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Review

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AGENCY THEORY AND SUCCESS OF THE COMPANY AND INFORMATION SYSTEMS DEVELOPMENT PROJECT

Summary: *The success rate of information systems development projects is very low. Agency theory explains the low level of project success, emphasizing that agency problems and the opportunistic behaviour of designers are the main causes of the low level of project success. The main factors of agency problems are conflict of interest between the owner and the designer, avoiding the execution of tasks, collection of private information and not using tools and techniques for project management. The research was conducted as a case study. The data was collected based on questionnaires filled out by the designers and interviews with the designers and the owner of the company. In the questionnaire, based on a five-point Likert scale, the views of the designers were expressed. Only the designers and the owner of the company took part in the examination of the views on the conflict of interest. The draft research linked the agency problems and the success of the project and the company in a systematic way. The paper claims that the opportunistic behaviour of designers can be solved with an adequate employment contract. The scientific contribution of the work refers to the rejection of new scientific facts, cognitions. In addition, a detailed questionnaire was created to collect the designer's views on agency problems and a model was created for solving agency problems and improving the success of projects and the company. Researchers, designers, and company owners will benefit from the mentioned research.*

Key words: *agency problems, agency costs, employment contracts, opportunistic behaviour, monitoring, project success, information systems*

JEL classification: *M15, M54*

INTRODUCTION

The success of projects and companies involved in the development of information systems can be improved if agency problems are eliminated. Agency problems arose in the relationship between the owner and the developer. Owners and developers have different goals. The goals of the owner are related to the highest possible return on the invested value with calculated business risk, that is, to maximize earnings. In addition, the owner wants to receive relevant information about the company's operations and the behaviour of developers during the development of information systems projects. Also, the owner wants developers to work in his interest, but also for them to satisfy their own interests.
On the other hand, developers want to maximize the rewards for the work done but bear as little risk as possible for the work done. In addition, developers want as much independence as possible

when performing tasks. Also, developers want to have private project information that they don't want to share with others.
Opportunistic behaviour of programmers leads to the appearance of agency problems, which in the development of information systems can be divided into the following factors: conflict of interests between programmers and owners, avoidance of tasks, collection of private (asymmetric) information, avoidance of using tools and techniques for project control.
Agency problems cause agency costs. Opportunistic behaviour of managers can be eliminated by creating and signing an optimal contract on the work of developers.
In this way, the success rate of the project will increase, which is now very low and hovers around 16%, but there will be an increase in the company's success rate.

1. THEORETICAL ASPECTS OF RESEARCH

Agency theory has been a very successful and active research area in economics, finance, management, and related disciplines since the beginning of the seventies. Agency theory focuses on agency problems and their resolution (Jensen and Meckling 1976).
Agency theory is related to the psychological behaviour of agents within the organizational structure of the company (Kosnik and Bittenhausen 1992). Agency theory seeks to understand the problem that arises when one party, the agent (manager), acts on behalf of the other party, the principal (owner) (Panda and Leepsa 2017). Agents face various problems when acting on behalf of their principals, but principals also face many problems in wanting agents to achieve their goals rather than their own. These problems are called agency problems.
Numerous factors can lead to agency problems, and the most common are conflict of interest, asymmetric information, avoidance of tasks, moral hazard (Todorović and Tomaš and Todorović 2020). The identification of sources of agency problems is still a current area of research. The trend of analysis of agency problems relates to a descriptive description of the problem (Young and others 2020).
Each agent's corrective action has its own direct and indirect costs. Direct costs are monitoring costs, motivation costs and other losses. Indirect costs are fraud, capital costs, and owner time costs.
Addressing the opportunistic behaviour of managers and reducing agency costs can be achieved through an adequate contractual relationship between managers and owners. (Hart 2017). It means that agency theory deals with working relationships that arise when one party hires another party to do some work on behalf of the first party. This contractual relationship can be between owners and managers, owners and individual workers, managers, and workers, but also between owners and creditors and majority shareholders and minority shareholders.
The employment contract can be complete or incomplete (Gretschko and Pollrich 2022). A full employment contract is used when the situation is clear. If the cost of the manager's control is high, an employment contract based on business results is concluded. If the cost of control is low, a contract of employment based on behaviour or a fixed contract is concluded. Incomplete contracts are used for uncertain situations that cannot be predicted. In addition to the owner and manager, a third party, a court or a notary is included in those contracts.
Another way to solve agency problems is to establish a quality information structure in the company where the owner would have all the relevant information about the manager's actions. (Lamprou and Vagiona 2022).
A third way of solving agency problems and preventing managers from abusing their position and power and protecting their interests, owners can use several different mechanisms. (Boshkoska 2015). Internal mechanisms are: internal audit (Todorović and Todorović and Tomaš 2020), changes in contractual items related to salary and benefits, concentration of ownership and good corporate governance. External mechanisms are external audit, capital market, laws, and legal framework.

Perrow (Perrow 1986) criticized agency theory because it looks at the opportunistic behaviour of the agent rather than the principal. An agency problem can happen to both parties. Principals can also behave opportunistically towards agents, cheat, avoid their obligations and take advantage of agents.

2. RESEARCH METHODS

The research used a combined research methodology. Quantitative data were obtained based on employee questionnaires and data from the company, and qualitative data were obtained by talking to the owner, managers and designers of information systems. The purpose of the survey and interviews was not to test agency theory. Agency theory has been validated in many other management contexts. The purpose of the question was to better understand the effect of agency theory on the management of information systems development projects.

Only respondents who were willing to voluntarily participate in the research took part in the research. The research examined the attitudes of 30 employees who worked on the development of information systems projects. Individual and average assessments of respondents represent the opinion of those persons, and not the position of the organization in which they are employed. The respondents' attitudes were determined based on a five-point Likert scale.

In this study, an open-ended and a closed-ended questionnaire were used because closed-ended questions are more appropriate for sensitive topics that require fixed answers and where less articulation is needed.

After the research was conducted, an interview was conducted with randomly selected respondents (owner, managers, and designers). We asked them to give comments on certain characteristic items.

The study was designed to evaluate the influence of independent variables on the dependent variable, i.e. the influence of agency problems and agency costs in an information systems development project on the contracting process between the owner and manager and/or designer of information systems and the quality of the project, which is represented by the research outline in Figure 1.

The main hypothesis claims that agency problems arise in the relationship between owners and managers and/or designers of information systems, which cause agency costs, and that an adequate contract between owners and managers and/or designers of information systems can reduce or eliminate agency costs and improve performance. information systems development project and the success of the company.

The auxiliary hypotheses are:

H1: The more the company owner's goals are different from the developers' goals, the less successful the projects and the company are.

H2: The more the programmers avoided the execution of tasks, the less successful the projects and the company.

H3: The more private information the developers had, the less successful the projects and the company.

H4: The less developers applied techniques and tools in project management (programmability of tasks), the less successful the projects and the company.

H5: If the contract between the owner and developer does not satisfy mutual interests and developers are not adequately rewarded, there is a need for greater monitoring.

H6: The more tools, techniques, and practices of project monitoring (monitoring) are used, projects and companies will be successful.

H7: If the projects are more successful, the company will also be successful.

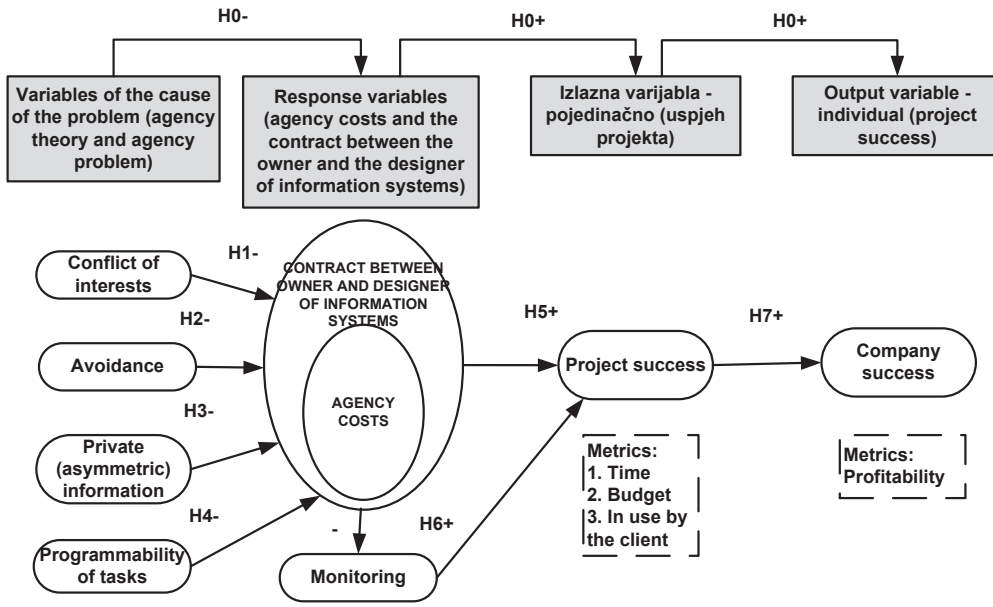

Figure 1. Outline of the research (Authors)

3. RESEARCH RESULTS

3.1. Conflict of interest

Designers may have goals that are opposite or different from the goals of the owner. A conflict of interest can lead to poorer project results and overall company results.
After the completion of the project, the designers and owners were asked questions related to the conflict of interest. Standard project goals were listed, and designers and company owners were asked to rate each individual goal based on a five-point Likert scale. The extent of impact rating ranged from 1 representing a very small extent of impact to 5 representing a very large extent of impact. We also calculated the average scope of influence based on the views of developers and company owners in relation to standard project goals.
7 standard project goals were set: 1) Professional development of the developer, 2) Completion of the project on time, 3) Completion of the project within the budget, 4) Profitability of the project, 5) High quality project development, 6) Error-free project development, and 7) Satisfaction client's need.

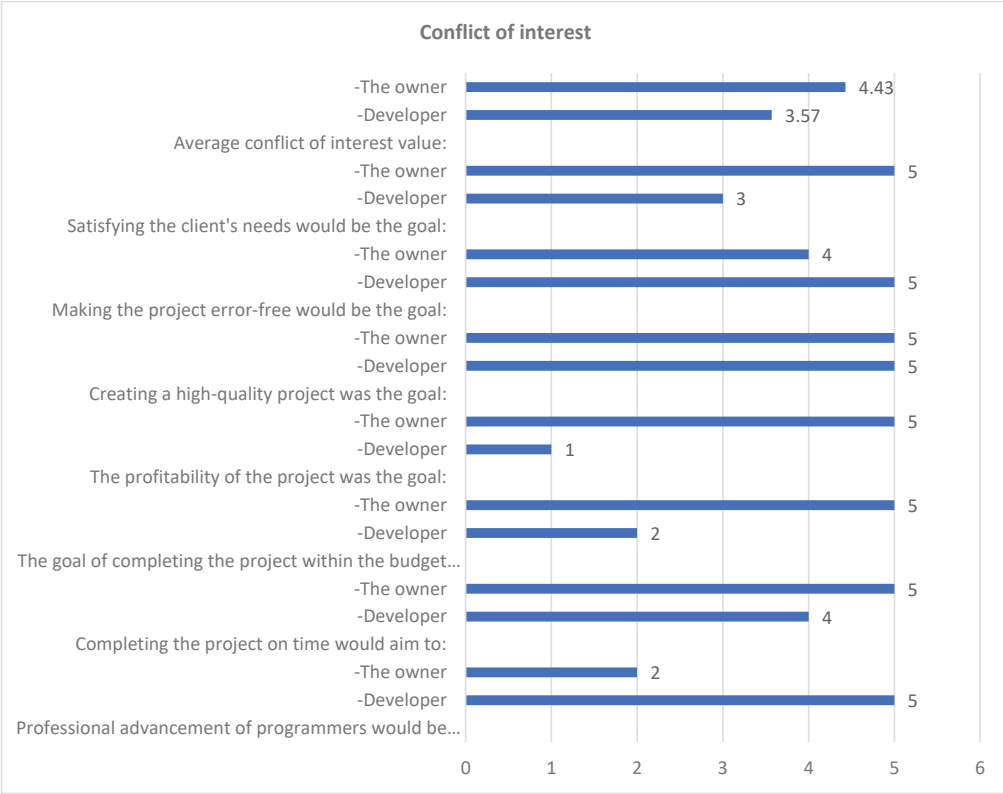

Figure 2. Evaluation of the scope of influence of the owner and designer in relation to the project goals (Authors)

The average volume of influence based on the views of the company owner in relation to the standard project goals was 4.43, while the average volume of influence based on the views of the developers in relation to the standard project goals was 3.57.

The compatibility of the developer's goals with the goals of the company owner is expressed in the project goal, which refers to the creation of a project without errors. Developers and the owner of the company rated this goal as 5, that is, the scope of the impact is very large. The biggest inconsistency between the developer's goals and the company owner's goals is expressed in the goal of creating a high-quality project. The owner rated this goal 5 while the developer rated this goal 1.

The inconsistency of the goals of the developer with the goals of the company owner led to the realization of worse project results and the overall results of the company. In this way, the first auxiliary hypothesis was confirmed.

3.2. Task avoidance

Because of the designers' own interests, they will not work to achieve the goals of the company owner. Designers can avoid their obligations related to the execution of defined tasks in numerous ways. The greater this threat, the higher the agency costs and the more detailed definition of the employment contract is required. All this reflects on the success of the project and the company.

After the completion of the project, the designers were asked questions related to the avoidance of tasks. The designer's views were evaluated based on a five-point Likert scale. The extent of impact rating ranged from 1 representing a very small impact to 5 representing a very large impact. We also calculated the average volume of influence based on attitudes in relation to the questions asked. We asked 13 standard questions related to task avoidance: 1) Socializing, 2) Surfing the Internet, 3) Working on the wrong tasks, 4) Playing computer games, 5) Spending time on tasks not assigned to the developer, 6) Making excessive break, 7) Working on interesting less important tasks, 8) Talking on the phone, 9) Bad organization of programmers, 10) Taking fictitious sick leave, 11) Not understanding requests, 12) Sending messages and jokes by e-mail, Face book and 13) Taking long lunch breaks.

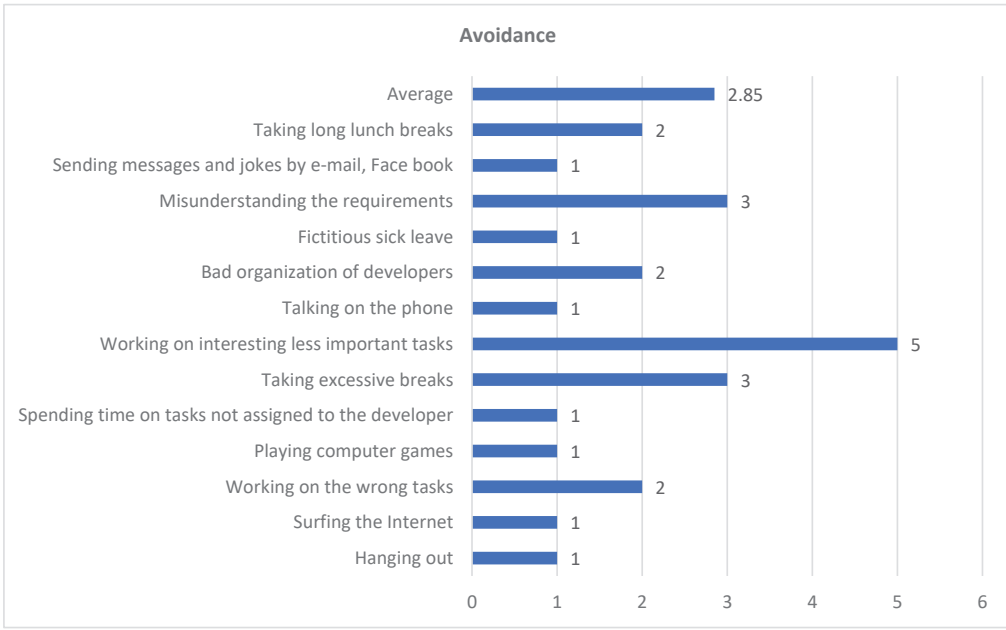

Figure 3. Assessment of the scope of the designer's influence regarding the avoidance of tasks (Authors)

The average volume of influence based on the attitudes of programmers related to issues related to avoiding the execution of tasks was 2.85, which would mean that the level of influence is moderately important.

The highest level of programmer agreement, which was rated 5, was related to working on interesting less important tasks. While with 7 questions, the level of task avoidance was the lowest and was rated 1.

Avoidance of tasks by developers led to worse project results and overall company results. In this way, the second auxiliary hypothesis was confirmed.

3.3. Private (asymmetric) information

Agency problems and agency costs increase when developers have information that company owners do not have. That private information can be misused and harm the owner. Developers can use private information to misrepresent the real situation. The owner can obtain this information only with additional costs and spending his own time.

We asked 11 standard questions related to the possession of private information: 1) Developers described a problem to auditors, 2) Developers discussed problems they believed they could quickly correct , 3) Developers discussed project problems during status report reviews of the project, 4) Developers provided their knowledge of the project, 5) Developers reported project status, 6) Developers reported project completion statuses, 7) Developers willingly reported their working hours, 8) Developers reported their working hours accurately , 9) Developers reported hours on specific tasks, 10) Developers reported hours on specific tasks, and 11) Developers shared critical information about project status.

After the completion of the project, the designers were asked questions related to the existence of private information. The designers were evaluated based on a five-point Likert scale. The extent of impact rating ranged from 1 representing a very small extent of impact to 5 representing a very large extent of impact. We also calculated the average volume of influence based on the views of developers in relation to the questions asked.

The average volume of influence based on the programmers' views related to issues related to the possession of private (asymmetric) information was 3.82, which would mean that the level of influence is important and that the developers did not have a significant level of private information that could affect business costs.

The highest level of developer agreement rated at 5 was related to working on: Developers provided their knowledge of the project, Developers volunteered their working hours, and Developers shared critical information about the status of the project. The lowest rated level (1) is the question: The developers described the problem to the auditors.

The existence of private information on the part of developers leads to increased costs, which leads to poorer project results and overall company results. In this way, the third auxiliary hypothesis was confirmed.

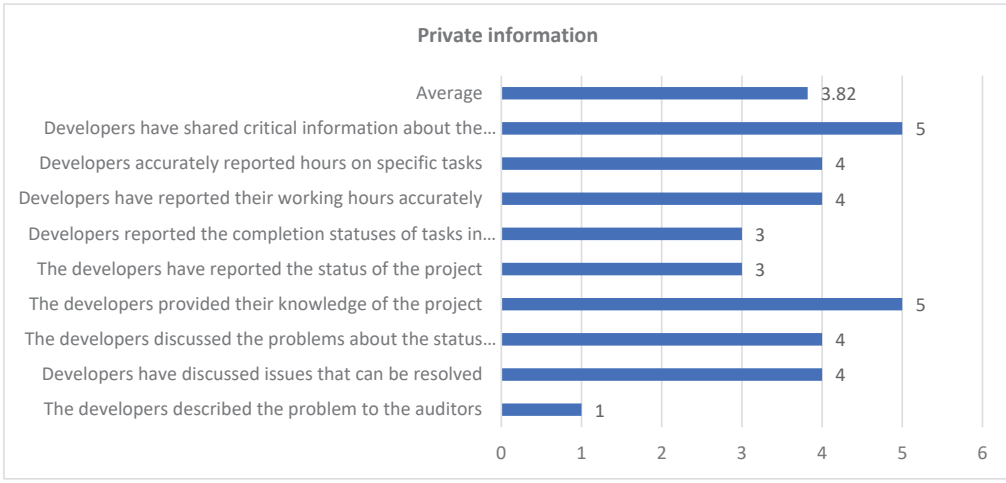

Figure 4. Assessment of the scope of the designer's influence regarding private (asymmetric) information (Authors)

3.4. Programmability of tasks

Task programmability refers to the degree to which the appropriate behaviour of the programmer and the outcome of the project can be accurately estimated using standard tools and techniques. A lower level of use of standard tools and techniques affects a lower level of developer and project

control. This leads to an increase in agency costs and affects the lower level of success of the project and the company.
After the completion of the project, the designers were asked questions related to the existence of programmability of the tasks. The responses of the designers were evaluated based on a five-point Likert scale. The extent of impact rating ranged from 1 representing a very small impact to 5 representing a very large impact. We also calculated the average volume of influence based on the views of developers in relation to the questions asked.
We asked 8 standard questions related to the application of tools and techniques in project control: 1) Techniques or tools for system design, 2) Techniques or tools for generating requirements, 3) Techniques or tools for data administration, 4) Techniques or tools for software installation, 5) Software testing techniques or tools, 6) Software coding techniques or tools, 7) Software source selection techniques or tools, and 8) Project management techniques or tools.

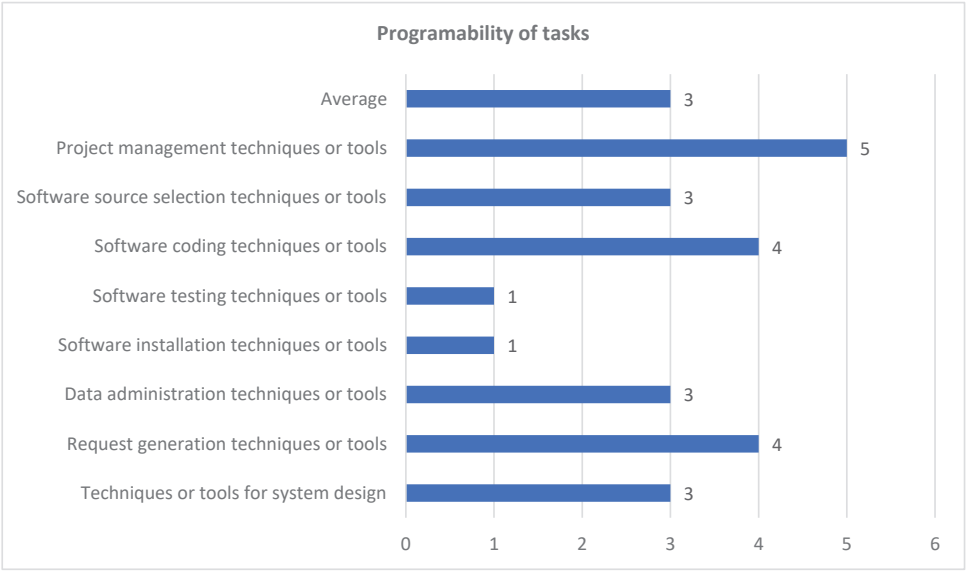

Figure 5. Assessment of the scope of the designer's influence regarding the programmability of tasks (Authors)

The average volume of influence based on the views of developers related to the application of tools and techniques for project control was 3, which would mean that the level of influence is moderately important.
The highest level of developer agreement, rated 5, related to: Techniques or tools for project management. The lowest rated level (1) are the questions: Techniques or tools for installing software and Software testing techniques or tools.
Developers did not use many tools and techniques for project control, which could negatively affect the success of the project and the company. In this way, the fourth auxiliary hypothesis was confirmed.

3.5. Type of contract - elements of rewards for results

The contract is the basis for solving agency problems. The contract may refer to the behaviour of the developer or to the results achieved. The developer's activities do not have to be monitored in detail if the contract is related to business results. When developers have a fixed salary or hourly rate, with no achievement for successful project completion, the company owner must monitor their work in more detail.

After the completion of the project, the designers were asked questions related to the existence of reward elements defined by the contract. The designer's answers were evaluated based on a five-point Likert scale. The developer's scale of impact rating ranged from 1 representing a very small scale of impact to 5 representing a very large scale of impact. We also calculated the average volume of influence based on the views of developers in relation to the questions asked.

We asked 15 standard questions related to rewards for developers for a successfully completed project: 1) Technical training, 2) Flexible work schedule, 3) Feeling of contribution to the organization, 4) Public praise, 5) Positive annual performance evaluations, 6) Independent office, 7) Free time during work, 8) Pride, 9) Financial bonuses, 10) New technology (computer and similar), 11) Possibility of working from home, 12) Celebration of project completion, 13) Choice of future task, 14) Advancement to work and 15) Workplace safety.

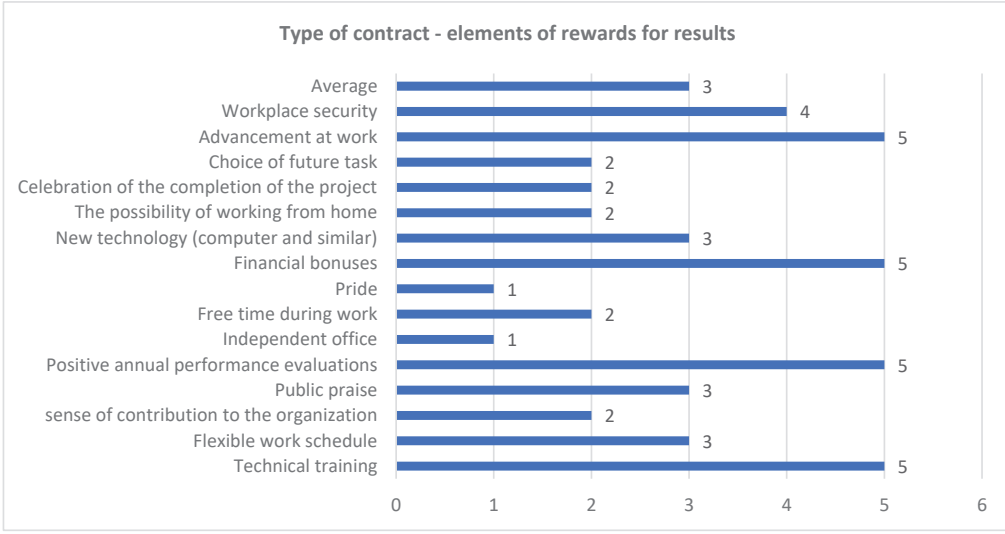

Figure 6. Assessment of the extent of influence of the designer related to the contractual elements of the award for results (Authors)

The average extent of influence based on the views of developers related to the contractual elements of the reward for results was 3, which would mean that the level of influence is moderately important.

The highest level of developer agreement, rated 5, was related to work on: Job Advancement, Financial Bonuses, Positive Annual Performance Evaluations, and Technical Training. The lowest graded level (1) are the questions: Pride and Independent office.

If the developer's level of attachment to business results is lower, the owner spends more time controlling the developer, and this could affect the success of the project and the company. In this way, the fifth auxiliary hypothesis was confirmed.

3.6. Monitoring

Often, agency problems and agency costs arise in cases where the company owner is unable to check and monitor the developer's activities. Agency theory points out that supervision by the owner of the company is one of the tools used to make the developer work in the interest of the owner. The ability to monitor the project is important to the success of the project. However, the activities of monitoring the project and the designer are related to the costs of equipment, creation of procedures, recruitment of personnel, conclusion of work contracts.
After the completion of the project, the designers were asked questions related to the elements of monitoring the developer and the project. The responses of the designers were evaluated based on a five-point Likert scale. The extent of impact rating ranged from 1 representing a very small impact to 5 representing a very large impact. We also calculated the average volume of influence based on the views of developers in relation to the questions asked.
We asked 21 standard questions related to the monitoring of the designer and the project: 1) Project plan , 2) Analysis of the main risk factors , 3) Critical path analysis , 4) Gantt charts , 5) Internal publication on the progress of the project , 6) Periodic review by external auditors , 7) Periodic comparison of actual and planned costs, 8) Periodic comparison of actual and planned results , 9) Periodic comparison of project progress , 10) Periodic calculation of project completion percentage , 11) Periodic project audit meetings , 12) Periodic project team meetings , 13) Post-Completion Project Audit , 14) Project Management Software , 15) Project Manager Signature on Project Completion, 16) Project Progress Report, 17) Change Management Software, 18) Structured Instructions, 19) Periodic Program Timeline Report of the project, 20) Testing the completeness of the module and 21) Signature of the user that the project has been delivered.

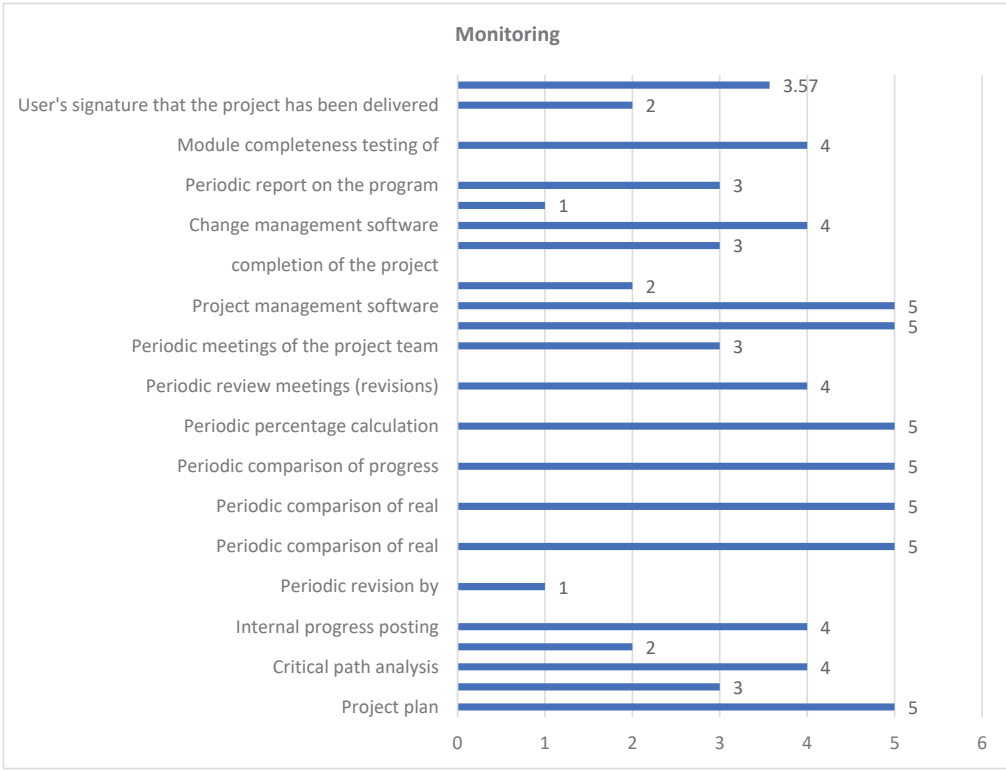

Figure 7. Assessment of the scope of the designer's influence related to the monitoring of the developer and the project (Authors)

The average volume of influence based on the views of the developers related to monitoring was 3.57, which would mean that the level of influence is important.
The highest level of developer agreement rated 5 was related to work on: Project plan, Periodic comparison of actual costs with planned costs, Periodic comparison of actual results with planned results, Periodic comparison of project progress with schedule, Periodic calculation of percentage of project conclusion, Project audit after completion and Project Management Software. The lowest graded level (1) are the questions: Periodic audit by external auditors and Structured instructions.
If the level of monitoring is higher, it will affect the occurrence of certain costs, but more significantly it will affect the success of the project and the company. In this way, the sixth auxiliary hypothesis was confirmed.

3.7. Project success

All information systems projects have defined financial limits and deadlines. These limits are not imposed by the project team, but by top management, clients or stakeholders for whom the software is being developed. The success of the project was measured by three factors: 1) The project was completed within the planned time, 2) The project was completed within the planned budget and 3) The project that was developed is in use by the client.
After the completion of the project, the designers were asked questions related to the elements of the success of the project. The responses of the designers were evaluated based on a five-point Likert scale. The rating of the extent of influence ranged from 1, which represents completely disagree, to 5, which represents completely agree. We also calculated the average volume of influence based on attitudes to the questions asked.

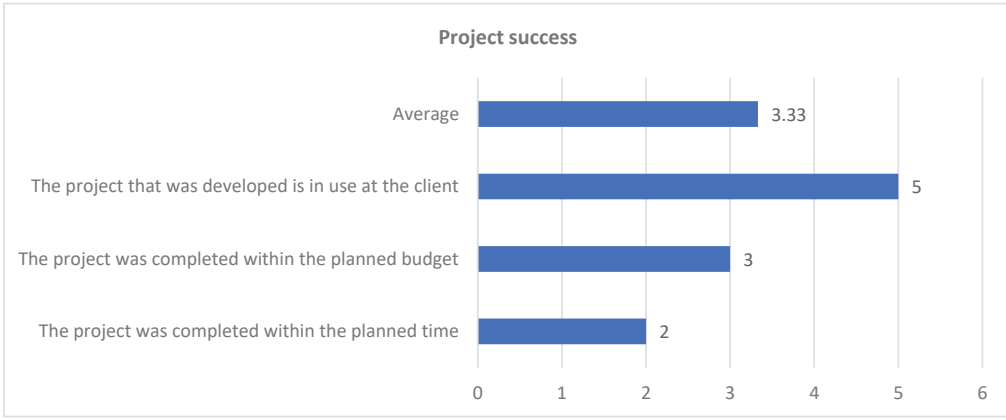

Figure 8. Assessment of the scope of the designer's influence related to the success of the project (Authors)

The average volume of influence based on the views of the developers related to the success of the project was 3.33, which would mean that the developers were undecided about evaluating the success of the project.
The developer's level of agreement, rated 5, was related to the project's success factor: The project that was developed is in use by the client. The lowest level of value (2) is the question: The project was completed within the planned time frame.
If the level of success of the project is higher, the company will be more successful. In this way, the seventh auxiliary hypothesis was confirmed.

3.8. Summary results

The views of programmers related to agency problems, monitoring and success of projects are shown in Figure 9.

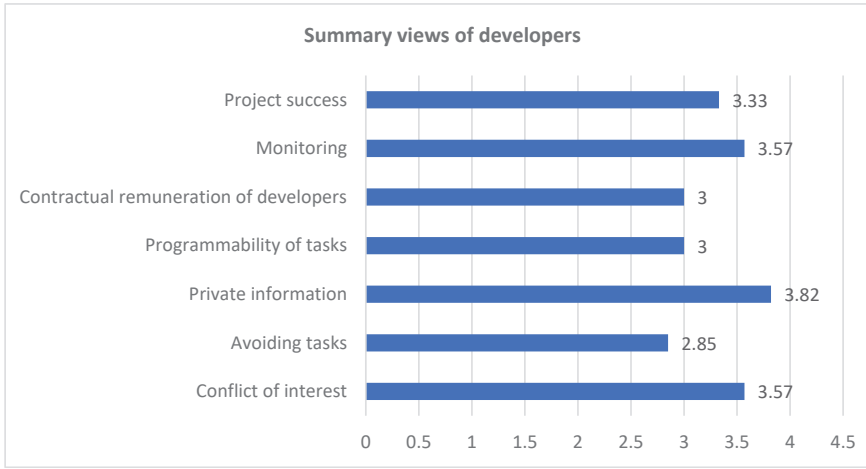

Figure 9. Developer skills related to agency problems, monitoring and project success (Authors)

Agency problems cause agency costs. The employment contract between the owner and the developer should reduce the agency costs, which will increase the success of the project and the company.
Based on the views of the designers, we checked the draft research and the main hypothesis of the research.

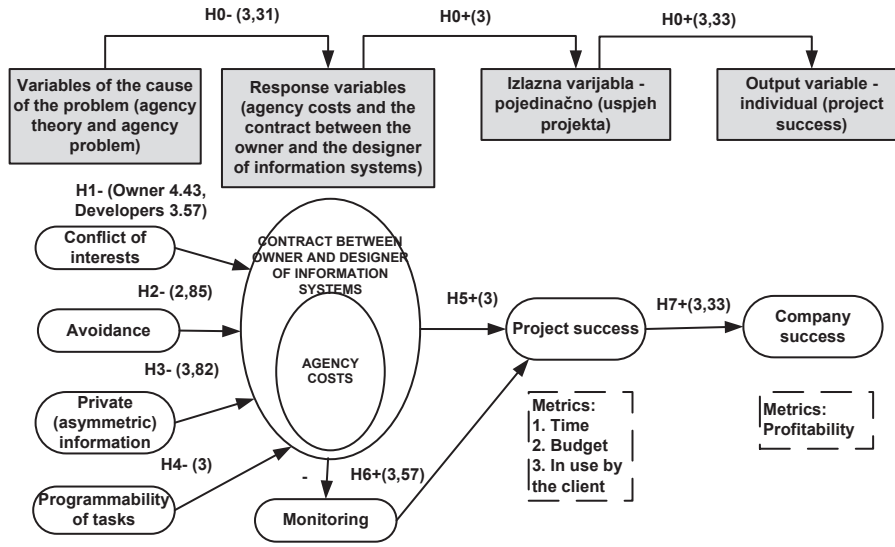

Figure 10. Summary results of the relationship between agency problems and success (Authors)

We have confirmed that agency problems related to conflict of interest, avoidance of tasks, existence of private information and use of tools and techniques in the programmability of tasks cause agency costs, which are eliminated by the age-defined work contract between the owner and developer. A well-defined work contract and monitoring of the project and the designer have a positive effect on the success of the information systems development project and the IT company.

4. DISCUSSION

The agency theory has shown, through several studies, that agency problems appear in the relationship between the owner and the designer (Mahaney and Lederer 2011; Lamprou and Vagiona 2022) which cause agency costs, and which has a negative impact on the success of the project and the company (Nusraningrum and Jaswati and Thamrin 2020) . The opportunistic behaviour of designers can be solved by creating an adequate work contract that should ensure the satisfaction of the goals of the designer and the owner of the company (Erikson and Knockaert 2021) .
The research results have scientific and practical contributions. Scientific contributions refer to new scientific facts and insights in the definition of agency problems in the development of information systems, which relate to: conflict of interest between the owner and the designer, avoidance of tasks by the designer, collection of private information and poor use of tools and techniques for project control. It is especially important to emphasize that the agency problems are described in detail and that a questionnaire was created that can determine the views of the designers in relation to the agency problems. The paper presents a model for solving agency problems in order to improve the success of projects and companies in the field of information systems development.
Research can serve practical purposes for researchers, company owners and designers.
Researchers will receive a model for solving agency problems in companies developing information systems projects. They also received a questionnaire to determine the designer's views related to agency problems. Researchers could include more different companies from different sectors in future research and improve the questionnaire. They could also estimate direct and indirect agency costs.
Information systems designers will receive additional information about agency problems that will be useful when negotiating an employment contract. By creating an adequate work contract, designers will strive to achieve their goals, as well as the goals of the company owner. Also, the obtained information can be used in the project management process with the aim of improving the success of the project and the company.
Company owners will receive information based on which they will be able to reduce the opportunistic behaviour of designers and reduce agency costs. All this will affect the success of the project and the company.

CONCLUSION

The success rate of information systems development projects is very low. Agency theory explains that low success rate is related to agency problems.
This research has shown that avoiding the execution of tasks by programmers and not using tools and techniques for project control have the greatest impact on project completion deadlines.
It is especially important to highlight the role of monitoring in following up the designer and the project. Monitoring has a positive effect on the success of the project and the company. These findings indicate that project owners and managers must use more monitoring, but also techniques and tools for project control to improve the level of project success.

The opportunistic behaviour of designers and increasing their satisfaction is most effectively solved by creating an adequate work contract. Employment contracts should increase the satisfaction of designers, achieve the goals of the owner, and increase the level of success of the project and the company.

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