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FOREWORD

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This is the open series for the publishing of the most recent research results and international projects from all technical fields and scientific disciplines which are in the field of interest of DAAAM International. Actuality, competence, team work, interdisciplinary and international cooperation are the main characteristics of this initiative. To all readers we wish joy during the reading and success during the studding of this book.

A book of this magnitude is the work of many people. On behalf of the world wide DAAAM International community, we thank all of the authors for their high-quality contributions and external referees for carefully reviewing the submissions. We hope that this book will encourage other colleagues to join us in this fascinating international academic project. You are welcome to present your research project and to publish your research results in the next DAAAM International Scientific Book 2015.

Vienna, 2014-11-27
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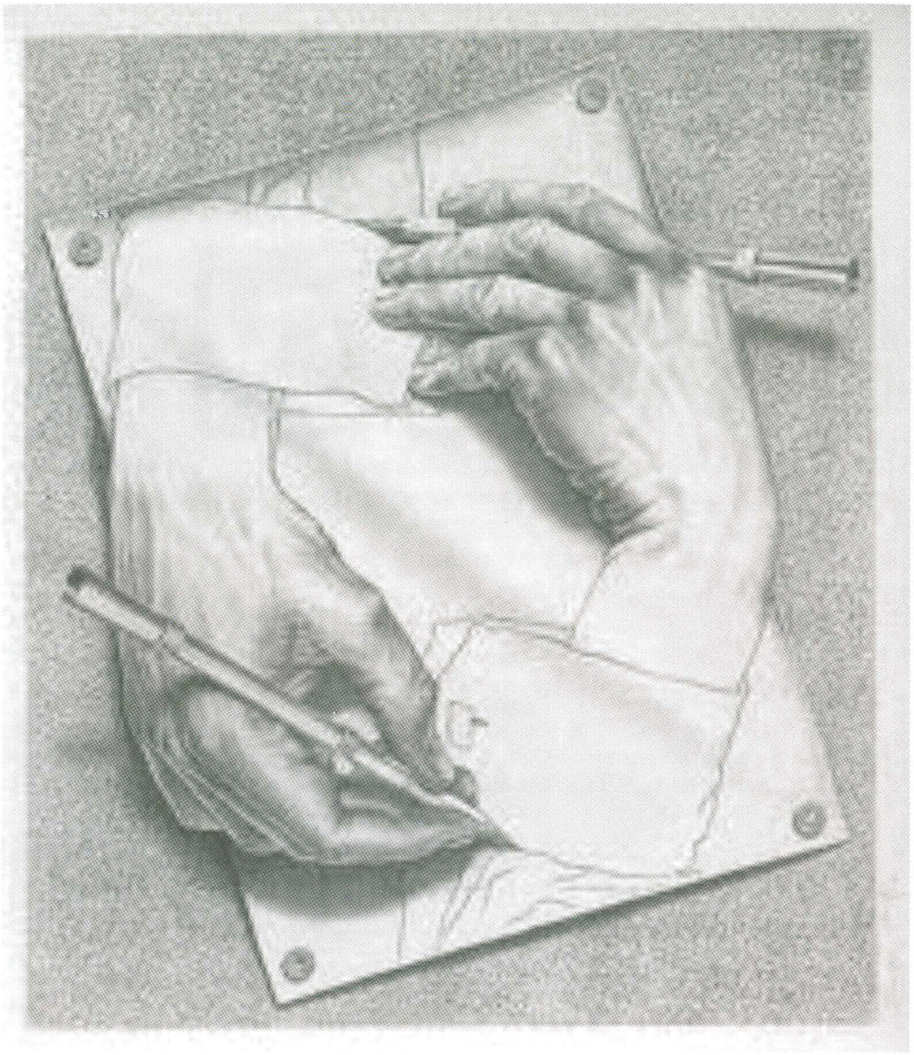

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CONFLICT ANALYSIS FOR PROJECT AND MATURITY MANAGEMENT

AZAROV, V. & CHEKMAREV, A.

Abstract: *Conflicts are widely used in management as engine for development and a tool for collecting information about current processes. But what kind of information can we get by analyzing conflicts, arising during information technology project and how can we use it? Could we measure conflict characteristics? Are these conflicts unavoidable? Could we use conflict information for maturity and capability evaluation? According to ISO 9000 we should provide interim control of projects flow to achieve higher quality. But how can we do that between or before control milestones of the project? Could we use conflict information for interim control? The article presents results of implementation of new method for project interim audit, based on quantitative analysis of conflicts. Provided case study also demonstrates results of the conflict evaluation method application for Capability Maturity Model Integration appraisal.*

Keywords: *quality, maturity model, project, CMMI*

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1. Introduction

A lot of complex IT projects at the recent times are completed unsuccessfully. For example, according to report of the Standish Group in 2009 only 32% of projects met time, budget and quality requirements, 24% were interrupted before completion.

Due to that fact research of IT project management improvement methods becomes important.

According to ISO 9000 interim control of projects and process flow for higher quality should be provided. But that task is very tough outside milestones and recognizable physical results. Conflicts arise throughout life of a project and could provide information at request, so could be used for interim control.

International standards and common methods of project and process management for example PMI Project Management Body of Knowledge, Capability Maturity Model Integration, pay apparent attention to conflict management during project implementation. Conflict is considered as an inevitable phenomenon or process which should be effectively managed and having significant influence on project results. "...Completion of projects may require several years, and they can be difficult to manage under the best of circumstances. If organizational conflict is superimposed upon the normal project management difficulties, successful project outcomes are rendered immensely more difficult..." (Sutterfield, et. al., 2007).

Every project is a process creating unique outcomes and changing organization. It inevitably forces subsystems of organization to adopt changes, which are divergent from their goals and current way of work. Need of adaptation creates stress and tension (Venda, 1990). Stress created by project is recognized as negative emotions and conflict with project team by employees. So conflict is unavoidable. High level stress could lead to crucial loss of effectiveness of a system (Venda, 1990). Consequently project manager should avoid high level of conflicts but absence of conflict demonstrates lack of adaptation processes and project progress.

In management theory conflicts are widely considered as development engine and an ongoing process analysis tool. In (Kurtuhuz, et. al., 2011) is posited that "...conflict will undoubtedly arise in the management team, both functional and dysfunctional. The form of conflict that is productive is cognitive conflict, which is task oriented and focused on discussing and challenging diverse perspectives.... The opposite form of conflict is affective conflict, which is more emotional based. When considering conflict, the key to ensuring a high performing management team is making sure that conflict is of the cognitive variety, based on critical thinking and focused on tasks, while removing the affective conflict, that which is based on emotion...."

The higher level of the conflict the lower quality of the project outcomes (Barki & Hartwick, 2001). Three dimensions of conflict have been identified: interdependence, disagreement and interference (Barki & Hartwick, 2001). Consequently they could be used to measure level of conflict and predict quality of project outcomes. It could be used for creating of early alerts.

"...Process-based conflict deals with tension that stems from how tasks should be completed..." (Sutterfield, et. al., 2007). The mentioned paper posited conflicts of processes. Processes of a project are well classified by PM PMBOK. They are conducted in the midst of current work processes classified for example by CMMI. High level of conflict demonstrates need for adaptation of conflicting processes and consequently low maturity of them. Received information about process conflicts helps to select priorities during revamp of project and organization.

Project outcomes quality is function of several main parameters: Project group capability, Organization processes capability, Project complexity, Level of conflicts and Style of conflicts resolving (Barki & Hartwick, 2001). That statement could be used for various purposes. If Project group capability, Organization processes capability and Project complexity are measured and constant than project outcomes quality could by predicted via conflict characteristics. If Project outcomes quality, Project group capability, Project complexity are constant than Organization processes capability (maturity level) could by measured via project conflict characteristics.

Although there is extensive research regarding conflicts there is lack of research examining methods of conflicts level and conflicts resolving effectiveness measuring and interpretation. This study tries to fill a void in the project management literature by proposing a new method of interim control of IT projects and maturity assessment via conflict measurements. Besides that, proposed approach allows positing that project manager can and should manage level of conflicts. Low level of conflict demonstrates lack of project progress and gives opportunity to select priorities during revamp of project and organization.

2. Conflicts in project management

PMI PMBOK (Project Management Institute Project Management Body of Knowledge) gives very structured description of conflict management in the chapter "Project human resource management". According to PMBOK "Successful conflict management results in greater productivity... Conflict is natural and forces a search for alternatives. Conflict is a team issue, Openness resolves conflict, Conflict resolution should focus on issues, not personalities and Conflict resolution should focus on the present, not the past". Besides, PMBOK defines six general techniques for resolving conflicts: Withdrawing/Avoiding (retreating from actual or potential conflict situation, Smoothing/Accommodating (emphasizing areas of agreement rather than areas of difference), Compromising (searching for solutions that bring some degree of satisfaction to all parts), Forcing (pushing one's viewpoint at the expense of others), Collaborating (incorporating multiple viewpoints and insights from different perspectives), Confronting/Problem solving (treating conflict as a problem to be solved by examining alternatives).

PMBOK suggests managing only of team conflicts and neglect other types of conflict for example conflicts of Sponsor and Project manager. As a result PMBOK unfortunately could not provide an overall description and guideline for this issue.

The theory of complex systems and system analysis share approach to conflict issues, which interpret any conflict as a natural process of interaction of two or more developing and co-adapting complex systems (Venda, 1990), (Druzhinin, 1989). Arising of conflicts is caused by systems interaction or changes of inner subsystems of the organization system. Project development is inevitably accompanied or followed by conflicts that are not negative per se.

A conflict can be considered "good" or "bad" depending on its characteristics – level and result (style of resolving). But the main characteristic is reasonability of the conflict – some of them have no system-related reasons.

Various conflict resolving techniques have different potential for adaptation of organization to project and its results. Some of them reject adaptation and could make the project a "mission impossible" or lower its quality level.

The level of conflict allows evaluating the amount of changes and ability of the organizational system (maturity of the system) to adopt changes produced by the project of such complexity. Resolution style and stakeholder's interaction can help to predict the quality level of the upcoming project results or its part.

This suggestion provides the possibility to develop a method for on-line evaluation of project implementation effectiveness based on quantitative conflict evaluation instead of final or milestones control.

Conflicts can provide valuable information about project implementation. Projects are implemented in an existing organizational system interacting with its processes. So each project implementation process with arising conflicts can be used to get information not only about itself but also about effectiveness and capability of interacting subsystems and processes, about their maturity.

There are recommendations about conflict management in almost every process area description of CMMI.

Thereby the existence of conflicts, there severity and style of resolving are directly interconnected with maturity level and could be used for its recognition. Meanwhile official documentation of CMMI and accompanying publications contain no information about conflict evaluation and classification.

Besides quantitative conflict characteristics could be used as additional metrics of processes such as "Quantitative Project Management" on the higher levels of maturity.

CMMI is widely used in the world. Consequently developing new maturity level evaluation methods is a very relevant task.

Surely conflict evaluation methods could be used in appraisal of different process-based standards of IT and project management (ISO 20000, COBIT, ITIL, etc).

3. Measurement of conflicts

According to the system approach conflict management is management of adaptation of organization to outer changes and co-adaptation of its subsystems to each other. It is management of development of organization. Conflicts can provide valuable and objective information as they allow comparing subjective opinions. Taking this point into account, the following techniques should be developed: Measuring of

conflict intensity, Measuring of conflict effectiveness of resolving, Identifying the conflict's origin, Evaluating of maturity level.

All the information could be taken from the people taking part in the project. Man is a very universal and effective sensor but his interpretation should be corrected. Accordingly, methods of The Theory of Expert Estimation can be used to get precise scores. Adopted Likert 5 levels scale could be used to get raw data.

Conflicts are recognized as interpersonal phenomenon. There are four metrics, offered by (Barki & Hartwick, 2001) to evaluate the level of conflict: Level of interdependence, Level of disagreements, Level of intervention, Level of negative emotions.Conflict resolving effectiveness could be measured by evaluation of using by the stakeholders of different style of conflict. Some of them are directed to adaptation in interacting while the others are not. Evaluation of presence of Compromising, Collaborating and Problem solving style provides the required score of effectiveness of conflict resolving.

Unfortunately due to common low level of maturity (on the lowest levels processes could not be defined) and use of different project management standards stakeholders couldn't be asked directly about the problematic area of processes during project implementation and in organization, which causes conflicts. Consequently a more complex technique has to be developed implementing universal process classification and providing possibility to identify a problem-causing process by analyzing the project phase information. Evaluation of maturity level could be done by comparing the level of conflicts and effectiveness of their resolving during the project. This article provides results of the above-mentioned method implementation in complex IT project carried out in one of the biggest Russian financial institution.

4. Project management and the maturity model

The goal of the project was to develop an automated system for online position, PnL calculation and limits control for FX (currency exchange deals) and securities deals of treasury department. Overall project implementation period was 18 month. The first 6 - months phase of the project was analyzed – FX deals calculations, which included 4 main stages:

1. Defining and confirming of the project purposes.
2. Creating of the project team and base plan of work.
3. Design, software development and implementation.
4. Testing and formal acceptance.

Questionnaire was filled in by the bank divisions-stakeholders and project manager, which were the sides of the conflicts. All the scores, received from the sides of conflicts were averaged to reduce subjectivity. Unified classification of the project processes areas included in questionnaire was: Functional/technical, Organizational, Planning, Documentation, Testing and acceptance, Finance. Comparison of this unified consolidated definitions and stage of project allowed exact mapping of a project

processes (according to PMI PMBOK and CMMI) which caused conflicts and hence had the lowest maturity/capability level.

№	Scores	1 stage	2 stage	3 stage	4 stage	Project average
1.	Conflict intensity	1,19	0,99	1,00	1,25	1,11
2.	Resolving effectiveness	2,61	2,95	2,95	2,64	2,79
3.	Maturity	1,13	2,28	1,84	1,47	1,13

Tab. 1. Level of conflict intensity, resolving effectiveness and maturity in different project stages

To check the scores simplified CMMI evaluation of IT processes maturity level was done (only second level processes were checked). Analysis confirmed that some of the processes required for the 2-d level were not implemented. So that quantitative conflict scores are likely to be proved.

№	Processes	Evaluation (capability level)
1.	Configuration Management	**Initial** (not defined, not repeatable)
2.	Project Planning	**Initial** (planning of resources is absent, milestones are not set)
3.	Project Monitoring and Control	**Initial** (monitoring is subjective, not repeatable and planned)
4.	Measurement and Analysis	**Initial** (not defined, not repeatable)
5.	Requirements Management	**Initial** (regulations or repeatable process are absent)
6.	Process and Product Quality Assurance	**Initial** (user acceptance testing is implemented without any regulations)
7.	Supplier Agreement Management	**Managed** (there are regulations for agreement management and decision making)

Tab. 2. Processes of CMMI for Development of the 2-d level

№	Process area	Score	1 stage	2 stage	3 stage	4 stage	Average
1.	Functional/ technical	Intens.	1,28	1,00	0,99	1,17	1,11
		Effectiv.	2,17	2,34	2,13	2,06	2,17
		Maturity	1,70	2,34	2,15	1,76	1,95
2.	Organizational	Intens.	1,34	1,14	0,99	1,20	1,17
		Effectiv.	1,50	2,6	2,63	1,76	2,12
		Maturity	1,12	2,28	2,66	1,47	1,81
3.	Planning	Intens.	1,22	1,04	0,96	1,19	1,10
		Effectiv.	2,71	2,57	3,39	2,18	2,71
		Maturity	2,22	2,47	3,53	1,83	2,46
4.	Documentation	Intens.	0,94	0,84	0,95	1,21	0,99
		Effectiv.	4,00	3,19	2,99	3,75	3,48
		Maturity	4,26	3,80	3,15	3,10	3,52
5.	Testing and acceptance	Intens.	1,06	0,90	1,07	1,55	1,14
		Effectiv.	2,00	2,92	1,97	2,34	2,31
		Maturity	1,89	3,24	1,84	1,51	2,03
6.	Finance	Intens.	1,23	0,89	0,90	1,00	1,01
		Effectiv.	3,29	4,19	4,59	3,75	3,96
		Maturity	2,67	4,71	5,10	3,75	3,92

Tab. 3. Conflict intensiveness, conflict resolving effectiveness in process areas during project stages

Evaluation of conflict intensiveness and conflict resolving effectiveness (in process areas during project stages (above) confirms the results of comparison of CMMI and conflict scores.

5. Conclusion

There are some interesting topics should be examined in future research for example, dependence between maturity level and the conflict characteristics changing curve. Besides that some automated system for collecting data and results interpretation should be developed. But some conclusions are to be presented:

- The evaluation method offered proved to be useful. It provides repeatable, objective scores, which can be used for project monitoring and IT processes and services maturity level evaluation. Hence the scores received can be used for instant reacting and long-term measures/strategy development.
- Questionnaire developed was well understood and provided enough information for analysis.
- The scores received can be used as metrics for comparing effectiveness/maturity of different types of processes.
- Level of maturity can be used as threshold value in project monitoring based on conflict characteristics. For example if the conflict score of maturity received is much lower then the results of CMMI appraisal value then the project complexity probably exceeds the organization's possibilities given its current maturity level and the scope of the project objectives has to be reduced.

- The study carried out showed that the special software for receiving data of questionnaire and its analysis should be developed for effective monitoring of real projects – during significantly simplified investigation more than 1300 values received from only four stakeholders were processed for only one stage of the project.

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THE ROLE OF THE ELECTRONIC JOURNAL IN RAISING THE EFFECTIVENESS AND QUALITY OF THE EDUCATION AND SCIENTIFIC RESEARCH PROCESS

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Abstract: *The analysis of one of the areas of information and communication technologies is associated with the creation of collections of electronic documents, in particular, in the form of electronic journals. Creating electronic versions of scientific journals promotes dissemination of research results and the exchange of scientific results among members of the scientific community. Advantages of electronic publications are those of their properties, as an operational contribution of incoming materials, permanent access to articles, unlimited amount of material, reducing manufacturing costs by reducing the magazines printing costs. The article describes and analyzes the number of features and problems relating to the legal, organizational and technological aspects of the formation, presentation and publication of electronic journals.*

Key words: *quality, electronic journal, education, e-books, mass media*

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1. Introduction

The modern information society is characterised by the rapid development and active use of those information and communication technologies (ICT) that ensure not only the exchange of information through the internet but also the possibility of integrating local information resources within the unified information space. These resources have significant influence the intensity of the processes of study and scientific research and therefore the provision of public (including distance) access to these resources has become one of the priority tasks in serving education, science and culture. It is today generally recognised that the most effective way to resolve this task is through the creation of electronic libraries (E-Libraries) and electronic publishers (Azarov & Grachev, 2013) - "distributive information systems which allow the reliable storing and effective use of the various collections of electronic documents (texts, graphics, audio and video) available in a convenient form for use by the end user through the global data network. One of the elements of the scientific E-library which allows for the creation of new types of electronic resources and the exchange of scientific information using modern ICT today is the electronic scientific journal, including those purely in e-format. However, in our country a unified system for electronic scientific publications is lacking, there is no methodology nor any legal documents supporting the process of the electronic publication of scientific journals. The overwhelming majority of paper based journals in Russia do not have freely available electronic versions. This makes the distribution of the results of scientific research and the exchange of the latest scientific findings between members of the scientific community and representatives of industry more difficult. Apart from the above named information resources, there exist in the Russian internet a significant number of scientific databases, which although they are in demand both in Russia and abroad are not coordinated either on a technological or an organisational basis (Ershova & Hohlov ,1999).

Modern society is characterised by the development and active use of information technology, allowing for the exchange of information through networks and for the presentation of various data groups. One of the directions in which information-communication technology is developing is the creation of collections of e-documents, particularly in the form of e-journals. The creation of electronic versions of scientific journals enables the distribution of the results of scientific research and the exchange of scientific findings between members of the scientific community. Electronic scientific journals can be prepared either as an analogy of the printed versions or as purely electronic publications. The advantages of electronic publications include those properties which allow for the quick publication of new materials, the permanent access to articles and the lack of limits restricting the length of materials as well as the lesser cost of preparing the journals due to the reduction of printing costs. However there are still problems with the legal, organisational and technological aspects of the formation, presentation and storage of electronic publications. Electronic publications need to obtain an official status, with the definition of how materials should be accepted for publication and how the format for prepared materials which allow for reliable access and long term storage should be chosen. The introduction of electronic

scientific journals creates the possibility of making scientific information bases available to a wider audience, including to millions of students, lecturers, scientists and other potential readers who do not have convenient access to standard research libraries.

2. Data analysis and interpretation

According to the GOST (state standard) 7.83-2001 «Electronic publications. Main types and output details» "electronic publications" are:

- when there is a printed equivalent – the electronic version of the printed publication, or an independent electronic publication;
- defined by the type of main information contained – a text (or symbol) electronic publication, and artwork electronic publication, an audio electronic publication, software product or multimedia electronic publication;
- defined by their intended use – an official electronic publication, a scientific electronic publication, popular-scientific electronic publication, practical-industrial electronic publication, a normative practical-industrial publication (standards), textbook electronic publication, mass-political electronic publication, information electronic publication, electronic publication for leisure or advertising use;
- defined by the technology used for distribution – local electronic publication, network electronic publication, electronic publication for combined distribution, fixed format electronic publication of flexible format (interactive) electronic publication;
- defined by periodicity – irregular electronic publication, serialised electronic publication, periodic electronic publication, continuous electronic publication, renewable electronic publication;
- defined by structure – single volume electronic publication, multi-volume electronic publication, electronic series.

In discussing electronic journals, it is necessary to mention one of the advantages of electronic versions – the possibility of publication immediately after the writing of articles without the loss of time on printing and collating. The text of the publication becomes available to the reader without having to wait for delivery. Moreover it is not necessary to wait until all the articles are written (as it is necessary to do with printed versions), articles can be published when they are ready, which in certain areas is not unimportant as while the article is awaiting the preparation of the journal and printing, the information it contains can become hopelessly outdated.

It should be said that there are fierce supporters and opponents of the very idea of electronic journals without paper. The basic argument of the opponents of such journals is that the journal would have a small readership and would not be read (which of course is the most important), and "why start a new journal when the former journals are going through such a hard time?" In short, this represents a fear of competition. But the fear is baseless. The speedy publication of articles in electronic journals does not exclude their subsequent wider publication in any paper based journal. The contrary is

not possible. As far as we are aware, electronic journals do not accept already published texts. But publication in a purely electronic version allows not just the speedy transfer of the article to the reader, but also the speedy publication of comments and responses to the article. The presence of purely electronic journals can not in any way change the balance of publications in paper journals. But at the same time, it should be understood that with the further development of the internet, the quantity and role of electronic publications will grow. Those paper based journals that exist today can maintain themselves and continue to play a significant role as before only if they are able in time to change their approach and start the energetic development of their electronic versions. The future lies in the effective combination of paper and electronic issues. Here it should be underlined that the practically complete lack of electronic versions for our "classical" Russian language paper journals throws us back and causes harm to the rapid distribution of our scientific results amongst our own scientists and specialists (Veselago & Elizarov & Syuntyurenko, 2005).

The advantages of electronic journals are (Polilova, 2009):

- the possibility of the speedy publication of the results of scientific research. Materials can be placed on the site as articles appear (without having to wait for a full edition to be produced);
- the reduced need for time and material expenditures to ensure the full cycle for the editorial and publication preparations for the paper journal;
- the speed of access to scientific materials presented in the electronic journals;
- multi-user access;
- the presence of hyper-links. Connections or links in electronic journals allow for the easy access to further scientific materials and publications linked to the theme;
- the possibility to use high quality coloured illustrations, photographs and even video materials;
- a more flexible choice. When the journal enters the internet, there is no longer the need to accept the full assortment of articles: the reader can chose from the selection only necessary articles;
- an increase in the personal citation index of authors in electronic journals. The quantity of internet referrals for the users of electronic journals can exceed that of paper journals by a thousand times;
- the possibility of the automatic search for the necessary materials;
- the possibility of downloading materials onto personal computers;
- the possibility of dialogue in inter-active regime between the author, reader and editor;
- the reduction of losses due to the theft of editions or damage to them, less space used on shelves;
- the ability to effectively obtain statistical data on journal readership and that of individual articles;
- the possibility of the integration of local information resources in a single information space.

As far as the readers of electronic publications are concerned, lecturers and students can be divided into 2 groups. Firstly, those who are more educated in the technological sense and who want to have a more independent access to materials, their demands can no longer be met by libraries. Secondly, those who are not so keen to go over completely from paper to electronic versions, they like the speed of on-line searches and availability of information, but they prefer dealing with paper copies of articles. The majority of readers, both lecturers and students want:

- To receive access to a large amount of materials at the lowest cost and with the least work;
- To have easier access to more extensive funds;
- To use quicker and simpler methods of access to ordered materials or their copies;
- To use search engines that are understandable and which use "real" words and not artificial terms that appear to be derived from traditional standard library classifications;
- To have the possibility of reviewing and not simply seeking specific articles or articles on a given theme;
- To use more hyper-text links and other mechanisms connecting different materials;
- To receive not just text articles but illustrations connected to them;
- To access this information on screen in the most convenient way.

Readers — scientists and researchers want the same but also have further demands for electronic access:

- The ability to display on the screen indexed text and other special symbols used in scientific and multi-lingual publications;
- The provision of draft print-outs of scientific and scientific research articles;
- The ability to fix the time of receipt of articles at the journal editorial for, if required, use by scientific juries;
- Confidence in the quality and competence of the journals received, and their ability to serve as open forums for scientific debate;
- The ability to archive electronic texts with the guarantee of their storage without change (scientists should be sure that their work will not be amended or that access to them curtailed);
- The moderate costs for accessing the materials or low subscription rates;
- Extra functions such as floating graphics, the ability to enlarge diagrams, sound, "virtual reality" and direct references to quoted articles and bibliographic sources;
- Access to book reviews and editorial letters as supplements to the full texts of articles;
- A forum where scientists from the less industrialised countries have the same say and the same recognition as their colleagues from developed countries working in the same scientific area;
- The status of electronic and printed journals should be equal – scientists want to be confident that when their articles are published in them, they get the same recognition and are treated in the same way as far as the promotion of scientific ideas and the formation of scientific opinion is concerned as if they had published in traditional published journals.

The development of a system for the support and publication of electronic versions of a journal consist of two parts: for readers and for publishers.
The part for readers is intended to allow the viewing of the electronic journal, and also the search for information in the database of authors and articles
The part for publishers is intended to support the editorial documentation processes, the up-dating of databases, the preparation and publication of articles, the creation of the journal and has two WWW interfaces –the author's interface and the editor's interface.

The author's interface allows the author to send their articles to the editor, using a WWW viewer or electronic post, and also to review information about the progress of the article.

The editor's interface is intended to allow the receipt and preparation of articles for publication and also for the laying out of the electronic version of the journal.

The electronic version of the journal consists of three main databases: database of authors, database of articles (unpublished, published and archived), database of reviewers and also a number of supplementary databases: towns, countries, degrees, titles and job-titles etc used to ease the repeat input of information, and also containing other supplementary information.

In comparison with traditional paper publications, electronic versions are not limited to just presenting texts and pictures – they can include animations, videos, music, various visual effects, and even be interactive. For example, they can contain

Information and resend data by the internet, interact with other software, be used for the organisation of testing, for calculations and so on. In addition to these creative aspects, electronic publications have other specific economic advantages: they take less time to produce; they can be renewed or republished and cost considerably less. Moreover, thanks to the use of special methods of compacting data, electronic publications stand out because of their compact size, which extends the possibilities for distribution – electronic materials can be distributed using CD-, DVD disks and even diskettes, they can be circulated on websites or by electronic post.

3. Result and discussion

The many different possible uses of electronic publications automatically ensures a wider choice of ways of presenting information. For example, this can be a convenient form of text book which can be used not only for the convenient presentation of material, but also for the checking of how well knowledge has been absorbed through testing. Electronic publications can be presented in many different formats, beginning with the standard HTML- and PDF-files, using EXE-files and ending with narrow-specialised formats, which require the installation of the personal computer of additional software. However the use of the EXE-format is becoming more popular because it allows the possibility of being read on any computer irrespective of whether a special application has been installed and thus extending the number of users, who can become acquainted with the presented material.

Existing programmes for the creation of electronic publications can be divided into 3 categories (Shlyahtina, 2006). In the first are editors. These are useful

instruments for the speedy compilation of text, graphics, navigation elements and so on and have defined functionalities in the sphere of editing. They provide greater opportunities for editing text, however to varying extents (for example, by adding additional specialised applications on the computer) can be used to edit other objects that have been included in the publication. Editors allow the creation of any types of electronic publication and to add unique formats to their presentation. But, as a rule, such programmes are expensive; they need time to learn how to use them and are intended mainly for those who are already experienced computer users. The most attractive programmes in this category are NeoBook Professional Multimedia, DeskTop Author and eBooksWriter SunRav BookOffice 3.0

The second category of programme products are the HTML compilers intended to unite in one structure already prepared HTML files. HTML compilers have significantly less potential for formatting the external presentation of the publication, but they are cheap and are significantly more modest in the memory they occupy. Creating publications using them demands a minimum of time, and any user can easily get to grips with the nuances of working with them. Amongst the most interesting HTML compilers are ebookGold and eBook Maestro.

And finally the third category conditionally includes those applications intended for the creation of e-books as one of the forms of electronic publication. There are many popular formats for e-books (Adobe Pdf, Mobipocket, Palm Doc, iSilo, Microsoft Reader, Franklin eBookMan, Hiebook, Rocket etc.), however they are mainly intended for reading books using the various pocket readers. This limits their range of use to the corresponding software and therefore the choice of one of the narrow-specialised formats is not the best option for creating advertising, educational, informational or other materials intended for a wide audience. The exceptions are the application Adobe Acrobat, because the PDF format has today become the leading format for the exchange of documentation and is used in state institutions and large corporations throughout the world and BookDesigner, which supports a large number of formats and allows the creation of electronic books intended to be read on a wide number of e-readers.

If we briefly review the formats which are used for the publication of electronic journals, we find that as HTML is the format language and Postscript the language for describing the pages of a printed document, these have in reality become the standards for printed copies for pages created on computer and it is natural that these standards dominate the production of electronic journals. The application Acrobat PDF is today widely used. The programme of the company Catchword Real Page has been adapted from the data presentation system Postscript (whose motto is to "present files with a significantly smaller volume significantly quicker"). Real Page is intended for the production of electronic journals.

PDF and HTML support the distribution of all popular computer platforms by means of freely available viewing programmes and they also support hyper-text links and text searches. It is entirely possible that HTML, when generated with SGML (Standardised Generalised Markup Language), will easily become the main format for electronic journals, given the number of journals created by well-known publishers. A discussion about the advantages and shortcomings of HTML and SGML in the

publication of electronic journals will continue, moreover new media are appearing (for example, XML – Extensible Markup Language). In addition, the hypertext mark-up language (HTML) will remain the most used language and without doubt, will take on board some of the features of XML. Cascading pages of another new standard Web fulfil the function of similar desktop publishing programmes (DTP) and can be used for the modification and management of HTML documents.

The choice of formats (HTML, PDF) made by the publishers of electronic journals depends on the history of their publication (whether an original or in parallel) and the particulars of their production. Original electronic journals more often use HTML, for which mathematical and other notes cause no problem. The PDF format is more often used for electronic journals which have first been produced as paper journals. Moreover all journals are rapidly becoming available in both formats. As important aspect of the development of electronic journals is the appearance of fully functional media programmes which use a number of automated processes which are standard in scientific publications. From the point of view of the information processing, the process of publishing the electronic journal presents itself as an XML flow, the input of which are materials presented using the journal's standard rules and the output is the relevant number of the journal offering the reader the possibility of choosing the suitable format (pdf, html, djvu and so on). This approach, apart from the standardisation of the process, allows search engines to access bibliographical data of those articles published in the journal.

To create an electronic journal with the page turning effect, pages are turned mainly using the Adobe Flash technology, which allows beautiful page-turning to be easily achieved. If a programmer is well acquainted with Flash, then he should have no trouble in creating a module, which will allow page-turning, which in turn will allow the creation on the site of other unusual features.

The remarkable programme FlippingBook Publisher is intended for the creation of internet publications, journals and photo-albums with a real page turning effect. FlippingBook Publisher is a convenient application, intended for the creation of digital books with a 3d-effect page turning feature. FlippingBook Publisher allows for the import of any files: PNG, JPEG, PDF, MS Office and others in a digital flip book.

It is possible to change the outer view of practically any visual object. Any number of publications can be created and they can be placed on an unlimited number of web-sites. FlippingBook Publisher allows your book to be published in the cloud based site Publ.com intended to allow for the viewing of digital publications using just a couple of mouse-clicks. For the distribution of publications on CD / DVD or USB disks, EXE files for Windows or APP files for Mac OS X can be used. Using FlippingBook Publisher publications can be produced using various platforms and launched on such devices as iPhone, iPad, Android. All that is required to access these HTML5 publications is a browser on the mobile device.

It should be noted that original journals are often organised better than printed journals (large volume, form of presentation, regularity of production, search, study and information services, use of multimedia etc.). Each of these journals has its own characteristic properties, which are not always useable on paper. Parallel electronic

journals are electronic versions of existing published editions. This is the most widely used form. These are not new editions, but new tools.

Amongst the number of integrated services can be found, for example, those that present on the Web only the content of their printed publications or reviews of the articles, recommendations etc.

Another important issue in creating electronic journals is related to the resolution of legal questions (Kozlova, 2006).

Legal questions can be resolved by the official registration of the electronic scientific journals, access to which is available using telecommunication networks. The possibility of registering electronic scientific journals was enshrined in the Decision of the Government of the Russian Federation of the 30th January 2002 No 74 "On confirming the Unified register of scientific degrees and scientific titles and the Position of the procedure for the award of scientific degrees". The Federal agency for inspection in the sphere of education and science and the NTTs's "Informregistr" is implementing the Decision of the Government of the Russian Federation of the 20th April 2006 No 227 "on introducing changes to the Decision of the Government of the Russian Federation of the 30th January 2002 No 74" have agreed the "Procedure for the registration of electronic scientific journals, publications in which are considered equivalent to published works containing the main scientific results of dissertations".

This situation allows the process of the official registration of electronic scientific publications in which the materials used to defend dissertation work are included can begin. With the aim of implementing this task, a programme-technology complex is being developed and an archive of electronic publications established allowing for the organisation of the long-term storage of publications in the form of a generally accessible electronic library of scientific electronic editions.

The procedure for registration includes the formal expert-analysis of the journals, in particular the technological aspects and the founding documents presented by the founder-organisers. On the basis of the formal expert-analysis a "list of electronic scientific publications" is produced, which acts as the basis for the further semantic expertise of the journals with the aim of their inclusion in the "List of electronic scientific publications, the publication of which is expected for the defence of dissertations of those seeking the degree Doctor of Science".

A special group of electronic scientific journals are those electronic publications that do not exist in paper versions. Today there exists a clearly expressed need for the organisation of such journals, most of all because:

- Such publications allow the speedy publication of submitted articles (i.e. to ensure the speed and efficiency of publication);
- They give the possibility of rapidly becoming acquainted with published scientific materials (immediately after these materials have been accepted for publication) for the widest possible audience with the widest possible distribution geography;
- Published materials, as a rule, are not restricted in volume; their availability to a wide audience is only defined by the availability of the internet to the reader.

Moreover, the preparation and review cycle of purely electronic scientific publications can be sharply cut and simplified, and their publication can be

significantly cheaper than the publication of paper journals, as all the printing problems are removed. However the publication of purely electronic scientific journals inevitably meets with several serious problems.

The first of these – the observance of author's rights for the authors of published articles. The author should be confident that his publication in electronic form cannot just be reprinted by "best friends" in a paper journal. This problem, in line with the current legislation, can be resolved by registering the journal with the Federal unitary state enterprise Scientific-Technical Centre (FGUP-NTTs) "Informregistr", where it will gain the status of electronic publication and be issued with a state registration number. It will be necessary to periodically send "Informregistr" a record in a solid and reliable form (i.e. on CD-ROM) of all articles and materials published in the journal together with publication dates. After this, the information will be stored for an undefined but long period of time. If an argument arises over the published material, this information can be used to decide the opposing claims.

Another important question is how decisions are made on which materials are accepted for publication. It is very important that purely electronic journals have an editorial board and that accepted articles are reviewed. Only this way of organising the work of the journal will enable the possibility of obtaining the agreement of VAK Russia (Higher attestation committee) that the journals can be used for the publication of materials, which will then be used in the confirmation of Candidate's and Doctor's degree.

As a result of an innovation in the law on "The mass media" which came into effect on 10.11.2011, article 2 of this law now defines "network publications" as a means of mass communication. "Network publication" includes the understanding "sites in the information-communication network registered as mass media in correspondence to the current law. By mass media product is understood either separate or republished network publications, by the distribution of mass media products is understood the making available of publications on the internet.

In this way, the internet site is recognised as a means of mass information, the product of which is distributed through the information-communication network – internet. The principle of the voluntary registration of a site as a form of mass media remains. The new edition (article 8) points out that a site in the information-communication network internet can be registered as a network publication in line with the new law. A site in the information-communication network internet that is not registered as mass media is not considered to be a means of mass information.

The creation of an electronic journal presupposes the preparation of an application in the form and following the procedure established by law, and also the compilation of the packet of registration documents, the payment of the administration fees and their presentation to the registration body for consideration.

It must be said, that there are ardent supporters and opponents of the idea of paperless electronic journal. The main arguments of the opponents of such magazines consist in the fact that the magazine will have a small audience, it will not be read

and (of course, the most important thing), "Why open a new log when the old experiencing such hard times?" In short, it certainly is a fear of competition. This fear is not entirely justified. Rapid publication of articles in the electronic journal does not exclude subsequent expanded publication in any journal on paper. The converse is not possible - as far as we know, do not take electronic journals already published texts.

However, the publication of purely electronic publications designed for quick article to bring the reader to the possibility of rapid publication of reviews and comments on the articles. The presence of purely electronic journals cannot change the balance of publications in paper journals. At the same time we must clearly realize that the further development of the Internet and the role of the number of electronic publications will increase. The existing paper journals can save yourself and continue to play a significant role in the process of scholarly communication only if the time to face this problem and will vigorously develop its electronic version. Future for an effective combination of paper and electronic publications.

Here we must emphasize that the almost complete absence of electronic versions of our "classic" Russian-language paper magazines, takes us back to inflict significant damage to the rapid spread of our scientific results of our own scientists and experts (Fyodorov, 2010).

4. Conclusion

From an analysis of the activity of purely electronic journals it is clear that they have all positioned themselves correctly amongst the many other form of electronic scientific information. These journals are intended for the speedy publication of new scientific results, moreover they use so-called preliminary reviewing of the articles. Some journals do not identify issue numbers, but simply add articles onto the server as they are accepted for publication. This means that such journals are related to electronic archives, but are distinguished from them by the presence of the reviewing of articles.

Purely electronic scientific journals are well supplemented by the presence of paper journals, including those that have an electronic version. When organising fully electronic scientific journals, their founders, as a rule, do not resort to the use of any form of mass advertising of the new edition.

Search possibilities. One of the main advantages of electronic journals is the real simplification of the search function in articles for the readers. It is very important to organise your system in such a way that users can conduct a search by key words or phrases. Even if this is not possible within a given system, it helps your readers to quickly and easily page through the contents of previous editions, for example to find an article whose name cannot be fully remembered. This is much easier, than to review every edition in turn on the library shelf. Depending on the complexity of the system, readers should also have the possibility of indirectly turning to particular sections of the article, (for example, book review) or a particular section of an article (for example "Materials and methods" or "Results").

The distribution of the editorial board in different cities can be viewed as an informal collective of like-minded colleagues, working together to solve a common task. The methods of work adopted by the editorial board can then be used for the organisation of a collective, intended for the resolution of specific tasks which arise in the process of developing the information system.

The architecture of the established information system can be presented as the combination of interconnected layers, beginning with the purely verbal description intended for students and new researchers and finishing with the completely formalised and described axiomatic mathematical model.

One of the difficulties of the creation of a successful internet project that is in demand is the definition of the intended audience to which it is directed. The choice of actual themes for the electronic publication is already the key to its success. The wrong definition of the intended audience and the aims which are used in establishing the electronic journal will mean that the full business potential of the project will not be realised. Another difficulty is the need to find the necessary technical knowledge and skills.

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FIBER-OPTIC SENSOR FOR MONITORING SYNCHRONICITY OF ACTUATORS

GUDKOV, Y.

Abstract: *In most projects aimed at modernization of existing production lines and units a new group of mechatronic objects - interconnected multi-motor electric drives - is used. For the efficient and safe operation of this type of drives it is necessary to solve a number of problems, one of which is the development of methods and tools to synchronize the rotation of activators dynamically. The purpose of the research is to create a non-contact sensor for measuring the rotation of the activator. The basis of the developed sensor is a fiber optic converter with external modulation, with which you can implement a non-contact method of measuring displacement of reflective label installed on the shaft of remote devices. To compensate the non-informative factors affecting the accuracy of the position measurement, the original block diagram and processing algorithm were developed which provides stable and accurate registration of appearing the reflective labels under the fiber end when using the sensor in a production environment. The results of the research have made a theoretical basis for the design of the two measuring devices: a high-speed tachometer and a sensor for control of synchronicity rotation in the dynamic mode.*

Key words: *optical fiber, non-contact sensor, synchronicity, actuator, reflective label*

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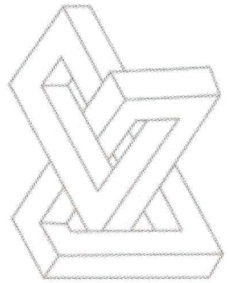
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