

**REFLECTIONS AND SUGGESTIONS ON CROSS-COUNTRY
ELECTRONIC SERVICES FOR TRANSPORTATION, LOGISTICS
AND FOOD SUPPLY CHAIN**

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ABSTRACT

This paper aims to reflect on the increasing need for the electronic cross-country service provision, and provide certain solution suggestions to address related issues, benefiting from the experience and expertise of the coauthors. While the current state is being presented and suggestions are being provided, examples from transportation and logistics areas are given, with a particular focus on food supply chain and thus technology support in agriculture and livestock management activities. Accordingly, the paper is finalised with a specific suggestion on block-chain-based cross-country information system for livestock supply chain management. The resulting work is hoped to contribute to the development and provision of high quality, user-oriented electronic cross-country services.

Keywords: *Cross-Country Electronic Services, Information Systems for Farmers, Agriculture and Livestock Management, Block-Chain, E-Government*

**ULAŞIM, LOJİSTİK, GIDA TEDARİK ZİNCİRİ ALANLARINDA
ÜLKELER-ARASI ELEKTRONİK HİZMETLERE YÖNELİK
DÜŞÜNCELER, ÖNERİLER**

ÖZ

Bu çalışma, ortak yazarların tecrübe ve deneyimlerinden yararlanarak, ülkeler arası elektronik hizmet sunumuna yönelik artan ihtiyacı değerlendirmeyi ve ilgili hususlarda çözüm önerileri getirmeyi amaçlamaktadır. Mevcut durum ele alınırken ve öneriler getirilirken, ulaşım ve lojistik alanlarından örnekler verilmekte olup, yiyecek tedarik zinciri ve dolayısıyla tarım ve hayvancılık yönetimi aktivitelerinde teknoloji desteğine özel olarak odaklanılmaktadır. Buna dayalı olarak çalışma, bir blok-zinciri temelli, canlı hayvan tedarik zinciri yönetimi için önerilen ülkeler arası enformasyon sistemi önerisi ile sonuçlandırılmaktadır. Ortaya çıkan çalışmanın, yüksek kalitede, kullanıcı odaklı ülkeler-arası elektronik hizmetlerin geliştirilip sunulmasına katkıda bulunması ümit edilmektedir.

Anahtar Kelimeler: *Ülkeler-arası Elektronik Hizmetler, Tarım, Hayvancılık ve Çiftçiler İçin Bilgi Sistemleri, Blok-Zinciri, E-Devlet*

1. INTRODUCTION

In today's global world, it is no surprise that there is an increasing awareness and recognition of the need for cross-country electronic services. For instance, European Commission underlines the cross-country mobility for businesses and citizens, "as one of the main objectives of the EU eGovernment Action Plan 2016-2020" [1]. Here the key enablers, eID and eDocuments are of vital importance, especially eIDAS Regulation coming into full force (pp. 30-37). Accordingly, for instance, Europol's SIRIUS portal already responds to the goal of "establishing an online information and support portal at EU level to provide support to online investigations, including information on applicable rules and procedures." [2] (pp. 3-4)

However, there is still work to be done in order to diffuse the use of electronic cross-country services [1]. in all areas, based on a life-cycle or life event approach, similar to those adapted to national services. For instance, an example recently experienced by the coauthors could be given from the transportation area:

For a train travel between Poland and Germany in September 2018 tickets were bought using credit card at the Germany company website, before departing from home, Ankara, Turkey. A mail was received, acknowledging the completion of the online transaction. Meanwhile additional postal service charge was being paid to receive the tickets, as the system did not give the digital tickets. Before starting out the train trip from Warsaw Central Train Station, the counters of the relevant company were visited and it was confirmed that showing the mail version on the train would be enough for the ticket control. However, on the train the Polish officials did not accept these documents for already-bought tickets and forced to buy new tickets, behaving in a very impolite, humiliating and even threatening way in public space. Despite their pre-paid and pre-reserved/pre-bought seats, the coauthors were treated as if they did not do so, experiencing a very negative customer service that spoiled their trip. They were also told that on German border the crew would change and they would ask the help of the German team. But the German side on the train and in the arrival station were also not very useful, and as of this paper is written, the issue still remains unsolved, while a response being expected from the German company headquarters at least for the return of the initial ticket payments.

As far as the coauthors are concerned, this example is a very good case of how cross-cultural services could go terribly wrong. A number of solutions to address the related issues could be to enable the issuing of electronic tickets or other documents that are acceptable on both the departure and arrival country sides. Or the online system should at least give proper warnings to prevent such cases to happen in reality. Over all the companies should assume full responsibilities for the whole trip, rather than splitting them to be valid only for their sides until the border.

This paper, accordingly, aims to investigate further the related issues with respect to electronic cross-country service provision, and provide certain solution suggestions to address them. In accordance with the Journal theme, while transportation, logistics, and supply chain areas will be underlined, a specific attention will also be given to food supply chain and thus technology support in agricultural & livestock management activities.

2. INFORMATION SYSTEMS FOR AGRICULTURE AND LIVESTOCK MANAGEMENT, AND THEIR APPLICATIONS IN TURKEY AND EUROPE AS CROSS-COUNTRY ELECTRONIC SERVICES

Since the development of agriculture, most of the food needed to feed the population has been produced through industrialized agriculture. Although industrialized agriculture has been successful in producing large quantities of food, the future of food production is in jeopardy due to problems in agriculture. Two of the most major problems in agriculture are the loss of agricultural land and the decrease in the varieties of crops and livestock produced. This is mostly caused by the use of wrong farming methods which decrease the quality of community living in rural aspect. Second significant problem is low level of environmental, farming literacy of farmers and their lack of knowledge in farming technologies. In places where economy is mostly based on agriculture, it is crucial to meet the information needs of farmers and enable their farming capacity in accordance with developments, fluctuating innovations with Industry 4.0 and farming sectors becoming digital as well for national development [3]. Agricultural productivity and yield can basically be enhanced through information and technology [4].

Farmers and farmer groups are as vital as other stakeholders such as authorities in municipalities, businessmen, traders, non-governmental organizations, among others, in a rural community. Farmers have a capacity and power to control their environment. They all need and share information about politics, finance, market, technology and in relevant fields.

In their agricultural activities, farmers encounter problems such as unfertilized crops and products which leads to the negative fluctuations in the economy, dying plants due to the misuse of pesticides and wrong irrigation methods. Routinely-faced problems in the agricultural working field leads to the loss of motivation and efficiency in the professional-based daily activities of the farmers. Among different professional groups, farmers are one of the key groups who need agricultural information and information about recent farming technologies in everyday life.

As Turkey has been progressing well on national e-government systems ([5] based on [6]), “E-Government-Gateway (EGG) provides various services for Turkish farmers”, for instance enabling them access to services of Ministry of Food, Agriculture and Livestock [7] (p. 21.) As a result of these services, for example, it is practically possible to access to the records of a cattle and check whether the information given in the “Feast of Sacrifice” market by the seller about the age of an animal is true or not.

Such information systems are designed for and effectively work at national scale. However, for cases where international transactions are involved it is hard to find and give examples of such systems. As one recent controversial case about animals imported from Brazil by Turkey before the 2018 “Feast of Sacrifice”, there have been questions on “how the authorities allowed those ‘infected animals’ to enter the country”, whereas the official rule is stated to be that “all animals imported into the country are quarantined at a specific site and tests are run on those animals for 21 days to make sure they do not have any diseases before they are allowed to be sold on the market.” [8] While this case raises serious public concerns on food security and safety [9], issues on animal rights and the health conditions in the related logistics operations are also highlighted by different parties (for example, [10]).

Such issues and risks that emerge as part of international logistics and supply chain operations could be addressed and mitigated, benefiting from a cross-country information system. There are various examples of such systems. For instance, STORK/STORK 2.0 and e-SENS projects, in which Turkish institutions were also involved, developed an authentication and authorization, as well as information and document sharing system across different countries in Europe [11, 12]. In eSENS project, for instance, “a cross-border farmer from a German border area can authenticate himself/herself using his own e-ID to log in to the Dutch agricultural portal. He can access all digitally available services, such as applying for European agricultural subsidies, and can comply with agricultural regulations in such matters as the registration of cattle.” (eSENS Agriculture Pilot, Figure 1, [13])

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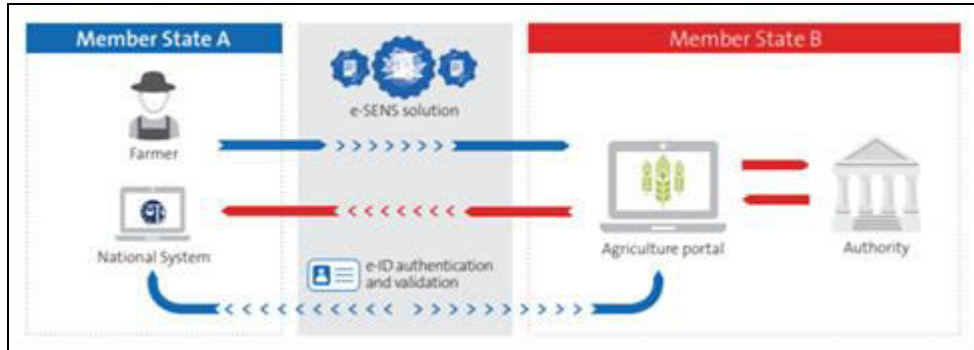


Figure 1. eSENS Agriculture Pilot Use Case Scenario (Source: [14])

3. A SUGGESTION FOR BLOCKCHAIN-BASED CROSS-COUNTRY INFORMATION SYSTEM FOR LIVESTOCK SUPPLY CHAIN MANAGEMENT

Based on the information provided above, combination of new technologies such as Internet of Things (IoT) applications and block-chain mechanisms / smart contracts could be utilized to support information systems for agriculture and livestock management. These could enable smarter and more secure and effective systems for such cross-country or intercontinental operations. For instance, health situation of animals on the transport ships could be monitored by a cloud IoT tool (please see, for example, [15]) as part of a business transaction determined by predefined smart contracts (Figure 2).

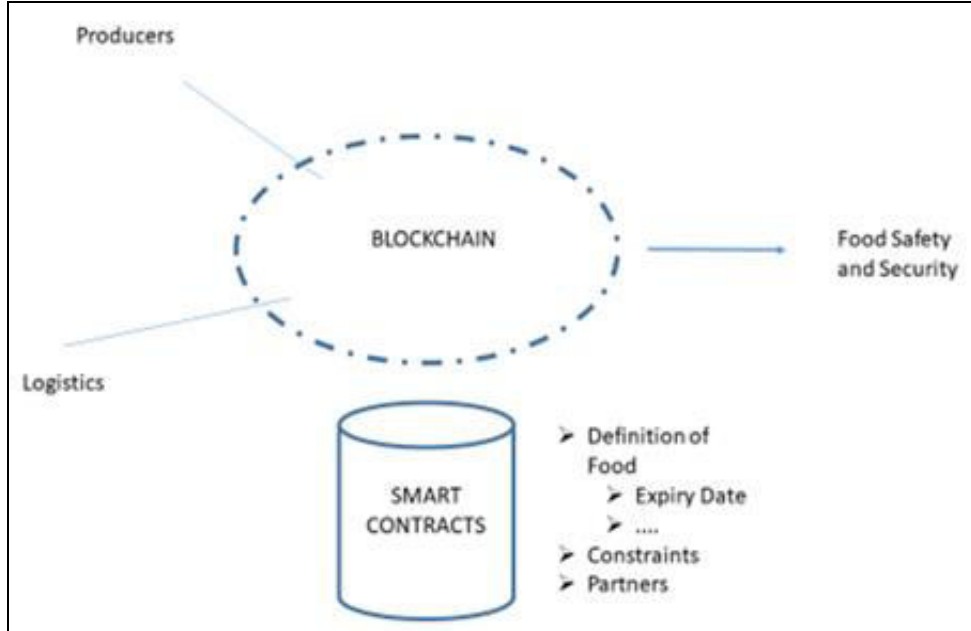


Figure 2. Block-Chain-Based Smart Contract Structure for Cross-Country Secure Live-Stock Supply Chain Management

Benefiting from such system, a specific constraint, for instance, could be not to have more than 1 sick animal during the transportation. If more ill animals are identified via health monitoring then the conditions of the contract are not met and the animals are not accepted. Such systemic solutions could prove to be very useful to address public trust, especially for travels that last more than the quarantine period, which also happen due to delays because of forced fares between ports that do not accept the ships with troublesome cargo. These could at least stop controversies on where and when responsibilities start and end.

Similarly, different contract terms could address other partners' and stakeholders' concerns and requirements. As a result a smooth, effective cross-country operation that addresses issues on food security and safety, as well as animal rights, among others, can be ensured.

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The examples with respect to cross-country service provision in transportation and logistics areas could also be increased. Customs and other border transactions could also be added to these. Furthermore, examples could be expanded, considering other life areas and activities. Transactions of life and health insurance that arise when a citizen of a country visits another country where and when s/he experiences health problems could be given one example to the possible occurrences with respect to these different life events. Such scenarios could be studied by cross-country teams to provide reliable, working solutions to real life problems.

4. CONCLUSION

Cross-country services and transactions have become an inseparable part of socio-economic life, and information and communication services would play a significant part on developing and providing user-oriented, quality applications across borders that integrate online and offline business processes. Transportation and logistics, as well as food supply chain are among the key areas with respect to these online cross-country services. This paper has presented a current state analysis of and suggested solutions to the related issues, providing selected examples relevant to these areas. The analysis and suggestions come from coauthors' experience and expertise, and mainly provide a selective perspective at Turkey-level and its relations with EU and overseas. Still it is hoped that the information and ideas shared in this paper would be helpful for academicians and practitioners who would work on electronic cross-country service development in the future.

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