancellor of the Ministry of Economics. His assistant has sent him some links to the RTE materials that cover extensive technical topics, but they do not provide a clear high-level overview of the current RTE landscape in multiple countries.
- Martin is interested in **collaborating with the public sector to jointly develop pilots** that will provide added value to the businesses and at the same time will strengthen the reputation of Martin's company as a forerunner in the government-business collaboration.

Organisation, Culture and Talent

- Jane has seen some changes in the RTE team over recent years. Some persons have moved abroad to pursue new career paths and some of her colleagues have started university studies. Jane has several senior colleagues that are well familiar with RTE topics, but she is struggling to find new junior analysts to join RTE projects. Jane graduated with a master's degree in 2016, and back then RTE was not on her teaching curriculum. Jane is also **not very much familiar with the European funding processes** when it comes to projects related to digitalisation. For example, she is not sure whether she can apply for several funding at the same time and combine them for the same project.
- Thomas feels that **he has not received enough training on new digital topics**, as he has previously worked on data protection matters related to "traditional" processes (such as employment affairs). He does not yet fully understand the added value of RTE and is very concerned about associated data privacy risks and associated increases in workload that RTE projects might bring him.
- Peter has certain **concerns about how the RTE team can attract sufficient funding** for the projects for the next 5 years. Therefore, he is not sure how much of the budget can be allocated to RTE incentives.
- Andrea is interested in **receiving long-term funding for RTE topics**. She wonders how to approach government authorities for a joint project idea. She is also interested in seeing whether she can apply for funding jointly with some municipalities.

Processes and Procedures, Best Practices User Stories:

- Jane has received a collection of links on previous RTE projects in Estonia and Finland, as well as on Nordic Smart Government and Business. She is interested in reading more about other RTE initiatives and main findings to be able to perform her role as an RTE team lead better. However, she does not have enough time to listen to webinar recordings and would like **to have some report summaries in a condensed format**.
- Peter would like to **integrate RTE under one of the key policy** areas but is not sure what is the best policy area that RTE development can be incorporated under.
- Andrea would like to have **access to the RTE community to find suitable contact lists from academia**. She is especially interested in developing a teaching curriculum on RTE for master students in economics.
- Martin would like to **exchange experience with other private sector providers** (especially, software companies that are not direct competitors) on how his company can get engaged in pilot projects together with the government authorities.
- Mary has been invited to comment on the e-invoicing guidelines by the local tax authority. She is trying to **pull best practices from other countries and look into the viewpoints of private sector representatives** in other countries. If she does not find enough information on this topic, she might end up missing the opportunity to provide her input on the legislative process.

Legal, Governance, Security and Privacy

- Maria is **not interested in the legal and privacy aspects of RTE**, as she trusts that the systems, she uses, are secure and comply with the regulations. In practice, Maria's work as an entrepreneur and her private consumer choices might be affected by the legislation in place.
- Thomas is **quite sceptical about the upcoming proof-of-concept exercises at the Ministry**. Part of this work is related to investigating data protection aspects of the e-receipt pilot, and he sees

multiple risks associated with GDPR compliance. He has short timelines to revise the drafts of contracts with the potential software providers for the pilot. He is concerned that some of them might be passing data outside the EU.

- Jane is working closely with David on legal compliance topics. She has a background in economics, and she is **struggling to understand GDPR terminology**.
- Peter needs to ensure that the **RTE program is aligned with the Ethical data initiative** that the Ministry is undertaking now.

Technology and Standards

- Maria would be interested in piloting e-receipts with the clients. However, it can be quite **costly for her as a small entrepreneur** at the moment. She hopes that the cost of being "digitally compliant" will decrease in the future, as e-receipts will also help her clients to return defective soaps and face care products easier.
- Martin wants to **extend his software to new markets**. However, he is not sure what would be the best approach to do it, as he is not sure whether European countries can agree on using the same standards. Existing uncertainty makes it difficult to plan a long time ahead when it comes to the market entry strategy.
- Jane has **a task to develop criteria for successful RTE projects**, that can be used during the RTE hackathon in spring 2023. Jane is interested in translating interoperability requirements into concrete assessment criteria.
- Thomas is reviewing contracts for the upcoming RTE pilot with an external software provider. He needs to **make sure that requirements on technical standards and interoperability are reflected in the contracts** as well.
- Peter wants to ensure that the **implementation of technology standards is coherent with the general digitalisation strategy** that covers topics of AI, government portals for SMEs, as well as sector-specific digitalisation incentives (such as an incentive on the digital construction industry).

14. Ideation session results

The current chapter provides a summary of the ideation work RTE experts conducted in the small groups during the RTE workshop on 22 September 2022.

14.1. TEAM 1 ideation session results

Key topics discussed

- Interoperability
- Digital identity of companies
- Differences in priorities
- Showing the "price tags" for the RTE development

Summary

It is normal to be positive about different countries doing things as they pleased **as long as interoperability is maintained** between the countries. Interoperability is a keyword throughout all exercises.

One thing that was not that much highlighted was the **digital identity of companies**. It would be a good place to start. The ability to reliably identify the players around the board and then go to the semantics of the actual products or documents seems like a good approach. It could be helpful to perform a gap analysis on the elements of the RTE and key differences.

One of the great barriers to widening cooperation is the **resources of national authorities.** All participants are more or less thin on the specialists and the money as well.

Different priorities are also one of the barriers, and that may be an obstacle to cooperation.

One of the enablers that was discussed was the **leveraging of the genuine desire and need by the companies to be able to operate cross-border without unnecessary difficulties**. That is something that can be used when decisions are made about investments in development. It is about the genuine need from the business side to operate cross-border more fluently and with less administrative work. The policy decision is needed by the management that also gives the sponsorship to the company.

One thing that was mentioned is that **in Finland it is useful to have price tags** – the price tag for benefits, for business administration. If the money side is shown, then more attention could be gathered.

The team believed that there is no need for a joint definition of RTE at the regional level.

The team came up with the idea of dropping **a list of minimal requirements** that the national solution should or should not have in order **to ascertain interoperability**. When the solution comes, it would follow the list.

14.2. TEAM 2 ideation session results

Key topics discussed

- Need for digital service solutions
- Need for legislative support
- Buy-in of the companies and the importance of change management
- Portability of data
- Onboarding of authorities to RTE initiatives
- Cross-border exchange of data

- Quantifying the benefits and added value of RTE solutions

It would be great to have a discussion on specific solutions even if not in the RTE, but **digital service solutions that are needed in countries** – not necessarily the huge innovation, but something that everyone could be proud of. Because during the discussion the team had a number of interesting little things popping up from different countries that the other people knew. That was interesting, even if it is not directly RTE.

E-receipt, product information or e-invoice are basically the carriers of some forms of data. The question is **what types of data and how long this list could be**. This is probably something that unifies all seven countries.

In regard to other streams, the team highlighted two things. First, **the legislative support has to be for all countries**. If at least one of the countries does not follow along, then it blows up all the regional efforts. Second, **most countries are acting simultaneously**. If one country is not allowing the solution of the others to be used, then most likely most companies will not use it.

The second one is the **buy-in of the companies and the importance of change management**, how to actually get them to use it in order to create a critical mass that would fit the system in itself going forward. The unfortunate reality is that most likely it is hard to motivate without a regulatory push, but it cannot be just a push.

The team highlighted the **portability of data** in regard to the barriers, from the perspective of the ability to control the data from your company's perspective. These data can be actually taken away and then can be moved to another place. It was realised that most likely currently it cannot be done because the vendor also has the data and for example the vendor does not want to delete it, to get rid of it. In many cases, it is hard to get out and use the data in different places.

The team has two ideas about the enablers. There are all the large agencies who are affected by any change and most likely there are tax or customs authorities, who are dealing with a bunch of company information. The **authorities have to be onboarded**; otherwise, the system will not live without the support of the authorities.

The second thought is a **cross-border exchange of data.** It could not be figured out, how it can be done by the government. Most likely there should be a formal private company that starts moving the data across borders. The government will face some difficulties with getting it. Companies cannot manage all government data.

In many cases of the RTE solutions, the benefit to **the particular company will be relatively small but the benefit to other companies or the states that use the RTE solution is much larger**. It is hard to sell the idea to the company from this angle. If the company saves only a little bit of money per year, then it is not willing to do the hustle of implementing something new.

Second, **it is hard to understand how to value the opportunity that is getting from having this big data available in real-time**. A bunch of interesting solutions and services can be created based on that. However, it is hard to know, if the data is available to society, whether the society can use it or not.

14.3. TEAM 3 ideation session results

Key topics discussed

- Trust in the structure
- Need for the dialogue
- Funding initiatives in the EU
- Cost-benefit mapping
- Criteria for quick wins

The team listed many building blocks. **Trust in the structure is important**. There should be data availability, traceability, authorisation and identity management. Otherwise, no one will use it. It should

be a machine-to-machine API digital wallet. One of those action lines is to deliver and discover a technical solution. It is important to be focusing on value-added services. Dialogue is needed with the market. It should be done in a specific trustworthy way. The solution should be produced based on the dialogue.

Cost-benefit mapping is to be done. For example, in the Nordic countries, there are technical skills and an advantage to knowing how it is. That would be possible to influence, but access is needed. The initiatives that already take place in different countries, and strategic communication (that means agreements at the Ministry level) should also be mapped. Interoperability should be ensured if there are different national solutions.

One part that can actually be influenced is the impact on **funding** initiatives within the EU, and how the funding should be organised. Wins are good quality data, data-driven decisions, faster processes, more automation and standardised information exchange that is enabled in the interoperability. Creating consent-based solutions is important. The last quick wins are related to mapping all initiatives that are already taking place.

14.4. TEAM 4 ideation session results

Key topics discussed

- Differences in cross-border and local RTE building blocks
- Digital business vs RTE as concepts
- Need to create a database of tools
- Good quality of data

The first thing that was discussed under the building blocks was that **different building blocks can be taken at different levels**. It means that for cross-border building blocks, there should be more horizontal domains like technical legal operations, whereas for the local building blocks the context matters more.

Local building blocks can be a bit different, and content-based as well like e-receipts and e-invoices, because it is very difficult to organise all the building blocks across all the regions as well. If different blocks are for different countries, then this cross-border harmonisation of various ecosystems is what makes it different. There are also different roles for the public and private sectors: for example, one builds the road and another one uses the road.

The important thing that can be challenging is the concept itself. Sweden proposed that the **digital business is a bit easier concept to understand than RTE**. Sometimes the question is what real-time is. Sometimes in this context, the real-time means microseconds, but sometimes in terms of latency of transactions it also means days. This concept is therefore a bit blurry.

The team had a good discussion on the theme of “local context in general”. It is not a question of tools and technologies, and not about what the government is doing, but it is the **question of smart people and businesses.** The RTE is successful if **businesses are taking on the solutions that are there in the market** and the business achieves digitalised transactions, at the same time as people are starting to use end goals and applications. Then we speak about RTE. It is not about tools offered by the central government, local government or EU.

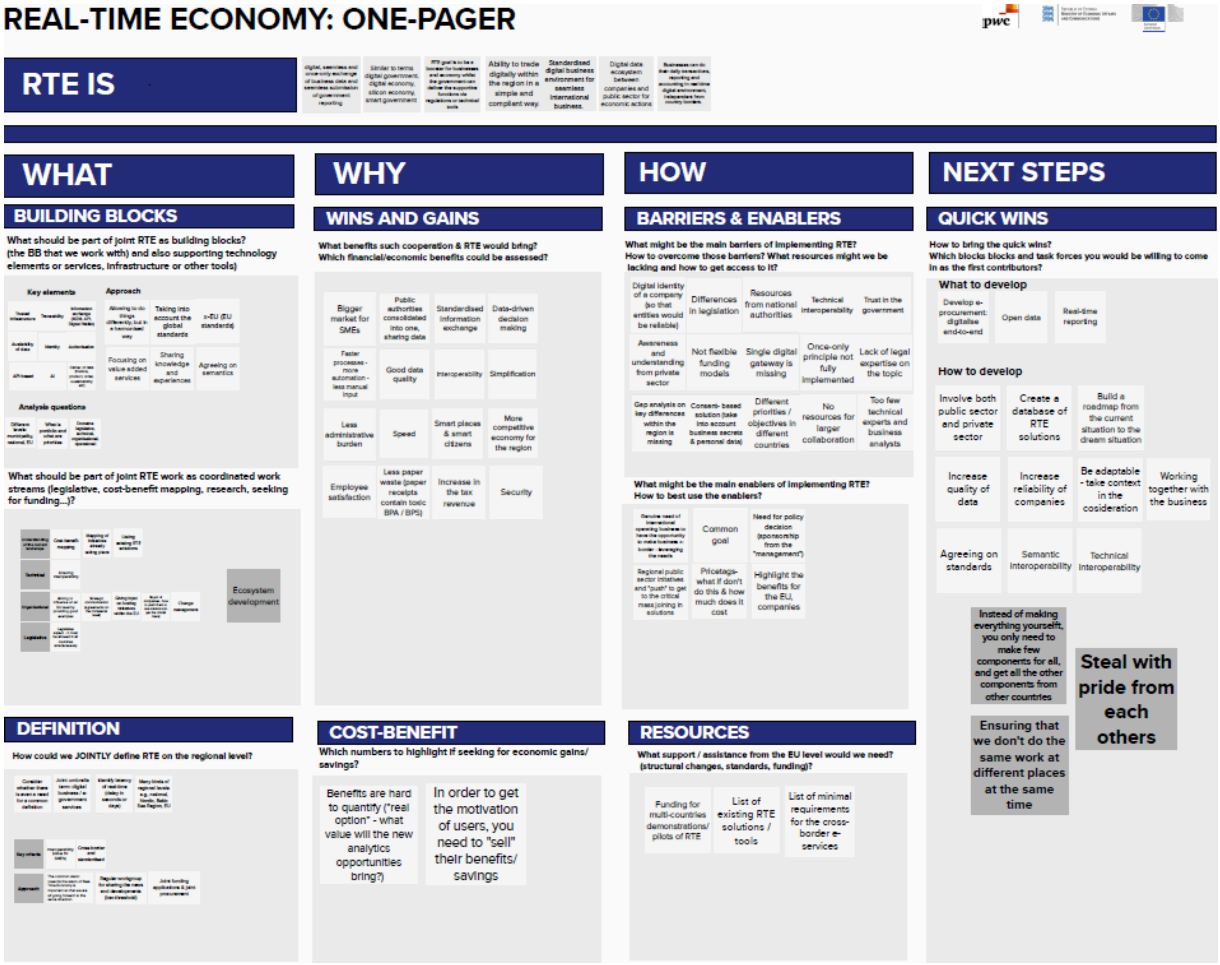
A database of tools is needed. For the start, it can cover EU tools that have already been developed. Currently, there is no understanding of what tools are actually available and can be used in the ecosystem. It can be not only about EU tools, but it can also cover the tools needed for the RTE ecosystem. Links with other concepts like the once-only principle and single digital gateway were discussed as well. For the next steps, e-procurement was pointed out as something important. The concept of local solutions to be scaled up was discussed several times as well.

To sum it up, there should be **more adaptiveness in the system to harmonise the activities** between countries in terms of RTE. Solutions in one country or one region can be very different. How to achieve this harmonisation is an important question. **Good quality data** is extremely important, it is the keyword.

14.5. Merged ideation session results

As a summary of the workshop ideation, a collage combines all individual worksheets and ideation results.

Figure 22. Consolidated ideation board results of the Workshop[85]



85

Summary

There are many definitions of Real-Time Economy (RTE). Data-driven, automated, seamless and secure business-to-government and business-to-business data exchange is seen as a new normal in parallel to more and more interoperable e-services as government solutions. It is happening not only on the national but increasingly also at the cross-border level.

Trusted environments, commonly accepted identification, authentication and authorisation tools, timestamping functions, security standards, data ownership and sharing principles, machine-readable file standards, semantics, registries, certifications and harmonised business processes are the key enablers for integrations within the business community and moving to daily information exchange in their local or international business operations. For enabling businesses to fully start using e-services, a significant number of ICT developers should be able to build the necessary cross-border operational services which function seamlessly for businesses operating in several countries.

RTE should cover the whole life cycle of business operations

Business data that is used in business operations is either connected to providing a service or selling a product. A life cycle of the information and documents in connection to such operations formulates a sequence that also needs seamless support by ICT tools and data standardisation. The data for reporting provided to the government authorities or business partners have to function seamlessly and according to the work streams. They should make it easy to prove the point for a business or a supply chain to onboard a digital solution.

In that matter, the new RTE approach holds a strong component of **combining financial and non-financial information with actual supply chain processes**. Product catalogues, procurement, purchase orders will be followed by trade and production reporting, invoicing, transport and customs documentation compiled, exchanged and reported in between, invoices and receipts, followed by tax reports and VAT returns, declarations and reviews and concluded by annual reports and submissions of statistical data for reporting. There is a clear demand from the business for reliable solutions that can provide support to the whole cycle of transactions, as well as be required by law to also guarantee the services through availability and archiving.

RTE is about trust between the government and business

For both operations and archiving processes, **trustworthiness is key**. It is important to hold the data in a **secure, externally inaccessible and immutable manner**. Businesses should not see Real-Time Economy as a tool for the government to control their transactions, and businesses should not fear mistakes that they could potentially make in the digital environment. Only then the governments can achieve their digital and Real-Time Economy ambitions nationally and internationally.

Sandbox approach

Trust is clearly connected with the second shift: agile thinking that makes the sandbox approach and quick testing of new technologies possible. It is important to create process flexibility for the proof-of-concept exercises and train the legal teams on identifying key legal issues in such technology projects, as sandbox deployments, standard testing, hackathons and cross-border trials. With such an approach, the regulatory side will not be seen as a blocker for new developments.

RTE is about making business lives easier

For soon almost a decade, there has been an emerging pressure to create business-to-business e-services and business-to-government solutions alongside regular e-government evolution. For the past five years, governments and mainly ministries responsible for economic affairs and finances have taken a priority, even the mission, to **prioritise making business lives easier** and develop solutions that fit not just the regulatory requirements but also business processes. For the past few years, such ambition has been growingly backed up by dedicated cross-border projects, analyst work, road map studies as well as networking between governments, business associations and software developers to map the best possible options for national and cross-border implementation of RTE building blocks. In parallel, dedicated work on e-government solutions and building blocks at both national, regional and European Union levels has been advancing.

Key enablers

The evolution of solutions like e-ID, e-signature, e-seals and once-only principle (TOOP) technological solutions have been contributing tremendously to the planning of an interoperable cross-border business environment. In such an environment, in addition to government and registry information, also **business reporting data and business-to-business data can be exchanged** based on harmonised standards, compatible platforms and interoperable identification tools.

For cooperation and successful implementation, **a shared regional vision and roadmap would be a great enabler**. Second, financing proves to be the key enabler for networking and other activities. Yet, the cooperation and alignment, exchange of best practices incorporation and policy domains do not require that might show up finances but more time in human contribution.

Third, it is necessary to pay attention to human and time resources to **ensure needed skills (including, e.g. skills in legal expertise, solution architecture and business analysis) for RTE projects**. Specific skills might be lacking in one of the countries, and we might have a general lack of some necessary expertise. However, jointly, the competencies prove to be available and if combined, there is no need for a large amount of external contribution. In order to resolve the resourcing challenge and possible changes in the local RTE teams, it is important not to only provide sufficient funding for new positions, but **also to make it possible to quickly onboard new stakeholders to RTE topics**. We recommend using this report as a quick starter for RTE topics for a wide range of stakeholders: government officials, public sector representatives and the academic sector that wants to incorporate RTE topics into the teaching curriculum.

European-wide approach

For cooperation on building blocks, technical solutions, proof-of-concept exercises or creation of joint real-time economy systems in place, national, project or EU **funding can be allocated based on the joint decisions in prospective savings, wins, process improvements and projected cost benefits**. Such low-effort and quick-win projects can easily be set up also on small scale combining already existing tools, elements, studies and best practices that the countries in the region already have. The majority of elements are already available out there. It is important to map such projects and take them as a first priority. It helps to decrease costs and also to strengthen coordination between these countries. Showcasing a quick win in a larger region like the Baltic Sea region would also serve as a great benchmark for other European Union countries. By proving the applicability of cross-border RTE building blocks, the Baltic Sea region countries, in their joint efforts, **can show a pathway to join the testing and best practice exchange, but also solve potential dilemmas or question marks at the European Union level**. Regional initiatives and cross-border RTE solutions approach in such a coordinated manner can drive forward the actual EU-level regulations on the matter. They will enable the testing of the best regulatory approaches at the European Union level.

Countries should start collaborating already **at the moment of preparing and submitting applications for funding for cross-border RTE-related initiatives**, to ensure sufficient funding, especially from the European Commission.

Added value both for public and private sectors

Last but not least, if data can be generated, exchanged and stored in a standardised and secured way, added value can be brought to the data both on the business side as well as when it has been submitted to the public sector. The private sector can apply business intelligence tools to improve its business visibility. The public sector, in turn, can have better insights into economic operations and the state of health of specific industries, as well as design new services and business models, which generate value. **Both sectors can win from real-time visibility, identifying trends and making predictions.** In exchange for making data available from the private side or supporting the creation of the ecosystem by the public side, **both need to have buy-ins and wins** from that effort. If anonymisation and data security as well as the provision of consent-based services are guaranteed, the **businesses would be ready to share more than they do now**. In exchange, they will gain the ability to monitor their own operations in comparison to whole business sector data via government tools in a standardised manner.

The current report provides a review of the state of art and readiness for the Baltic Sea region countries to engage in joint prioritisation, cooperation and development in the RTE domain. It is to be discussed and agreed on when preparing the vision and roadmap, whether this will result in policy, studies and best practices exchange, content elaboration level or actual solution development.

E-invoicing, e-receipts, real-time business and accounting reporting, supply chain and transport documentation, e-procurement and product catalogues and sustainability reporting are among the list of building blocks reviewed in the context of readiness and state of art in the countries. It is possible to quickly onboard them across the territories.

We have analysed the state of play in Estonia, Latvia, Lithuania, Poland, Finland, Sweden and Denmark. All of them have a solid background and experience as well as an interest towards taking the next steps to reap the benefits of possible cross-border RTE applications in the region.

The study revealed that:

- The national and regional approaches to RTE do not vary significantly across the observed countries, even though slight differences in priority and terminology occur.
- RTE concept originates from Finland and Estonia. However, other countries have no difficulties reflecting the term in their own country frameworks. There is no objection, nor a competing term that would contradict using the same approach across the region to express the key development priorities.
- Latvia and Lithuania, which have not used the term “Real-Time Economy”, are ready to pick that up rather smoothly and find it easy to express the processes and projects under this umbrella term.
- Sweden and Denmark support a “smart government” umbrella term as the state of position in light of ongoing projects (Nordic Smart Government and Business) but do not reject “Real-Time Economy” as a useful term in expressing the principle and approach in general.

The most interesting dividing line between the concept for RTE would be the selection of building blocks that should be prioritised.

Mindset

Mindset is an important enabler to ensure cross-border cooperation and support when launching joint initiatives.

First, we talk about **a mindset to set up cooperation in areas that seem to be very national**, in order to exchange best practices, but also to share information and get inputs on the domains that are not yet that mature in the given country.

Second, it is a **mindset to collaborate on domains that are currently outside the scope of international regulations**, for example, those that are beyond the European Union regulations and therefore do not require international application or coordination. It takes effort to map and push for solutions in such areas based upon a common goal or mapped costs and benefits at the regional level.

Third, the key is **a mindset to collaborate on topics and all solutions that require innovation, discovery, exploration and research** combined into solutions that go beyond current applications and infrastructure. It is not easy to reach business-to-government and business-to-business cross-border interoperability with the help of only already existing solutions.