PROJECT STRUCTURE

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ABSTRACT

This paper deals with an important part of project development. The stages in the division of the project that enable its management in the best possible way are described. The division into phases also makes it easier to monitor the implementation of the project, checking the total workload. The role of the user is extremely important in starting a project. The user knows the business system of his company, has information about the characteristics, functionality and performance of the system, and sets requirements for the new IS that is being designed. The paper points out the fact that the user is the most important factor in the process of analyzing the business system, evaluating the developed IS project, and in the phase of introducing, a new IS.

Keywords: *project, project phases, project structure, planning, design*

1. INTRODUCTION

A person's life cycle begins with birth, childhood lasts until the age of 12. In that period, lifelong learning begins. The professional literature states that body growth usually lasts up to 30 years of age. The life cycle continues with maturity, in which period a person realizes his life needs on a business and family level. Can we make a comparison of the human life cycle with the project life cycle? The answer is self-evident, we can.

There are several definitions of project in the literature. We will mention some definitions:

– *Project is any set of related activities determined by the goal, descriptions and technical conditions that must be carried out using resources in a given time with limited availability of money to finance them. [1]*

– *As a set of mutually in a logical sequence related activities aimed at achieving the set goals in terms of time constraints. [2]*

– *Project is a goal-oriented, one-off, relatively new and complex intention, product or whole of interconnected activities whose duration is limited in time. The realization of activities is associated with the use of resources and high risk, so it requires the cooperation of various experts (teamwork) and special organization.*

2. STARTING THE PROJECT

Why are we starting a project? What are the reasons? Projects are started out of our desire to change or create something new. Because we want to change our environment, implement new technologies, new ideas, change processes, change the organizational structure, because we want to create a more pleasant atmosphere of work and life. Many organizations when thinking about starting a project make mistakes trying to paint too broadly the situation and problems that are happening in their environment. This is hard to resist, but nonetheless the project needs to be reduced to a specific problem that can be solved. The description of the problem should be the path to the intended solution.

Figure 1: Project structure

Practice shows that most of the difficulties and misunderstandings in design arise from the fact that the user is often unable to explain exactly what and why he is doing, or describe the existing system, and state what he wants or specify the requirements for a new IS. The user often knows only his narrow part of the job but has no insight into the mode of operation and the purpose of the existence of all the functions that IS affects.

The goal of this phase is to examine the feasibility of the project, decisions are made about who will be the project holder and whether the project will have the support of all entities involved in the project. At this stage, the future project manager makes proposals, the project sponsors evaluate the proposals and, after approval, start securing funding. The questions to be answered at this start-up stage are as follows:

– Why this project?
– Is it feasible?
– Who are the possible partners in this project?
– What will be the results of the project?
– What are the boundaries of the project, what are the limitations in relation to the environment, resources, time, money, etc.?
– Who are the beneficiaries of the project, in what way will he and benefit?
– How will the project fit into the organization's strategy?
– What human and financial resources are needed?
– What remains outside the scope of the project?

The project should start with a clear and accurate vision of how it will develop, when it will be completed and how to successfully lead the team towards the goal of completing the project. We need to be aware of the fact that project and project management should be aligned with business cycles, goals and time. The project must not be a mere implementation of new technologies, because the goal of the project is not the incorporation of technologies but a shift towards improving the process and organization of work. The project should bring improvement of product quality, increase profits, simplify business processes and the like.

At this stage, the most important T is to check whether the goals and results of the proposed project are in line with the strategic direction of the organization, or the environment in which the project will be implemented. Finally, if we are in the role of project proposer, our task is to propose projects that will benefit the organization to which we propose them.

2.1. PROJECT PLANNING

Planning is considered a central part of modern project management, so it is understandable that the literature mostly deals with planning methods and techniques that are presented through books, magazines, conferences and the work of professional organizations (White, Fortune, 2002). The generally accepted professional standards defined by the Project Management Institute (PMI) in its Project Management Body of Knowledge (PMBOK Guide) [3] emphasize the need to invest in project management processes and procedures, which support planning. Dvir et al., 2003; Dvir, Lechler, 2004).

Planning is the process of understanding why an information system needs to be built and that a project needs to lead to a goal, by efficiently allocating resources. By planning, we want to ensure that the project does not exceed the deadlines within the planned costs. Also in this phase, a project team is being built that will cooperate in building the information system. This phase consists of two planning steps:

1. ***Project initiation*** - how to reduce costs or increase revenues
2. ***Project management*** - The project manager develops a business plan and introduces techniques that help the project team control the project throughout the life cycle of the system.

Once the project plan, which was developed in the project start-up phase, is approved, the project enters the second phase: the planning phase. We can say that planning is the foundation for successful business in all aspects of business. Planning shapes the business environment and encompasses goals and ways to achieve those goals. The plan should include the planning structure, resources, costs and time required to complete the project. Planning is an unavoidable process in project development, at this stage management must be involved because it provides guidance and support in project development.

 Figure 2: Project planning

The structure of the project implies activity on the project and focus on the project objectives, from the initial to the final phase of the project, the phase of closing and ending the project.

– In time planning, the basic intention is that the project does not have major deviations from the set deadlines, ie that all phases of the life cycle take place within the scheduled deadlines. It is extremely import-

ant to adhere to the set deadlines throughout the project, because any deviation can jeopardize the completion of the project and negatively affect the morale of project team members, as well as the business entity as a whole.

– Costs as a planning factor play an important role in project development. This section provides reports on cost flows during project implementation.

– The human resources management function is important for the coordination of human resources during project implementation, with the ultimate goal of quality project completion.

The planning determines the business objectives, analyzes the existing business organization, and lists the business processes and data classes, which are used in the business system. The stages of project planning are determined by the business system and depend on its characteristics. Exploring the link between project planning and project success, viewed from a different perspective, Dvir et al. (2003). Found that there is a significant positive relationship between the extent of the effort put into defining the project objectives and the functional requirements and technical specifications of the product, in relation to the success of the project, especially from the end user perspective. That is why the participation of the customer or end user in the planning phase is crucial. Finally, we will define the most important steps in planning:

– Setting business goals
– Defining the project
– Prioritization
– Feasibility study
– Development of a work plan
– Defining resources.

2.2. PROJECT DESIGN

In this phase, decisions are made on how the system will function in terms of hardware, software and network infrastructure, how user interfaces will be designed, how these forms and reports will be used. This phase also defines the design of the program, the database as an organized set of data and the files as separate file systems, which will need to be designed.

The design phase has four steps:

1. ***Strategic design*** - decisions are made whether the system will be developed within a company or outside it? In this step, it is important to keep the future in mind and anticipate future challenges.

2. ***Architecture design*** - describes the hardware, software and network infrastructure that will be used.

3. ***Database and file characteristics*** - these documents determine which data and where it will be stored.

4. ***Program design*** - defines which programs should be written, what they will do.

It is possible to notice that clearly set project goals, quality design preparation and planning documents significantly contribute to the realization of the project in the planned time, within the budget and customer satisfaction with the final product / service (Dvir et al., 2003; Wohlin, Andrews, 2003). In the design phase, one or more plans can be developed, with which it is desired to achieve a more successful project result. Depending on the project topic, project phase products may include diagrams, sketches, flow charts, site trees, HTML projects, prototypes, and UML schemas. Project managers use these blueprints to select the final design to be implemented in the project. Once the design is selected, changes at a later stage of the project are not recommended. Therefore, it is important to anticipate possible extensions and upgrades in the next design phases.

2.3. PROJECT CONSTRUCTION

During the construction phase, everything that will be needed to implement the project is arranged. Necessary suppliers or subcontractors are entered, a schedule is made, materials and tools have been ordered, instructions have been given to staff, etc. It is important to note that in the construction phase we include:

– ***Building a database*** (software construction intended for storing, analyzing and searching a group of related data). [4]

Klasić and Klarin in their work (2003) [11] state that data administration tasks are included in almost all phases of project development. Data administration in the phase of maintenance and use of the database becomes the basis of reverse engineering, in the reconstruction of the existing and construction of a new information system. All requests for additions and changes to existing applications should be submitted to the database administrator for a particular database management system, in order to align new data structures with existing ones and control the information standards accepted in the enterprise information system.

– ***Programming a process*** (a heuristic / thought process by which we arrive at a solution to a problem or group of problems, using an algorithm or formal logic, with the irreplaceable use of a computer). [10]

- ***Testing*** (individual programs are tested, with the participation of system users which can be of great help in detecting vulnerabilities). In addition to testing in laboratory conditions, testing should also start testing in real working conditions. Of course, let us not forget that testing is done throughout the project construction life cycle. It is even desirable to run parallel work on the new and old mode for a while in order to compare and check all the functionalities. Klasić and Klarin in their work (2003) [11] state that the time of parallel work must be sufficient to identify possible shortcomings that were missed in previous testing and to repair them, as well as to "run in" employees to work with the new system.
- ***Integration*** - the project is integrated into the existing or implemented in the new structure of the information system.

The construction phase is completed when the implementation phase begins.

2.4. PROJECT IMPLEMENTATION

Implementation or introduction of the project in implementation - is the phase of unification of individual programs (subsystems) into a single information system. At this stage of the project, we identify several steps that need to be prepared. One of these steps is training or educating users. Depending on the size of the system, we can use project team members or developers to educate users. In large systems, a group of users should be formed to transfer knowledge, so that over time they can provide education to their users. The next step is to update the database where we can use the user or move data from the existing system, or perform data migration (Data migration is the process of transferring data between two systems, which includes at least two databases - the source system and the new destination. The concept of migration sounds simple, many equate migration with data replication, ie copying data to one, but in practice migration is much more complex because it involves the transfer of data from one data model to another, new, different model with many additional requirements and changes over data). [9]

The work on the system documentation is completed and instructions for the user are prepared, the takeover report is signed and after that the official implementation of the project begins.

Figure 3: Project life cycle based on activity and time
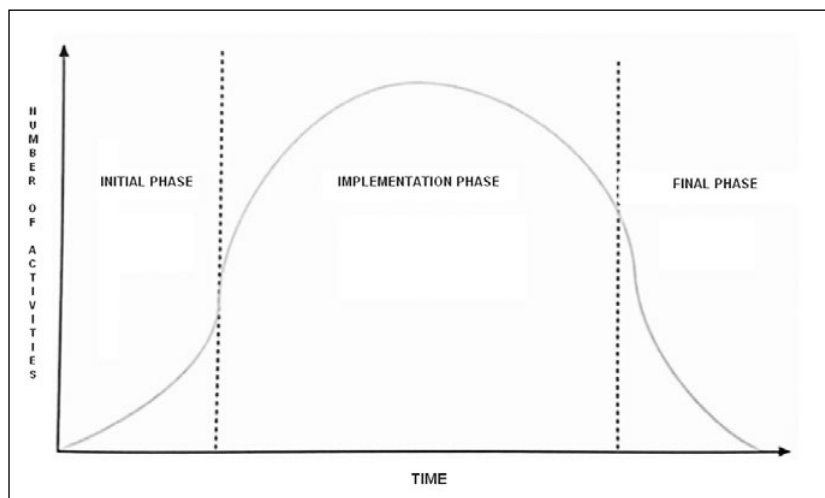
Source: Šimović, V., Zovko, V., Bobera, D. (2011): "Baltazar Adam Krčelić", Zaprešić, p. 34

3. REVISION, CLOSURE AND COMPLETION OF THE PROJECT

We will try in this chapter to answer the question, why an audit? The word revision is derived from the Latin word "revidere" which means "to see again", and therefore revision is "a subsequent review and review of processes and conditions".

Audit is, in the broadest sense, the process of examining the accuracy, completeness, credibility, legality and objectivity of certain phenomena and processes. In order for the audit to be successful, the following conditions must be met:

– Verification of project results - comparison with planned results,
– determining the degree of achievement of goals, both known and hidden,
– the audit report should contain a detailed description of the current situation,
– the auditor has a great responsibility in performing this duty,
– responsibility is reflected in the trust he must gain in team members, in order to successfully conduct an audit,
– The auditor should be a confidential, conscientious, honest and responsible person.
– Project audit seeks to capture the core of the positive and negative consequences of a project, with the ultimate purpose of better performing future projects.

– The audit must be carried out at each stage of the project implementation, and not only at the end.
– The audit is primarily carried out to prevent possible adverse effects on the project objectives.
– The main goal is to identify problems and their impact on project performance, costs and deadlines.

Audit, ie verification of the success of information systems according to Spremic. M and Panian Ž (2007) [8] most often refer to the following areas:

1. **Checking the functionality of information systems** - whether all parts work information systems (hardware, software, netware, orgware, lifeware, dataware) in a correct and prescribed manner and whether the underlying business transactions are carried out in accordance with expectations.

2. **Checking the reliability of information systems** - whether all parts of the system and the whole reliable for use, ie whether their use exposes users, owners or other 'involved' parties to some risk.

3. **Checking the security of information systems** - whether and what is the level of security risks of using information systems and what is their effect on business.

4. **Checking the efficiency and effectiveness of the use of information systems** - can information systems be used in a more efficient, cheaper or more efficient way? Do they exist ways to improve the profitability of IT investments, how effective they are information systems with regard to business needs.

5. **Checking the quality of information systems management and their impact on business** - the extent to which organizational and management methods and techniques are used in the management of an information system appropriate to the requirements of the business.

6. **Checking the compliance of the use of information systems with the applicable regulations, standards and internationally recognized frameworks** - whether the use of information systems and all its parts is in accordance with applicable regulations, international frameworks, norms and professional standards.

The most common reason for conducting an information systems audit is regulatory requirements, ie regulatory 'pressure' and obligations. In this case, we are talking about the regulatory audit of information systems, which should be carried out in almost all countries of the world, especially in the banking and financial sector. In Croatia, the CNB (Croatian National Bank) has prescribed a framework and obligation to conduct internal and external audits

of information systems (Decision on Appropriate Management of Information Systems of 17 July 2007). This decision also prescribes in detail the areas of verification, which also adopted a framework for audits of information systems in financial institutions (banks):

- information system management framework,
- information system risk management,
- internal audit of the information system,
- information system security,
- maintenance of information system,
- business continuity management,
- information system development and externalization,
- Electronic banking.

In general, the regulatory framework for the implementation of information systems audit in the Republic of Croatia consists of the following 18 areas:

1. Information security and information system management
2. Risk management related to information systems
3. Management of physical and logical access controls
4. Information system asset management
5. Management of operational and system records
6. Reserve management om storage
7. Relationship management with service providers
8. Relationship management with equipment suppliers
9. Management of information system development
10. Physical security management
11. Password management
12. Configuration Management
13. Change management
14. Business Continuity Planning
15. Recovery plan in case of disaster, unwanted and unforeseen events
16. Incident and problem management
17. Malicious code protection
18. Application of internal acts related to the information system

Identifying project goals is relatively easy, as is their relationship to the organization's goals, if the project is well managed. Nikitović, M. (2009) [5] in his script Project Management and Documentation says that the factors that project managers consider key to the success of projects and to which the audit must pay special attention are:

- Project efficiency - is measured by low or no deviation from the budget and the set time limit,

- Customer satisfaction - is measured in terms of technical tasks, but also to meet customer needs,
- Business success - is measured by the level of commercial success, and share in the target market,
- Quality and other objective parameters of the project,
- Future potential - the most difficult to quantify and refers to future markets, new product lines, new technologies as direct consequences of the completed project.

A project audit can be performed on the project in whole or in part. Unlike permanent, regular weekly / monthly inspections, the project is audited every two to three months (on projects lasting two to five years), in order to see the situation, ie to reveal possible problems on the project that are not recognized in the regular reports.

There are three types of project audit:

- **Project cost-effectiveness audit** - checks the input and output data on which the economic cost-effectiveness of the project was done in the planning phase and compares them with the situation at the end of the project;
- **Internal audit** - makes a control check of the project by the management; on behalf of management, this control is performed by an independent auditor, even the project team itself;
- **Final project audit** - or post-implementation audit, analyzes the actual success of the project.

Nikitović, M. (2009) in his script Project Management and Documentation states that the audit is most often performed at three different levels:

- **general audit -** a brief overview of the above points and their coordination among project stakeholders
- **detailed audit** - a detailed analysis of the above points, but without identifying technical problems
- **technical audit** - is performed by technical experts under the supervision of an auditor, and it is also the most detailed.

After the audit, an audit report is written, which must be written in a predefined form. The report should include the following:

- give a comparison between planned and achieved results and deviations from planned values,
- it should be written as positively as possible, ie warn of mistakes that can be corrected,

– necessarily maintain objectivity and professionalism,

– present only information and topics relevant to the project.

Completion of the project includes formal verification and acceptance of the project product, thus terminating the project activities. In this phase, as the last phase of the project, the research is completed, the initial problems are solved and the implementation is completed. The client shows his satisfaction or dissatisfaction. Members of the project team continue their activities on some other jobs or projects.

The project completion process should result in certain values for the organization implementing the project:

– improving understanding of how all projects can benefit the organization,
– improving the process of project management and organization,
– creating a work-friendly environment in which project team members are enabled to maximize their own ability,
– identification of organizational strengths and weaknesses related to project management,
– identification of risk factors that occur during project implementation,
– improving the capacity of project team members and their contribution to organizational goals,
– Identification key of people who are real human resources for the organization.

There are several reasons for the completion of the project, Nikitović, M. (2009) [5] mentions these five reasons:

- **Reasons related to business strategy:**
– the project is no longer consistent with the organization's objectives
– new achievements have made the project unnecessary or uncompetitive
– endangers the current business of the organization
- **Client reasons:**
– the client no longer wants the project
– the client's new wishes require too much modification
– the client does not think that the project will experience commercial success.
- **Technical reasons:**
– changes in the environment make the project unfeasible
– the experiments that were performed failed
– cannot be reported without major modifications in existing technology
- **Management reasons:**
– Lack of support for project implementation
– inconsistency with the financial capabilities of the organization

- better realization of the project outside the organization
- anticipated funds and resources can be better used
- **Reasons for project management:**
- costs are outside the budget
- feasibility is outside the planned deadlines
- the quality of the project result is low
- the requirements for modifications are too high
- project management is poor
- there was no support from the organization in which the project is implemented.

After the reasons mentioned above, a decision on the completion of the project should be made. It is not easy to decide, however there is a list of useful questions that can help in deciding that the project can be completed.

- Is the project still consistent with the organization's goals?
- Is the top management convinced of the successful implementation of such a project?
- Is the project implementation within the budget framework?
- Does the project have the support of all departments?
- Is the project team still innovative?
- Can new knowledge be protected as patents, trade secrets and the like?
- Can potential results be achieved more efficiently outside the company?
- Does the output of the project still give positive results of the cost-benefit analysis? (...)

Table 1: List of critical factors for project success by relevance

1.	Project vision	Initially, clearly set goals that are measurable and indicate the direction of action
2.	Top management support	The will and commitment of top management to provide resources and authority to implement the project
3.	Regular consultations with the client	Constant communication and active listening of the involved and interested parties
4.	Employee commitment to the project	Recruitment, selection and training of necessary people
5.	Technical features	Availability of required technology and expertise
6.	Acceptance by the client	The act of selling the final project product to the intended buyer
7.	Monitoring and feedback	Time-aligned information at all stages of project implementation
8.	Communication	Adequate communication networking of all stakeholders, until the end of the project
9.	Determining and solving problems	Ability to deal with unexpected crises and deviations from the planned

A project can experience success or failure if during the life of the project, if the project organization is not consistent, because the organization is not designed or suitable for the project, if there is insufficient management support, if resources are not provided and if there is poor coordination between departments. The placement of the wrong person in the position of project manager can also be an indicator, especially if that person does not have enough experience. Another indicator may be poor or insufficient planning, due to the speed of planning, in the desire to complete the project as soon as possible.

Table 2: Performance statistics

CHAOS RESOLUTION BY PROJECT SIZE

	SUCCESSFUL	CHALLENGED	FAILED
Grand	2%	7%	17%
Large	6%	17%	24%
Medium	9%	26%	31%
Moderate	21%	32%	17%
Small	62%	16%	11%
TOTAL	100%	100%	100%

The resolution of all software projects by size from FY2011–2015 within the new CHAOS database.

Source: https://www.infoq.com/articles/standish-chaos-2015

The project completion process is divided into two separate parts:
– decision whether the project should be completed
– if a decision on completion has been made, the determination to implement it

Models of support for decision-making on the completion of the project are divided into two categories:
– models based on the degree of fulfillment of factors that are generally accepted as success factors,
– models based on the degree of project completion, set general and specific objectives.

After the completion of the project, it is necessary to create a knowledge base, the skeleton of that memory is the final report of the project. The key reasons for preparing the final report are:
– benefits the project manager to improve his skills
– organization to increase its intellectual capital - acquired knowledge
– project management in order to improve the success of management and leadership of future projects.

It is mandatory to inform all workers that the project is over, for the following basic reasons:
– to warn all people in the organization that the project results are now available to everyone,
– to inform all people who participated in the project that the project has been completed and with satisfactory results,
– If the project was small, there is a possibility that not everyone in the organization knows it is over.

The final report should have the consent of the sponsor and the beneficiary that the project has been delivered and complies with the initially defined specifications. The final report is adopted by the project management committee and after adoption, the project formally ceases to exist.

4. CONCLUSION

Analyzing activities, technical conditions, technology development and our need to always strive for a better and more organized system in general, this paper presents the sequence of stages in process modeling and information systems design, to avoid user errors in project planning. Many questions were asked and analyzed and all questions were answered. It can be concluded that each project should bring an increase in profits, quality of products

and services, simplify business processes and organization within business systems. If this work has contributed to this, then it is the mutual success of the designers and authors.

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STRUKTURA PROJEKTA

SAŽETAK RADA

U ovom radu obrađen je važan dio u izradi projekta. Opisane su faze u dijeljenju projekta koje omogućuje njegovo vođenje na najbolji mogući način. Podjela na faze također omogućuje lakše praćenje realizacije projekta, provjeru ukupnog radnog opterećenja. Izuzetno je važno u pokretanju projekta uloga korisnika. Korisnik poznaje poslovni sustav svog poduzeća, posjeduje informacije o karakteristikama, funkcionalnosti i performansama tog sustava, te postavlja zahtjeve za novim IS-om koji se projektira. U radu je ukazano na činjenicu da je korisnik najvažniji faktor u procesu analize poslovnog sustava, vrednovanja izrađenog projekta IS-a, te u fazi uvođenja novog IS-a.

Ključne riječi: *projekt, faze projekta, struktura projekta, planiranje, dizajn*