UDC 658.336
**ZHABENKO A.V.,** junior research worker;
**GUNCHAK V.M.,** Candidate of agrarian sciences, director;
**FILIMONOVA A.G.,** junior research worker;
**KORDULYAN R.O.,** chief of analytical research laboratory.
Ukrainian scientific-research plant quarantine station PPI. NAAS of Ukraine
e-mail: ukrndskr@gmail.com

## USAGE OF CRM SYSTEMS AND CROWDSOURCING
## IN HARDWARE AND SOFTWARE COMPUTERIZATION OF AIC OF UKRAINE

*The possibility of crowdsourcing and CRM systems usage is researched as a necessary and advanced direction in hardware and software modernization and computerization of AIC of Ukraine. The basic advantages and wide possibilities of the given systems in scientific research computerization, increase of their competitiveness on a worldwide stage, and further commercialization are detected. The successful examples and variants of the given technologies are set out.*

***Key words:*** *computerization, modernization, CRM systems, crowdsourcing, competitiveness, commercialization*

**Introduction**. Revolution in science and techniques has put on a principal place the problem of new informational technologies implementation and computerization not only in spheres of studying, business and IT, but also in science, research and farming, plant protection, horticulture and vegetable production, which are traditional for Ukraine. The specifics and significance of automatization and computerization consist in the fact that in these and other spheres of national economy, labour productivity increase rather depends on them. Furthermore, for normal development of such industries, labour productivity with computer technologies usage must escalate with higher rates, as in modern society, information is more and more often a subject of final consumption: people need information about world events, research results, subjects and phenomena concerning their professional activities, science and society development. The further labour productivity- and research level increase is possible only based on usage of new intellectual devices and human-machine interfaces, oriented on large information volumes timely accept and processing. Currently, about 50 % of all working places in the world are supported by information processing media. In Ukraine, at the absence of sufficient research- and science informatization and computerization level, a significant slowdown growth rates of labour productivity all over national economy may take place. Unfortunately, some steps in such a direction have already been done and continue to be done.

For recent years, in Ukraine a tendency for funds committing reduction for scientific researches has been observed. Simultaneously, in developed states for the last decade, the situation is vice versa. In USA, the expences have been changed from 1,32 to 2,2 % GIO; in Australia - from 1,5 to 4,2 %, in RSA - from 1,39 to 2,59 % GIO (Fig.1, 2).
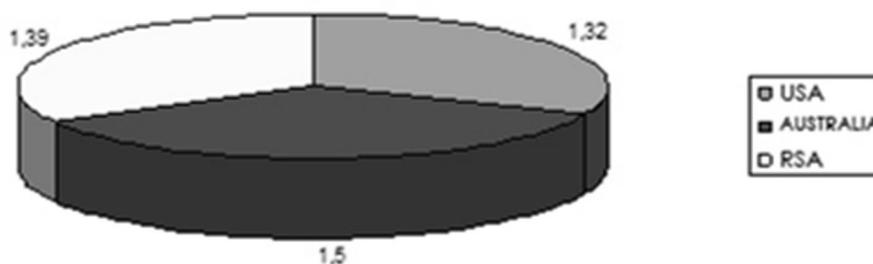


**Fig.1 Percentage ratio between funds committed and gross inner output (GIO) in prior years**
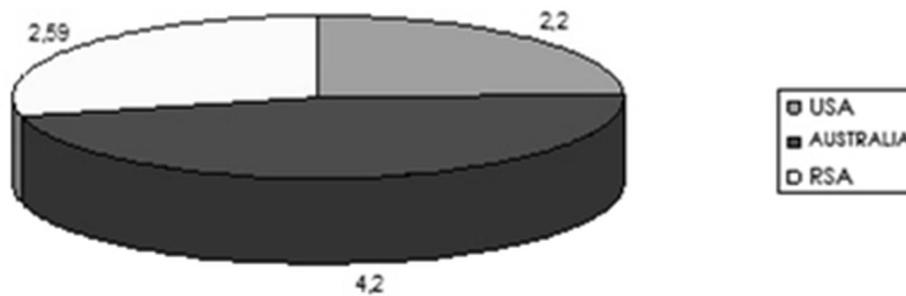
**Fig.2 Percentage ratio between funds committed and GIO in late years**

This is furthermore important, as nowadays the farmers' susceptibility to scientific achievements is very low, due to enterprises low possibilities. Computerization and informational systems development in research open new possibilities in AIC (agro-industrial complex) by means of productivity- and work quality increase, and their bringing out onto a new, worldwide level of competitive ability.

At the moment, the competition is rather high on all levels of market and science. Science must not only support the old level, but also achieve new horizons, in order to be successful in commercial and scientific way. This will be impossible to carry into effect without processes and researches computerization. The solution of the given problem is the implementation of CRM systems and usage of crowdsourcing into scientific researches.

The history of CRM systems for data systematization on clients and people interaction is used to begin with John Henry Patterson, the founder of the company National Cash Register, who was first to generalize the devices used for trade- and successful people interaction organization. The next one was Morris Perkin, who developed a system «Day-Timer». All these systems were the prototypes of the CRM system in their modern appearance and understanding. At the moment in the world, above 1000 solutions exist, which may be related to classes of CRM and Contact Management. What does this system present?

*Research aim.* To investigate the possibility of crowdsourcing and CRM systems usage as the most advanced direction in software and hardware computerization and modernization of AIC of Ukraine.

**Research methods.** CRM system is an informational system, the mission of which is the automatization of a company business processes which provide the interaction of all its departments among themselves and with clients on a level determined by CRM ideology. Such a system, on one hand, solves the assignments directed on clients' wishes satisfaction and clients retention, and on the other hand, serves for a company activities optimization, reducing expences due to information search and processing, data analysis, management, etc [2].

The main tools included into CRM systems technology are [1]:
• gathering of all the accumulated information about objects into a single client base;
• gathering history of mutual relation with clients, partners and providers;
• information exchange between departments and staff, without «informational collapses»;
• reportingto upper authorities;
• tasks accomplishment establishment and control by upper authority;
• creation of users access levels to certain information groups;
• integration with other systems;
• data synchronization;
• works sequence automatization, and their integration into a working environment;
• obtaining analytical reports;
• prognosing;
• planning and measures effectiveness analysis;

• complaints registration and sorting;

• company knowledge accumulation and its management.

Another stage in the industry's modernization, in our opinion, is the so-called crowdsourcing.

**Crowdsourcing** is a transmission of certain producing functions to an indefinite range of persons (based on a public offer without concluding a labour contract). Crowdsourcing is a part of that Eric fon Hippel calls an "innovation accounting on a user". Manufacturers rely on users not only in needs formulation question, but also in products and perfections determination, which would satisfy such needs. Crowdsourcing has appeared from account on forecasted consumers' wish to share their ideas with a company – free or for a small price, extremely because of an aspiration for seeing such ideas implemented in production [5, 6].

**Research results.** In scientific sphere, the given system may be considered a system which [3, 4]:

• allows the research workers to gather in a single place, maintain and process information on scientific developments, research results, tasks from authority; as well as information on some mistakes and possible difficulties in various experiments;

• allows the authority to monitor a degree and quality of the given tasks fulfilment;

• allows a large number of people to work over one and the same project, not depending on their location;

• allows to delimit the rights of access between research workers; to maintain all the obtained data and results in a so-called *cloud storage*, which significantly reduces the risk of data loss or stealing; to find quickly a necessary information. For better understanding, we shall give an example.

Several territorially independent researchers are working over a single project. They have a possibility, if the access levels allow, to look through all their colleagues' results; to see the problems isolated and ways of their solution; to see a necessity of some technical devices; to connect with one another by text messages or video conferences. The information on all the work periods is always near at hand, and there is always a possibility to take several steps back; to inform the authority about a necessity of some devices or other, as well as about certain problems and ways of their solution. In their turn, the authority always has a possibility to look through any data and a project performing degree, without a risk of losing or violating integrity of such data. The authority, as well as the staff, may be involved in several projects and simply switch on among them. All this – in a single place and in a single system. Certainly, this is impossible without a sufficient computerization level – both hardware and software.

Hence, we may come to an apparent conclusion that such a system is what we need for scientific research optimization, modernization, and computerization. Just now, for our scientific potential and our researches to be competitive not only inside the country but also on a wide world stage, we need to computerize our scientific researches not only by hardware, but mainly by software. CRM systems carry out the tasks set out by a so-called scientific research software computerization.

The industries more mobile to changes (banks; large trade companies; middle and small trade companies; tourist operators; telecommunicational providers; companies which give business services; equipment providers; insurance companies; pharmaceutical companies; manufacturers; mass media; IT-companies) have been successfully using the given systems in their business processes.

The scientific processes, researches and the research workers themselves should refuse the old work system. They need not to attend planning assemblies, the so-called "five-minutes conferences", to receive tasks on paper and to write reports on many pages, as well as to use plenty of other old devices in scientific work anymore. All these operations may be conducted with the help of CRM systems. The research workers may be located in long distances between each other. Nevertheless, this will not be an obstacle in carying out joint projects and elaborations, and for authorities - in putting certain tasks and deadlines, as well as in their control. This will not also

prevent to use a common information. As all these processes are conducted with the help of global and local networks, – that is why any distance limitations or different time zones are completely levelled. Using the given systems in science, institutions and individual researchers will be able to optimize significantly their scientific activity and investigations, to reduce expenses, to increase the rate of work and results obtaining, to improve the quality of research control, to become more mobile and independent. All the above-stated advantages are concentrated in a single system.

Among the examples of successful crowdsourcing projects, such companies are noted:

**InnoCentive** – a company which invites research workers for a competition reward from $ 10.000 to $ 100.000, to fulfil the tasks set by such companies as Procter & Gamble, DuPont, and BASF;

**Threadless** – a company producing T-shirts from Chicago; the elaboration process consists exclusively of an online-competition. The winners of a weekly competition get $ 2.000, and their work is started up into manufacture;

**Muji** – a Japanese furniture company, which collects ideas for its products through its corporative web site, and passes a decision on starting up into manufacture, according to the competition results;

**eBird** – a project using amateurs' resources for birds observation;

**NASA Clickworkers** - a NASA project created with the aim of analysing a massif of pictures from Martian surface, by amateur astronomers efforts.

**Peer-to-Patent** – American project based on a joint work principle: a state patent bureau works on a constant base with an open Internet community. In patents applications consideration, a network of volunteers participates (scientists, technical professionals, persons with qualification allowing to take part in patenting process).

**CONCLUSIONS**

In scientific sphere, it is not easy to leave a well-known track, to change completely its attitude and conviction, to give a part of work to unknown ones, and to rely on unknown results. However, the above-stated successful examples of crowdsourcing and CRM systems usage point on quite another. They point on a force existing in community. The modern world is not as it was 30, 20, or even 10 years ago. But if we wish to update the AIC of Ukraine, to achieve a quite new level, to become competitive and successful – we need to make essential changes.

We are sure that on this way, the scientific community of Ukraine will be able to achieve new levels of science development, its scientific progresses commercialization, and become successful.

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***Анотація***

***Жабенко О.В., Гунчак В.М., Філімонова А.Г., Кордулян Р.О.***

***Використання CRM-систем та краудсорсингу в апаратній та програмній комп`ютеризації апк україни***

*Досліджено можливість використання краудсорсингу та CRM-систем як невід'ємного та найперспективнішого напрямку в апаратній та програмній модернізації та комп'ютеризації АПК України. Виявлено основні переваги і широкі можливості даних систем в комп'ютеризації наукових досліджень, підвищенні їх конкуренто спроможності на загальносвітовій арені та подальшій комерціалізації. Наведені успішні приклади та варіанти використання даних технологій.*

***Ключові слова:*** *комп'ютеризація, модернізація, CRM-системи, краудсорсинг, конкурентоспроможність, комерціалізація*

***Аннотация***
***Жабенко А.В.****,* ***Гунчак В.М.****,* ***Филимонова А.Г., Кордулян Р.А.***

***Использование CRM-систем и краудсорсинга в аппаратной и программной компьютеризаци АПК Украины***

*Исследована возможность использования краудсорсинга и CRM-систем как неотъемлемого и перспективного направления в аппаратной и программной модернизации и компьютеризации АПК Украины. Выявлены основные преимущества и широкие возможности данных систем в компьютеризации научных исследований, повышении их конкурентоспособности на общемировой арене и дальнейшей коммерциализации. Приведены успешные примеры и варианты использования данных технологий.*

***Ключевые слова:*** *компьютеризация, модернизация, CRM-системы, краудсорсинг, конкурентоспособность, коммерциализация*