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E-trade with Direct Lending and Normalized Money

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Abstract

The article presents the advanced technology of the normalized commodity-money relations. The technology is considered as updating the model of the normalized economic mechanism. The core of this technology is the e-trade with direct lending where deferred portion of the payment is documented as the buyer's debt to the seller (not to the bank!). The technology of e-trade with direct lending provides the possibility of early repayment of debt amounts to the sellers of priority goods. This repayment is fulfilled by the debt department of the state central bank. Rules of emission of debt amounts are presented in the advanced model of normalized money. The important innovation in normalized e-trade is the rule of obligatory state online certification of transactions.

Keywords:

E-trade with direct lending, normalized money, system of property statuses, normalized economic mechanism, e-service, normalized e-banking.

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Introduction

Economic indicators in each country depend on the structure and rules of functioning of its **economic mechanism (EM)**, methods of implementation and monitoring of following these rules, technologies of information service for economic agents (individuals and entities), technologies of documenting property statuses of economic agents and their transactions (Ilyin, Ilyin, 2011). Current economic mechanism serves economic agents, above all, as the instrument of obtaining extraterritorial profit. It is not conducive to enhancing the potential of a country. Besides that, the mechanism structure does not meet modern organizational and technological capabilities of informatization of economic activities (Ilyin, 1996; Ilyin, Ilyin, 2014 [9]).

In (Ilyin, Ilyin, 2014 [9]) it was noted that the most dangerous trends of the last decades are climate change, intensification of pollution, inefficient land use, poorly managed migration of the working population (Taran, 2011; Meyfroidt et al., 2013; Helin, 2013; Skevas, Lansink, 2014; Lwasa et al., 2014) and the intensive growth of the non-producing but actively consuming part of population (which requires a continuous increase in budgetary expenditure on social assistance). Agricultural sector is most vulnerable to these trends: farms lose not only the necessary human and natural resources, but also a significant part of budget support. Researchers, engineers and environmentalists are looking for approaches to solving the problem of environmentally sound economic development (Valin, 2014; Lorek, Spangenberg, 2014). Implementation of unified technologies for multi-currency e-trade and e-investment is especially important for the agricultural sector because many farms are in need of expanding the market, attracting and making investments (Maart-Noelck, Musshoff, 2013).

The authors proceed from the fact that the complexes of scientific and technical problems of designing EM and the state mechanism are indissolubly linked. Both mechanisms are considered as an organizational base of a country's life-support system (Ilyin, 1996). Structure of these mechanisms and relationship between them should be changed depending on what is meant by the prosperity of the country and what problems of economic development are to be solved. Design of the mechanisms should certainly take into account the relationships with economic and state mechanisms of other countries.

Socio-economic role and **the s-model**[1] **of money in the era of e-services**, implementation of the system of property statuses and technologies of commodity-money relations in **the normalized economic mechanism (NEM)** - these and other things considered in this paper are studied in the framework of scientific research "Creating the methodology of informatization of normalized economic mechanism and software implementation of expert resource planning based on e-services". The research is executed in the Institute of Informatics Problems at the Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences. The first phase of implementation of the NEM information technologies includes a set of online services for expert resource planning. The authors have completed creation of the theoretical foundations of the NEM information technologies implementation and have published methodology, principles of work and description of use of the e-service "Cost Planning" (Ilyin, 2013; Ilyin, Ilyin, 2014 [8]). The method of interval planning implemented in this e-service (**www.res-plan.com**) does not have known analogues.

[1] Hereinafter, the prefix s- means that the term belongs to the methodology of symbolic modeling of arbitrary objects in the human-machine environment (Ilyin, Ilyin, 2009).

The article describes basics of the concept of normalized commodity-money circulation and the approach to implementation. The article is considered as the complement to (Ilyin, Ilyin, 2014 [9]) and updating the model of the normalized economic mechanism.

Analogous methodologies of e-trade with direct lending and normalization of commodity-money relations are not known to the authors. Critical analysis of the economic concepts of extraterritorial profit was published in (Ilyin, 2009; Ilyin, 2010) in Russian and (Ilyin, Ilyin, 2014 [9]) in English. A part of discussion on the first version of the model of normalized economics (Ilyin, 2009) is contained in the chapter 5.1 of the monograph (Ilyin, 2010), including answers to comments from reviewer (5.1.1) and from Egor T. Gaidar (5.1.2). The chapter 5.2 of this book contains critical analysis of the ideology of financial domination.

Materials and methods

1. The approach to informatization of the economic mechanism

Informatization is considered as a gradual transition from existing EM to the NEM (Table 1).

EA-management **(Economic Activity management)**	**RC-production (Real Commodities production)**
The complex includes state institutions (ministries and the central bank) and commercial institutions (boards of directors, etc). Basic functions: - to set the goals for development of the NEM complexes - to direct and stimulate economic activity through taxes, excise, duties and other means of economic regulation - to solve the problems of unemployment - to coordinate achievement of the objectives; to control the achieved results	Farms and plants should be built in accordance with the principle of constructing complexes from unified modules. This is the key method to solve the problem of unemployment among employable population. **VG-stockpiling (Vital Goods stockpiling)** In addition to the state reserves it is desirable to develop a non-government stockpiling of vital goods. Vital goods in the depositary networks of state and non-government VG-stockpiles are a useful trade buffer (both for consumers and producers and for those engaged in wholesaling). **Multi-currency market** **(on the basis of e-trade with direct lending)** Domestic e-trade is done according to the rules that are set by the laws of the state under whose jurisdiction the NEM-system operates. The e-trade deals between economic agents from different NEM-systems should be done following the given obligatory rules: - the applicable set of national currencies is represented by an intersection of the sets of currencies that are approved by central banks of the NEM-systems whose economic agents execute the deal; - restrictions should be made corresponding to the list of commodities that are allowed for import and export, as defined by law and by international treaties. **E-investment** Contractual money investment targeted at the development of NEM complexes.

Source: own processing

Table 1: Basic NEM complexes.

	EA-documentation (Economic Activity documentation) - PS-system (**system of Property Statuses**): ◦ **EA-accounts (accounts of Economic Agents)** ◦ **normalized money** - **Normalized E-banking:** central bank, banks-providers, personal e-banks (PEBs), corporate e-banks (CEBs) **The state budget, reserves, taxes and duties** If the multi-currency funds of the state are placed as investments in the NEM-system of this state, then the safety of these funds is guaranteed by collateralized property of investment recipients. In this case, the invested funds are used to increase the potential of the country to which they belong. **Regional budgets and taxes** **Social security funds**

Source: own processing

Table 1: Basic NEM complexes (continuation).

NEM is a market economic mechanism where central bank is obliged to monitor implementation of rules of commodity-money circulation which are established by law. The monitoring of activities of banks-providers, CEBs and PEBs works on the basis of electronic services (Ilyin, Ilyin, 2011; Ilyin, Ilyin, 2014 [9]; Ilyin, Ilyin, 2014 [8]; Ilyin, 2013). The relevance of the theme of state regulation of economic mechanism never decreases. Here is the example of discussion on this topic in ResearchGate: **https://www.researchgate.net/post/What_should_be_the_main_objectives_of_state_regulation_of_economic_activity_in_countries_with_developed_market_economies.** Structure and rules of the NEM, established by state laws, stimulate citizens to conduct business activities focused on increasing the economic potential of their country (Ilyin, 1996). This is to be done by means of taxes, duties and other economic instruments. The NEM does not suppress striving of economic agents (EA-agents) for obtaining an extraterritorial profit. It is supported in all cases when a transaction (sale, investment or other) does not contradict the objective to increase the potential of the country.

2. The system of property statuses

The system of property status (PS-system) is the system of e-documentary representation of monetary and non-monetary components that reflect property statuses of economic agents. Monetary components are represented by amounts of normalized money in different currency sections of unique unified multi-currency accounts of economic agents (EA-accounts). Non monetary components are represented by e-documents confirming the ownership of real estate, transport and other property which, if necessary, can be considered as collateral.

EA-account is unified e-document which contains several currency sections activated by the central bank. Since EA-account has a multi-currency structure, it can be applied to record the results of internal and overseas economic activities. Usage of EA-accounts assumes that each economic agent has own unique identifier (a conceptually similar project "National Strategy for Trusted Identities in Cyberspace" was published in the USA (THE WHITE HOUSE, 2011)).

2.1. The axiom of admissibility of operations on EA-account

Any change of the sums on EA-account can be done only after the documented encrypted confirmation of the EA-account's owner.

In the NEM it has to be implemented on software/hardware level. Operation becomes permissible (for purchase and sale transactions, investments, etc.) only when each owner of EA-account, involved in the operation, has given the encrypted confirmation. Each confirmation is included in e-document which describes the operation. The e-document is received by the owners of EA-accounts; its copy is kept on banks-providers' servers within a predefined time.

2.2. State online certification of operations on EA-accounts

EA-account can be changed only after online state certification of the operation permissibility. The certification is executed by special e-service

from central bank. The certification is based on data of the operation which is to be performed (purchase and sale, contract investment et al.) This prevents any violations of the rules of commodity-money circulation established by law (illegal economic transactions, non-payment of taxes, etc.).

3. Normalized money

Normalized money is programmatically implemented documentary representation of value of goods and property statuses of EA-agents, as well as the means of payment for goods, taxes and accumulation of wealth. NEM-money is represented by records in EA-accounts. The records certify property rights to a share of the commodity value of the NEM-system and property liabilities in relation to other economic agents, which are expressed by debts and received investments. Signed real numbers are used to present the sums in EA-accounts: the minus sign is used for those sums that are to be returned, the plus sign - for those sums which have been received in accordance with contracts of closed deals.

Two states are possible for normalized money: “assigned” (a debt due to a commodity purchase; investment; tax, or other sum to be paid) and “non-assigned” (sums in the “I own” sections of EA-accounts). Assigned money may be used only for a certain purpose [e.g. those received from investors can be used in accordance with the investment contract (purchase of new equipment, etc.)]. Non-assigned money is used according to the self-determination of the owner of EA-account (in any permissible deal).

Changes over time in purchasing power of NEM-money for different commodity types reflect changes in the supply-and-demand situation for commodities of these types. If manufacturers of certain type of real commodities, using excess of demand over supply, increase prices without increasing the functionality and quality of the commodities, then for some time, such manufacturers will benefit (until the market will not reach a balance of supply and demand). At the same time such manufacturers tend to lose some wholesale customers and, as a result, may lose a market share for their commodities.

The continuous decrease of the purchasing power of money in economic systems of extraterritorial profit is caused by money emission and bank trade in credits which are not tied to purchases of real commodities. In fact, the sums of money not backed by real commodities, are thrown onto the market, and it leads to excess of solvent demand over supply and to the rise in prices. Such organized decrease in the purchasing power of money is the fraud to take a part of money belonging to those who produce real commodities and do not increase their prices. This fraud was invented to “make money” without producing real commodities, and theorists of economy of extraterritorial profit explain it as inevitable attribute of market (Fisher, 1922; Keynes, 1936; Friedman, 2005).

4. Normalized e-banking

E-banking system of the NEM includes personal electronic banks (PEBs), corporate e-banks (CEBs), banks-providers and the state central bank, which controls functioning of all other banks.

The central bank possesses a network of servers located on the territory of a country under whose jurisdiction the NEM-system operates. The following functions of the central bank have to be implemented as e-services:

- issuance and revocation of licenses for banking activities (to owners of PEBs, CEBs and banks-providers);
- activation and deactivation of the currency sections of EA-accounts;
- monitoring the adherence to the rules of banking activities, including online certification of the transaction permissibility;
- analysis of the financial component of economic activity and presentation of results in the form established by law;
- development, modification and approval of the tested standardized forms of bank documents (including EA-accounts);
- monitoring the efficiency of allocation of normalized money belonging to state reserve funds, state social protection funds, other funds with state participation.

Bank-provider is a commercial institution established by legal entity (or by association of legal entities and individuals) involved in RC-production, RC-trade or VG-stockpiling. The bank-provider possesses a network of servers, designed to process the queries from clients' PEBs and CEBs, and to interact with the servers of a central bank.

The e-services from bank-provider are:

- processing requests from EA-accounts' owners, which are sent from PEBs and CEBs when a deal is to be made, including queries

to check the partner's EA-account state, sent upon permission of the partner;

- storage and update of encrypted copies of EA-accounts belonging to the bank clients;
- analysis of investment inquiries of clients (prospective investors and investment recipients): banks-providers can execute orders of investment recipients to consolidate investments;
- registration of contracts (with control of permissibility) and maintaining the contracts database which contains encrypted copies of documents on transactions served within predefined time period;
- legal support of deals.

The rules governing the process of establishing, operation and liquidation of banks-providers shall be established by law. Owners of banks-providers should have the property statuses with sufficient monetary and non-monetary components.

PEBs and CEBs are, as usual, portable electronic devices (like tablet PC) having smartphone functions. CEBs may be based on desktop computers. PEBs and CEBs keep (in encrypted form) the original EA-accounts and documents on transactions. Mobile banking software (certified by central bank) is the core of applications on PEBs and CEBs. Encrypted database of EA-account is stored in the device memory, and its copy – on memory card. Records in the files of EA-accounts may be initiated only by accounts' owners who make a deal.

Results and discussion

These days the approaches to implementation of normalized commodity-money circulation and e-trade with direct lending (described below) are discussed the most intensively. (Here is one example of discussion with the English-speaking participants: **https://www.researchgate.net/post/Why_is_trading_with_direct_lending_an_effective_anti-inflationary_tool)**.

5. E-trade with direct lending

One of the urgent measures to normalize economic mechanism is the e-trade with direct lending, where the deferred portion of payment is documented as the buyer's debt to the seller (not to the bank). This technology is applied to purchases of any commodity, any seller and buyer. Repayment schedule is fixed in the contract. The contract also specifies penalties for violation of the schedule and improper quality of the commodity. In extreme case the buyer has to pay by collateral. In such trading, all the benefits and risks are shared between buyers and sellers only. The legal and technological assistance to the seller and the buyer is done by their banks-providers.

5.1. Debt repayment: state support

In general case, debt repayment is determined by the contract.

When a debt is result of purchase of the priority vital goods, the rules of early repayment from the central bank funds can be applied. These rules are defined by the central bank and act for the sellers of commodities included in the priority list defined by law. The sellers can receive the debt portion of the purchase price much more earlier than it is determined by repayment schedule in the contract. A seller sends a request to the debt department of the central bank, using special online service. In case of positive decision, the central bank transfers the debt amount to the seller's EA-account, and then the buyer pays the debt to the department of the central bank. A seller informs buyer about such way of repayment before making a deal.

Early repayment of debts from the central bank funds implements the state program to support production and sale of priority commodities.

5.2. Emission of debt amounts

The central bank makes emission only when it does not have necessary sum to return a debt amount to seller of priority commodities. The emitted sum is the difference between the debt amount and the sum available on the debt department account.

Emission of debt amounts is used for the state regulation of total sum of normalized money in economic system and their purchasing power. Rules of emission of debt amounts exclude a possibility of emission of money not backed by real commodities.

5.3. Stimulation of sales for national currency

On the NEM' multi-currency market the e-trade with direct lending stimulates sales of priority products with payment in national currency: sellers have the possibility to quickly return the debt portion of the purchase price only when sale is made with payment in national currency.

5.4. E-trade with direct lending as anti-inflationary instrument

E-trade with direct lending makes use of current bank loans unnecessary. Such trade serves as effective anti-inflationary tool: change in the total

amount of money is always strictly related to the change in the total value of goods sold in the economic system.

In the first stage of normalization of banking activity the central bank has to oblige other banks to provide and serve the trade accounts which reflect operations of e-trade with direct lending.

Conclusion

In the system of property statuses of the NEM the normalized money is used as means of electronic documenting the value of goods, the volume of property rights and other economic entities related to property exchange (evaluation of collateral, values of debt and profit, contractual investments, taxes etc.) Normalized money is not a commodity unlike the one that the current banking system produces (by means of money emissions) and trades (in the form of loans).

It is technologically impossible to use the sums of normalized money, stored on the EA-accounts, without permission of the accounts owners. It is also impossible to use the normalized money in illegal deals due to obligatory online state certification of the transaction permissibility by e-service from the central bank.

The technology of normalized commodity-money circulation (including technology of e-trade with direct lending) is an effective anti-inflationary instrument, because a significant reduction in the purchasing power of money is possible only with a corresponding reduction of supply on the market. The rules of emission of debt amounts and cancellation of trade in credits exclude the occurrence of money not backed by real goods, stimulate production of the priority goods and selling them for the national currency. List of priority goods and rules of transaction permissibility are formed and updated by parliament with participation of central bank and business community.

The implementation of technology of e-trade with direct lending will significantly reduce farmers' dependence on bank loans. Such trade allows farmers to buy machinery, fertilizers and others products, paying directly with sellers of goods. Farmers could carry out transactions using their personal and corporate e-banks. Banks-providers should technologically support those transactions.

In the normalized economic system the central bank and the banks-providers are the core of the system of documenting the results of economic activity. This system processes the requests of economic agents sent from their CEBs and PEBs.

The approach to normalization of the money system is designed with taking into account the possibility of gradual change of the current monetary system. The change can be implemented without losses for the producers of real commodities and the state.

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References

[1] Fisher, I. The Purchasing Power of Money. Its Determination and Relation to Credit, Interest, and Crises. New York: The Macmillan Co. 1922.

[2] Friedman, M. The Optimum Quantity of Money. Revised edition. AldineTransaction. 2005. ISBN 978-1412804776.

[3] Helin, J. A. Reducing nutrient loads from dairy farms: a bioeconomic model with endogenous feeding and land use. Agricultural Economics. 2013, Vol. 45, No. 2. p. 167–184. doi: 10.1111/agec.12039. ISSN 0169-5150, E-ISSN 1574-0862.

[4] Ilyin, A. V. Ekspertnoe planirovanie resursov [Expert Resource Planning]. Moscow: Institute of Informatics Problems of Russian Academy of Sciences. 2013. ISBN 978-5-91993-022-8.

[5] Ilyin, A. V., Ilyin, V. D. Osnovy teorii s-modelirovaniya [Basics of the theory of s-modeling]. Moscow: Institute of Informatics Problems of RAS. 2009. ISBN 978-5-902030-78-2.

[6] Ilyin, A. V., Ilyin, V. D. S-ekonomika: mekhanizm khozyaistvovaniya v epokhu interneta [S-economics: Mechanism of Management in the Internet Epoch]. Moscow: Institute of Informatics Problems of Russian Academy of Sciences. 2011. ISBN 978-5-902030-94-2.

[7] Ilyin, A. V., Ilyin, V. D. The Technology of Interactive Resource Allocation in Accordance with the Customizable System of Rules. Applied Mathematical Sciences. 2013, Vol. 7, No. 143. p. 7105–7111. doi: 10.12988/ams.2013.311649. ISSN 1312-885X.

[8] Ilyin, A. V., Ilyin, V. D. The Interval Method of Cost Planning and Its Implementation in the Online Service. Contemporary Engineering Sciences. 2014, Vol. 7, No. 20. p. 931–938. doi: 10.12988/ces.2014.48114. ISSN 1313-6569, E-ISSN 1314-7641.

[9] Ilyin, A. V., Ilyin, V. D. Towards a Normalized Economic Mechanism Based on E-services. Agris on-line Papers in Economics and Informatics. 2014, Vol. 6, No. 3. p. 39–49. [Online] Available: http://online.agris.cz/files/2014/agris_on-line_2014_3_ilyin_ilyin.pdf [Accessed: 14 August, 2015]. ISSN 1804-1930.

[10] Ilyin, V. D. Osnovaniya situatsionnoy informatizatsii [Fundamentals of situational informatization]. Moscow: Nauka, Fizmatlit. 1996. ISBN 978-5-02-015213-7.

[11] Ilyin, V. D. Model normalizovannoi ekonomiki (nek-model): osnovi koncepcii [The model of normalized economics (nec-model): basics of framework]. UBS. 2009, Vol. 25. p. 116-138. [Online] http://www.mathnet.ru/links/c6cd01830a66b4c9d14eb6ce4365e59e/ubs6.pdf [Accessed: 14 August, 2015].

[12] Ilyin, V. D. S-model normalizovannoi ekonomicheskoi sistemi [S-model of Normalized Economic System]. Moscow: Institute of Informatics Problems of Russian Academy of Sciences. 2010. ISBN 978-5-902030-79-9. [Online] Available: https://smodeling.files.wordpress.com/2010/03/vd-ilyin-s-model-nec-sys-2010e.pdf [Accessed: 14 August, 2015].

[13] Keynes, J. The General Theory of Employment, Interest and Money. Macmillan Cambridge University Press, for Royal Economic Society. 1936.

[14] Krugman, P. What Ails Europe? The New York Times. 2012. [Online] Available: http://www.nytimes.com/2012/02/27/opinion/krugman-what-ails-europe.html?_r=0 [Accessed: 14 August, 2015].

[15] Krugman, P., Wells, R. Macroeconomics. 2nd edition. New York: Worth Publishers. 2009. ISBN 978-0716771616.

[16] Lorek, S., Spangenberg, J. Sustainable consumption within a sustainable economy – beyond green growth and green economies. Journal of Cleaner Production. 2014, 63. p. 33-44. ISSN 0959-6526.

[17] Lwasaa, S., Mugaggaa, F., Wahabb, B., Simonc, D., Connorsd, J., Griffithe C. Urban and peri-urban agriculture and forestry: Transcending poverty alleviation to climate change mitigation and adaptation. Urban Climate. 2014, 7. p. 92-106. ISSN 2212-0955. [Online] Available: http://ac.els-cdn.com/S2212095513000552/1-s2.0-S2212095513000552-main.pdf?_tid=a56edd90-b907-11e3-b1ca-00000aab0f6c&acdnat=1396293004_f0b5ada4b4bdf30aef954d96b7c2fc7e [Accessed: 14 August, 2015].

[18] Maart-Noelck, S. C., Musshoff, O. Investing today or tomorrow?: an experimental approach to farmers' decision behaviour. Journal of agricultural economics. 2013, Vol. 64, No. 2. p. 295–318. ISSN 0021-857X, E-ISSN 1477-9552.

[19] Meyfroidt, P., Lambin, E. F., Erb, K.-H., Hertel, T. W. Globalization of land use: distant drivers of land change and geographic displacement of land use. Current Opinion in Environmental Sustainability. 2013, Vol. 5, No. 5. p. 438–444. ISSN 1877-3435.

[20] Skevas, T., Lansink, A. O. Reducing Pesticide Use and Pesticide Impact by Productivity Growth: the Case of Dutch Arable Farming. Journal of agricultural economics. 2014, Vol. 65, No. 1. p. 191–211. doi: 10.1111/agec.12039. ISSN 0021-857X, E-ISSN 1477-9552.

[21] Soukup, A., Brčák, J., Svoboda, R. Monopolistic Competition in the International Trade of Agricultural Products. Agris on-line Papers in Economics and Informatics. 2014, Vol. 6, No. 1., p. 87–97. [Online] Available: http://online.agris.cz/files/2014/agris_on-line_2014_1_soukup_brcak_svoboda.pdf [Accessed: 14 August, 2015]. ISSN 1804-1930.

[22] Taran, P. Globalization, Migration and Labor: Imperatives for a Rights Based Policy. Journal of Globalization Studies. 2011, Vol. 2, No. 1. p. 58–77. [Online] Available: http://www.sociostudies.org/journal/files/jogs/2011_1/globalization_migration_and_labour_imperatives_for_a_rights_based_policy.pdf [Accessed: 14th August, 2015]. ISSN 2075-8103.

[23] USA. The White House. National Strategy for Trusted Identities in Cyberspase. Enhancing Online Choice, Efficiency, Security, and Privacy. 2011. [Online] Available: http://www.whitehouse.gov/sites/default/files/rss_viewer/NSTICstrategy_041511.pdf [Accessed: 14 August, 2015].

[24] Valin, H., Sands, R. D., van der Mensbrugghe, D., Nelson, G. C., Ahammad, H., Blanc, E., Bodirsky, B., Fujimori, S., Hasegawa, T., Havlik, P., Heyhoe, E., Kyle, P., Mason-D'Croz, D, Paltsev, S., Rolinski, S., Tabeau, A., van Meijl, H., von Lampe, M., Willenbocke, D. The future of food demand: understanding differences in global economic models. Agricultural Economics. 2014, 45, No. 1., p. 51–67. doi: 10.1111/agec.12089. ISSN 0169-5150, E-ISSN 1574-0862.