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Falch, Morten; Williams, Idongesit; Tadayoni, Reza

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# Cross-border e-Government Services in the Baltic Sea Region – Status and Barriers

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Morten Falch\*, Idongesit Williams and Reza Tadayoni

*CMI, Electronic Systems, Aalborg University Copenhagen, Denmark*

*E-mail: falch@cmi.aau.dk; idong@cmi.aau.dk; reza@cmi.aau.dk*

*\*Corresponding Author*

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## Abstract

The aim of this paper is to study the status of cross-border e-Government business services within the Baltic Sea Region, and to identify the most important barriers towards further development in this area. Empirical data for the study are collected through 60 interviews with international companies with operations within the area. The research is made as a part of the EU funded Interreg project DIGINNO. The findings point to language and identification/authentication as major obstacles in development of cross-border G2B services, however when these obstacles are overcome the service design issue and adaptation of local e-government services to the needs of users from other countries will become a major challenge.

**Keywords:** e-Government, Baltic Sea Region, cross-border business services.

## 1 Introduction

Currently, different companies face different obstacles when they have to register their enterprises across border in the EU. Different countries in the EU provide digital services to companies located within their jurisdiction

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who intend to establish a presence. However, it is not every country within the EU that provides these services to companies in other countries. This is often because foreign companies either may not have access or are not eligible to the authentication services provided by the country. This implies that they have to file their transactions offline. In other cases, the problem is that certain countries do not have digital services that supports certain G2B services. The availability and the access to certain national digital service infrastructures is still the prerogative of the member states. EU has introduced a standardized electronic identification, authentication and trust services called eIDAS [1]. When fully implemented, this might provide a solution to this problem. However, at present cross-border authentication by the use of eIDAS is only possible in a few cases. Whatever the case may be, these problems are some of the challenges that hamper the free movement of goods and services within the EU. Therefore, it is important to identify the major challenges that might affect the availability of cross-border digital services.

The topic for this paper is to present a study on cross-border e-government services offered to businesses in the Nordic/Baltic Sea area. The paper is based on research made as part of the EU funded DIGINNO project formed at the initiative of the former Baltic Development Forum. DIGINNO is a three-year project (2017–2020) and part of the Interreg Baltic Sea Region programme and implemented under the digitalization umbrella.<sup>1</sup>

The Baltic Sea Region is an interesting area to study, when it comes to development of ICT services. Although the countries in the Baltic Sea Region to a certain extent share a common history from medieval times, the countries are diverse with regard to culture and economic development. The Nordic countries have for more than a decade been among the leaders with regard to use of ICT services. The Baltic countries can be characterized as emerging ICT economies, as they have experienced a tremendous growth of ICT within the past decade, and today especially Estonia is among the most ICT-advanced countries in the EU. In addition, both the Nordic and the Baltic countries are small open economies with a focus on cross-border operations.

Development of e-government services has for more than a decade been a priority policy area within the EU. As a part of the Digital Single market a European e-Government Action plan 2016–2020 was adopted in 2016 [1]. In this action plan, three priority areas were mentioned:

- Modernising public administrations using key digital enablers (for example technical building blocks such as CEF DSIs like eID, eSignature, eDelivery, etc.);

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<sup>1</sup>More information about the project can be found at <https://www.diginnoobsr.eu/>

- Enabling mobility of citizens and businesses by cross-border interoperability;
- Facilitating digital interaction between administrations and citizens/businesses for high-quality public services.

Cross-border e-government services are important elements in this plan, as they contribute to all of these three areas. This paper focuses on cross-border government services provided to businesses. While many papers focus on e-Government services provided to citizens much less research is done on services aimed for private businesses. Whereas the DIGINNO project focuses on facilitating private businesses.

The cross-border service concept is without a universal definition. At the basic level, cross-border services could be services delivered by a business in one country to a business resident in other countries. From the G2B perspective, it could be a public service agency or a group of public service agencies resident in one country delivering their services to businesses whose administrative location is in another country.

As mentioned, the delivery of G2B cross-border electronic or digital service is of importance to the EU. In order to ensure the delivery of the G2B digital services, the EU and EFTA ministers have agreed to develop a national Interoperability framework [2]. The existence of the G2B digital services will facilitate a single digital market. However, there is no standard definition from the EU perspective of what a G2B cross-border digital service should be. In the Tallin declaration, certain parameters were agreed upon as a consensus for what the G2B cross-border service should consist of.

It should be

- Open for use by business based in a foreign country;
- Able to assist business operations or company's formalities;
- Independently of business location and country of establishment;
- Provided by a governmental body (central or local institution);
- An interoperable environment;
- Based on shared electronic authentication, identification and signature support services;
- Available in at least one language other than official national language.

The research question to be addressed in this paper is: What are the major barriers towards availability of cross-border e-government services for business in the Baltic Sea region. The paper has a clear policy focus, as it aims to go beyond a mere description of the state of art with regard to implementation of cross-border e-Government services within the region, and identifies areas for improvement, which can facilitate further development.

## 2 Methodology

The empirical research has been made on horizontal government services applicable for all business sectors and government vertical services offered in one particular sector. Five industries were selected for further investigation:

- Land and water transport;
- Manufacture of wood and wood products of wood and cork, except furniture;
- Manufacture of machinery and equipment;
- Telecommunications;
- Financial services, except insurance and pension funding.

The research was done in two phases. The first phase included desktop research of horizontal and vertical e-Government services provided for businesses within the region. All in all 77 different services were identified. About half of the services were horizontal and the other half were offered within at least one of the five key industries. The horizontal services included services under the three phases of a business lifecycle: Market entrance, Market activity, and Market exit.

The second phase included implementation of 60 semi-structured interviews with representatives from selected international companies and associations. Most of the interviews were carried out in the Baltic countries, but there are respondents operating in all countries within the region (Table 1).

About half of the interviews were made with representatives from the land and water transport sector. This was not due to a deliberate strategic decision, but simply because actors from this industry were more willing to participate

**Table 1** Number of interviews conducted and number of respondents operating in each country [2]

	Number of Interviews Conducted	Number of Respondents Operating in Each Country
Lithuania	16	29
Latvia	13	21
Estonia	10	21
Denmark	8	22
Finland	8	18
Germany	4	23
Sweden	1	31
Norway	0	23
Poland	0	23

in an interview. A reason for this could be that especially this sector has a keen interest in the project goals.

Data collection was made by national DIGINNO partners from Estonia, Latvia, Lithuania, Poland, Finland, Norway and Denmark. For practical reasons the studies of Sweden and Germany were made by a third party. The services included in the survey are listed in Annex 1.

A more detailed description of the methodologies applied and data collected can be found in [2, 3].

### **3 Maturity Models/Metrics**

Studies on e-government services have applied a wide range of different theories imported from other fields of research. However, maturity model is the only widely accepted framework designed especially for use in studies of e-Government services [4]. Maturity models offer a widely used framework for analysis and benchmarking of e-Government services. The concept were introduced by Lane and Lee in 2001 [4]. Here four different layers were defined: Catalogue, transaction, vertical integration, and horizontal integration. Horizontal integration was defined as the highest level with a full integration of a fully digitized service.

Since Lane and Lee presented their model in 2001, a host of alternative models have been proposed. This includes [6] by Andersen and Henriksen, where it is suggested to add a customer centric dimension in the model. In [7] Lee suggests in 2010 a synthesis of 12 different models including the Andersen and Henriksen model. In this model stages 3 and 4 are merged into one layer and two more layers are added: morphing and e-governance. These two layers are characterized by increasing participation and involvement of users, and addresses in this way the issues taken up by [6].

One should be cautious when applying maturity models for benchmarking of real life e-government services. E-government is a field with rapid development from both a technical and an application perspective. Therefore, the stages defined in maturity models are often either outdated or vague in their formulations. Already in 2007 Austria scored in an EU benchmarking report 100% on online availability of e-Government services and 99% on online sophistication, and Austria was closely followed by several other European countries [4]. Of course, this does not imply that Austria at that time had achieved a stage where no further development was possible. The definition of the perfect 100% digitalized government service is a moving target, and the upper layers in maturity models need a constant update in order to become relevant.

Another weakness of most maturity models is that they more or less implicit define e-government, as electronic services provided to private citizens, and thereby exclude government to business services as a subject for analysis. Users are denoted as citizens and in some of the models, the highest level is named e-democracy [7]. Finally, the cross-border aspect seems to be completely absent in the above-mentioned maturity models.

A literature review based on the maturity model proposed by Lee in 2010 categorize the most important success factors influencing implementation of e-government services [9]. The success factors found in the literature are summarized in Table 2:

Low and high level CSFs refer to the layers in the Lee model. Low is defined as the presenting and assimilating layers, while the high layers refer to the stages of reforming, morphing and e-governance. However most of the factors are relevant for all stages. Looking at Table 2 it is noticeable that the

**Table 2** Success factors influencing implementation of e-government [9]

Category	General CSFs	Low Level CSFs	High Level CSFs
External environment	Legislation		
	Political and administrative reform		
	Socioeconomic factors		
	Culture		
Organization	Characteristics	Expectations	Results orientation
	Financial resources	Prioritization	
	Infrastructure		
	Collaboration		
	Stakeholders		
Management	Characteristics		Business process management
	Commitment		
	Strategy		
	Managing the projects		
Employees	Human resources		
	Fear of change		
	Training and education		
Citizens	Digital divide		
	Training and education		
	Citizens needs and trust		
Technology	Infrastructure	Costs	Citizen centricity
	Design and access		
	Security		

focus is on government to citizen services, and that the majority of the factors are supply oriented.

The category Citizens reflect that it is assumed that services are delivered to private citizens rather than private businesses. Still some of the categories could be applicable for businesses as well as citizens. It should be kept in mind that this study concerns cross-border services. These services are only relevant for companies engage in cross-border activities, and most of these companies will be of a certain size and possess the capabilities needed for making use of digital services. The category citizen centricity can easily be replaced by customer centricity or business centricity, which is a highly relevant factor for the services addressed in this paper.

In this paper, we will use a simplified maturity model for the empirical research. In this model, five stages are defined:

- Complete automation (available cross border) – fully transparent machine-to machine service with full cross-border support.
- Fully online (Available cross-border) – all of the procedures needed to receive the service can be done online;
- Fully online (Available Nationally Only) – all of the procedures needed to receive the service can be done online;
- Partly online – part of the procedures needed to receive the service can be done online;
- Not online – none of the procedures needed to receive the service can be done online.

This model is limited in its scope as it only partly addresses the integration aspects and completely ignores participation and reforming aspects included in the higher layers of other models. This approach is applied because the higher layers in for instance the Lee model need to be reformulated before they are applicable for an analysis of business services. Furthermore, this study only concerns the front functions of e-government services. No data on back-end functions are collected. It is therefore not possible fully to address the integration aspect.

#### **4 Benchmarking E-Government in Europe**

As a part of the EU e-Government Action Plan 2016–2020 the maturity of e-government is benchmarked on an annual basis. This benchmarking is made according to the policy priorities stated in the action plan. Here four top-level parameters are defined [10]:

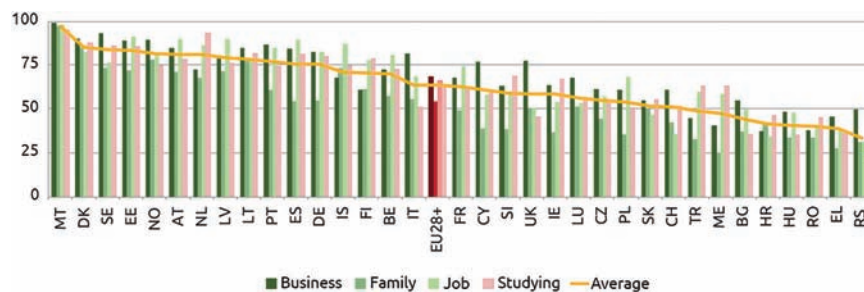


- User Centricity – indicates the extent to which a service or information concerning the service is provided online.
- Transparency – indicates the extent to which governments are transparent with regard to the process of service delivery; their own responsibilities and performance; the personal data involved.
- Cross Border Mobility – indicates the extent to which customers of public services users can use online services in another European country.
- Key enablers – indicates the extent to which technical pre-conditions for e-Government service provision are used.

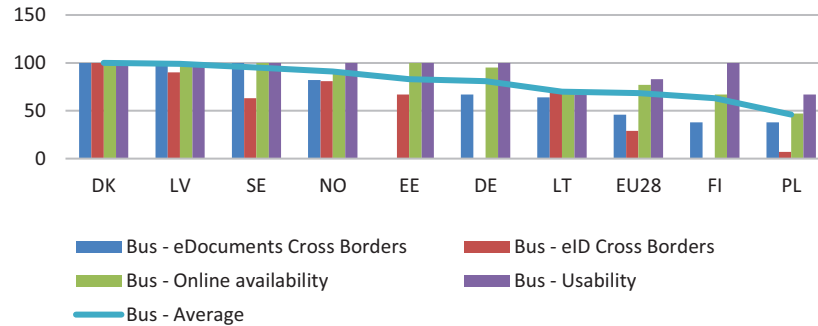
All of these parameters are important for a study on cross-border services. User centricity is benchmarked by the use of a kind of maturity model similar to the one applied in this paper, where full automation represent the highest level and purely offline services the lowest. Online availability is a precondition for provision of services cross-border. Key enablers such as e-identity is also important for cross-border services. Especially the provision of eIDAS (electronic IDentification, Authentication and trust Services) will be an important driver in the future.

The benchmark concerns a limited number of e-government services, for which cross-border availability is relevant. These services include one business service (starting up a business) and three citizen centred services (family, job, and studying). According to the benchmark, business is the most developed of the four kinds of services (Figure 1). Moreover, it follows from the figure that all countries in the Baltic Sea region except Poland are benchmarked above the EU average.

According to the report, the gap between services provided online nationally and cross-border is shrinking. It follows from Figure 2 that especially



**Figure 1** Average rankings for top-level benchmarks per 2016 [10].

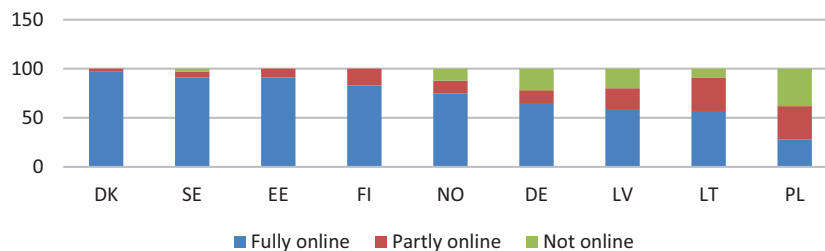


**Figure 2** Rankings for business service benchmarks per 2016. Based on data from [10].

Latvia and the Scandinavian countries are doing well with regard to cross-border business services. The major bottleneck in the Nordic Baltic Sea Region seems to be the availability of an eID, which can be applied cross-border.

The DIGINNO data concerns e-Government business services specifically. As it follows from Figure 3, the ranking made according to these data is similar to the rankings on maturity of cross-border e-Government services in Figure 1 and on cross-border e-Government business services in Figure 2 (Bus – Online availability in Figure 2 corresponds more or less to the maturity of G2B services in Figure 3).

There is however a noticeable difference in the data on Latvia. Latvia is doing well in the EU benchmarking, but ranks much lower if the DIGINNO data are applied. The DIGINNO benchmarking is based on the maturity levels explained in section three mainly focussing on the levels of digital transformation, while the EU benchmarking is based on a broader set of parameters linked to the four top-level parameters listed above: user centricity, transparency, cross border mobility, and key enablers.



**Figure 3** Maturity of G2B services [3].



**Figure 4** Cross-border G2B horizontal services [3].

The cross border availability was further researched by asking business representatives about the cross-border availability of e-Government services provided in respective countries. These data shows a very different picture, but there is no contradiction between Figure 4 and the other Figures. The figures indicate that in Germany and Sweden all government services, which are available online, are available abroad as well as within the country. However, in Germany only 65% of G2B services are available fully online compared to 97% in Denmark and 91% in Estonia and Sweden.

## 5 Barriers Towards Provision of Cross-border e-Government Services

Before the survey was initiated six main barriers towards cross-border delivery were identified through desk studies and included in the questionnaire presented to the companies:

- Language (service is available in local language only);
- Online identification (not present);
- Online authentication (not present);
- E-documents (not present);
- Recognition of documents (not available online);
- Regulatory.

An additional category “others” was included to capture any other kinds of barriers. In total more than 900 barriers were mentioned in the interviews. The numbers of barriers mentioned by category and by country are depicted in Table 3.

It should be noted that the number companies interviewed and the number of e-Government services provided differ from country to country.

**Table 3** Number of Barriers by country and by barrier category [4]

	Language	Online Identification	Authentication	E-documents Not Present	Recognition of Documents	Regulation	Other Barriers	Total
DK	30	19	20	6	6	1	1	83
SE	33	36	42	23	23	15	2	174
EE	12	1	3	0	2	17	1	36
FI	12	24	22	1	4	6	2	71
NO	24	27	28	6	9	11	3	108
DE	49	28	28	17	22	14	2	160
LV	26	6	35	4	4	12	3	90
LT	48	24	5	6	5	29	6	123
PL	28	8	6	5	0	15	2	64
Total	262	173	189	68	75	120	22	909

**Table 4** Number of Barriers by sector and by barrier category in % [4]

	Language	Online Identification	Authentication	E-documents Not Present	Recognition of Documents	Regulation	Other Barriers
Market entrance	38,7	22,6	21	1,6	3,2	9,7	3,2
Market activity	33,3	20,6	23,5	5,9	3,9	10,1	2,6
Market exit	47,8	17,4	21,7	0	0	8,7	4,3
Land and water							
Transport	25	20,7	20,1	5,5	8,5	15,2	4,9
Manufacture of wood and wood products	24,1	17	21,4	10,7	12,5	11,6	2,7
Manufacture of machinery and equipment	18,4	23,7	21,1	13,2	10,5	10,5	2,6
Tele communi cations	32,9	15,1	12,3	13,7	15,1	9,6	1,4
Financial services	18,9	14,4	18,9	9,8	13,6	24,2	0

Therefore, figures from different countries are not directly comparable. It follows however, that language seem to be a dominant barrier in all countries. Online identification and authentication are also important factors, but not in all countries. Availability and recognition of e-documents are the barriers mentioned least often. One could wonder why language is such important barrier, as it should be fairly simple to ensure that all services are translated into English. On the other hand, language is a relevant factor for almost all

kinds of services, while for instance recognition of e-documents is necessary only for provision of a limited set of services.

Looking at the barriers by sector, it seems that language is most important for horizontal services, while handling of e-documents seems to be most important for the vertical services. A reason for this could be that sector specific services are more oriented towards doing transactions, where exchange of e-documents are needed.

## 6 Conclusion

The topic for this paper is to study barriers towards provision of cross-border e-Government services to private businesses. The primary task for the Government is to provide services to its own population, and by far the majority of the transactions made by public institutions involve national citizens and companies. It is therefore no surprise that digitization first is made for services directed towards domestic citizens and businesses. Provision of e-Government services to foreign citizens and companies will only be a small part of the digital transformation of governments, and the potential savings are minor compared to those related to domestic provision of e-Government services on the domestic market. Governments might therefore have limited incentives towards development of cross-border availability. However, cross-border services are important for the creation of a European single market, and cross-border e-Government services is therefore a priority area within the Single Digital Market. Moreover, once digital services serving the domestic markets are created, it is often fairly simple to make them available cross-border.

The cross-border availability of e-Government services is not addressed in the maturity models discussed above. One could argue that cross-border availability should be added as a final stage of maturity. This would however be misleading, as even e-Government services belonging to the initial stages of maturity can be provided cross-border. Therefore cross-border availability should be seen as an additional dimension rather than an additional stage of maturity.

The major obstacles identified in this paper are language and identification/authentication. The language barrier is the one mentioned most often by the respondents interviewed. It is also an obvious barrier applicable to almost any kind of service. If you are unable to understand the language the service is provided in, the usefulness is limited. On the other hand, it will often be

quite simple to offer information in more than one language. This for is done for all e-Government services in Denmark, which are studied as part of the research made for this paper.

The second barrier mentioned, is only relevant for e-Government services offering more than information services and provision electronic forms (the first stage in the Laine and Lee model [7]). In the later stages enabling transactions to be done online, electronic identification and authentication are necessary. Companies must therefore obtain an electronic ID, which can be applied in the respective country, before it can access to a given e-Government, where online transactions can be made. The electronic Identification and trust services eIDAS offers a solution to this problem, but eIDAS is only available for transactions within a few countries. Until eIDAS is fully implemented, it is therefore necessary to enable easy access to national eID systems from abroad.

Availability and validity of electronic documents is also mentioned as a barrier. It is not mentioned as often as the other barriers mentioned above. The reason might be that it is only relevant for some services. From a technical point of view, this barrier is simple to overcome once the identification and authentication problems are solved. This relates to the final barrier included in this study – namely regulation, which might include recognition of legality of various kinds of electronic communication.

A final barrier to be mentioned, although it is not part of this study, is the issue of design. e-Government services and user-interfaces developed for provision of e-Government services are in most cases designed with domestic users in mind. User needs of foreign citizens and companies might differ from those of domestic ones. When the barriers studied in this paper are overcome, lack of well-designed user-friendly e-Government services taking the special needs of foreign companies into account might still be a barrier. This will be a subject for future research.

## **Acknowledgements**

The authors acknowledge all partners in the DIGINNO project, who have participated in the design of the data collection and carried out the interviews. CIVITTA has also participated in this. CIVITTA has also summarized the results in two research reports.

**Annex 1** List of e-government services studied [4]

Market entrance	<ul style="list-style-type: none"> <li>• Registering a trademark;</li> <li>• Consulting the business register;</li> <li>• Opening a new branch;</li> <li>• VAT registration;</li> <li>• Registration; modification, deletion of place of establishment;</li> <li>• Other.</li> </ul>
Market activity	<ul style="list-style-type: none"> <li>• Registering real estate;</li> <li>• Hiring employees;</li> <li>• Paying taxes;</li> <li>• Participating in public procurement;</li> <li>• Paying parking fines;</li> <li>• Applying for import/export licenses;</li> <li>• Other.</li> </ul>
Market exit	<ul style="list-style-type: none"> <li>• Termination of company's activities;</li> <li>• VAT deregistration.</li> </ul>
Land transport and water transport	<ul style="list-style-type: none"> <li>• Pre-arrival and pre-departure declarations;</li> <li>• Issuance of bill of lading (CMRs);</li> <li>• Port terminal certification of compliance;</li> <li>• License to provide cargo shipment services;</li> <li>• Other.</li> </ul>
Manufacture of wood and products of wood and cork, except furniture	<ul style="list-style-type: none"> <li>• Due diligence confirmation (Conformité Européenne (CE) marking for timber products used in construction);</li> <li>• Issuance of eco-label for timber;</li> <li>• Issuance of forest felling permit;</li> <li>• Permission to import and use forest reproductive material for afforestation;</li> <li>• Other.</li> </ul>
Manufacture of machinery and equipment	<ul style="list-style-type: none"> <li>• License of permanent supervision of potentially dangerous equipment;</li> <li>• Permission to carry out machinery manufacture services on a particular place of land (land purpose licence).</li> </ul>
Telecommunications	<ul style="list-style-type: none"> <li>• License to provide switching telephone, telegraph, telex and data communication services;</li> <li>• License of construction and operation of electromagnetic waves emitting devices;</li> <li>• Permission to use telephone numbers;</li> <li>• Permission to use network identification codes;</li> <li>• Permission to use public data transmission network identification codes;</li> <li>• Permission to use public mobile telephone network codes.</li> </ul>

*(Continued)*

**Annex 1** (Continued)

Financial service activities, except insurance and pension funding	<ul style="list-style-type: none"> <li>• Banking license;</li> <li>• License for the operation of an electronic money institution (including foreign country's branch);</li> <li>• Financial advisor enterprise license;</li> <li>• Permission for IPO (Initial Public Offering) procedure;</li> <li>• Confirmation of the subsidization request;</li> <li>• Other.</li> </ul>
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## Biographies



**Morten Falch** (born 1955) is Associate Professor at Center for Communication, Media and Information Technologies (CMI) located at Aalborg University Copenhagen. He holds a bachelor in Mathematic, a master degree in economics and a Ph.D. and has since 1988 specialised in research on socio-economic issues related to Information and Communication technologies.

This includes economic analysis of applications and telecommunication networks and services (e.g. Cost analysis of telecom networks), e-government, regulation of the telecom sector (in particular regulation of interconnection), ICT and industry policy, the role of competition in innovation of new services and frequency management.

He has participated in many EU funded research projects in the telematics area. He has also conducted a large number of consultancies for national and international organisations such as ITU, UNCTAD, the World Bank and the National Telecom Agencies in Denmark, Norway and Sweden.



**Idongesit Williams** is a Post-doctoral researcher and lecturer at Aalborg University Denmark. He acquired a Ph.D in 2015 at Aalborg University, specializing in internet policy and digitalization. He has for 7 years lectured and supervised Master of Science in Innovative Communicative Technologies and Entrepreneurship students at Aalborg University. Here he lectures on Internet Economics and Governance. He is been involved in EU projects involved in the digitalization of Education (OnCreate, an Erasmus plus project), the digitization of ideation process for companies (VOICE, an CIP, FP7 project), and now the facilitation of digitization in the Baltic Sea Area (DIGINNO, an EU Interreg programme). He is widely published with about 40 publications and regular in conferences related to the development of Internet policies and digitization initiatives.



**Reza Tadayoni** (born 1962) is associate professor and head of CMI (Center for Communication, Media and Information Technologies) at Aalborg University. He holds a M.Sc.E.E. from DTU (Danish Technical University) specialized in broadband communication, and holds a PhD from DTU in the field of media convergence. His main research focus is on the ICT development and media convergence. Reza Tadayoni has developed a number of courses at undergraduate, graduate and PhD level in the field of communication and media technologies. He has participated in a number of Danish, European and international research projects and he has supervised a number of PhD projects and master and bachelor thesis, and he has published +100 of scientific papers and research reports.

