

# REWARDING AND SUCCESS OF INFORMATION SYSTEMS DEVELOPMENT PROJECTS

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## ABSTRACT

The purpose of the research is to determine the causes of failure of information systems development projects. We came to the hypothesis that rewarding can improve the success of information systems development projects. For this reason, it is suggested that employment contracts be tied to business results. Extrinsic and intrinsic rewards are a good motivator that affects the improvement of employee performance, i.e. increases productivity, business results and job satisfaction and contributes to increasing the success of information systems development projects. Designers and managers of information systems development projects who participated in the research, gave their views on the impact of rewards on the success of the information systems development project in response to survey questions. The attitudes were evaluated on a five-point Likert scales. We obtained additional data based on conversations with managers and designers who deal with the development of information systems. Through the research design, we determined an independent variable related to the employment contract based on business results, which is the basis for the application of various forms of remuneration, and a dependent variable related to the success of the information systems development project. The main findings of the research are related to the definition of the contract between the owner on the one hand and managers and designers on the other hand, which solves the problems of opportunistic behavior of managers and designers of information systems development project. In addition, the factors of extrinsic and intrinsic rewards that are most often used to motivate managers and designers of information systems development are defined. The practical implications of the research refer to the benefits that the company owner, managers and designers of the information systems

development will have. They will receive the best model of employment contract for employees working on the development of an information systems project. In addition, they will receive information about the views of designers and project managers related to reward factors that improve the success of the information systems development project. The originality of the research refers to the creation of a model that links the work contract based on business results with reward factors that help to increase the success of the information systems development project.

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## 1. INTRODUCTION

The failure rate of information systems development projects is extremely high and is about 40%. It has become a practice for information systems development designers to consider failure as inevitable (Moura, Dominguez & Varajão, 2021). Researchers have identified a number of risk factors associated with the failure of an information systems development project (Hashmi, Shahzad & Izhar, 2022).

In order to solve the problem of the failure of the information systems development project, various solutions were offered, and among them rewarding designers and project managers as motivational factors for achieving the success of the information systems development project particularly stand out (Zhao, Feng, Wei & Wang, 2022).

Hasberg's theory of motivation proposes two types of rewards, extrinsic and intrinsic rewards, which are used as a motivator to achieve defined goals (Malik & Naem, 2013).

It is expected that using these types of rewards as a motivator will solve the problem of the low level of success of the information systems development project.

In the research, designers and project managers who work on the development of the information systems project were surveyed. Their views were processed and analyzed with the aim of testing the hypotheses. The hypotheses claim that extrinsic and intrinsic rewards are a good motivator for designers and project managers and improve the success of information systems development projects.

## 2. LITERATURE REVIEW

### 2.1. The contract between the owner and the designer

The relationship between the owner on the one hand and the designer on the other hand in companies dealing with the development of information systems projects is based on a contract on the fulfillment of defined obligations (Turner & Müller, 2004).

In order to measure the effectiveness of the relationship between the owner and the designer, (Sunindijo, 2015) it is necessary to know the costs borne by the owner, as well as the results of the company's operations, i.e. indicators of financial success. The goal is to achieve the highest level of efficiency of the contractual relationship between the owner and the designer (Todorović, Tomaš & Todorović, 2020).

The solution to the designer's opportunistic behavior (Gurcaylilar-Yenidogan & Erdogan, 2023) and the reduction of agency costs can be achieved by a well-defined contract between the owner and the designer. The purpose of the contract is to reduce or eliminate the designer's opportunistic behavior and to force the designer to work in the interest of the owner, and to receive an adequate reward for that loyalty.

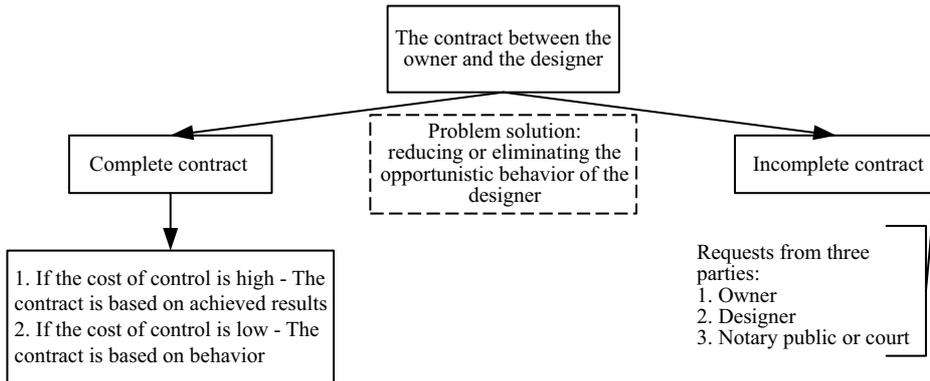
Contracts can be complete or incomplete (Badenfelt, 2011) as shown in Figure 1.

*Full contracts* are used when the situation is certain. If the cost of control is high, then contracts are concluded based on the achieved business results. When control costs are low, then contracts are based on behavior.

*Incomplete contracts* are used for uncertain situations and in these contracts, in addition to the owner and designer, a third party is involved, which can be a notary or a court.

A complete contract specifies the rights and obligations of each party. The contract is clear and unambiguous. The information is known to both parties, that is, there is no asymmetric information that would allow the occurrence of moral hazard, unfavorable selection or dispute (Kujala, Nystén-Haarala & Nuottila, 2015).

In this paper, we will deal only with the situation in which complete contracts are concluded and where the cost of control is high, that is, where contracts are concluded based on the achieved business results.



**Figure 1.** Contract between the owner and the designer

Source: Authors' compilation

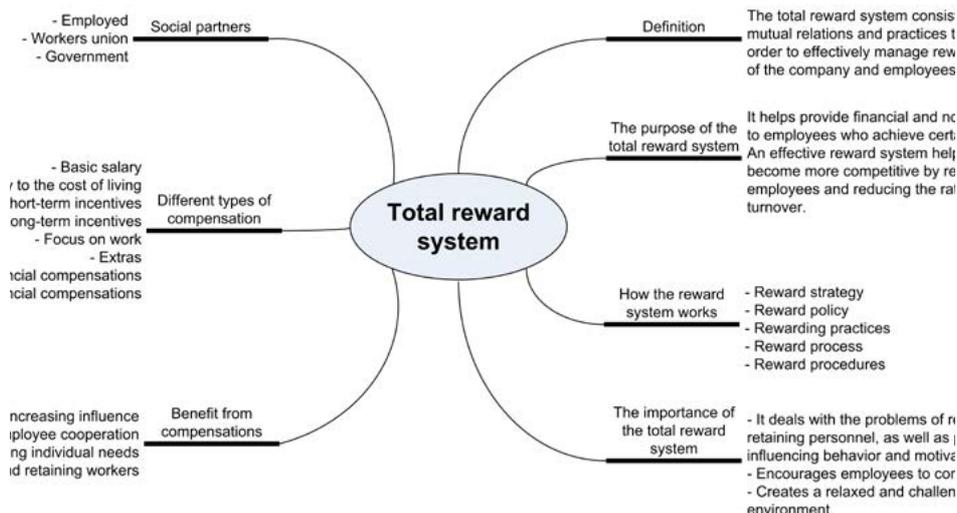
In this contractual situation, a contract is concluded which, in addition to the basic salary, offers the designer various forms of rewards for achieving the agreed results.

## 2.2. Rewarding the designer

The reward system deals with the strategies, policies and processes needed to ensure that the contribution of people in the organization is recognized and rewarded with financial and non-financial means (Shneor, Mrzygłód, Adamska-Mieruszewska & al., 2022). In practice (reward processes, practices and procedures) it is about the design, implementation and maintenance of the reward system (Fink, Wyss & Lichtenstein, 2018), which aims to satisfy the needs of the owner and designer. The overall goal is to reward people justly, fairly and consistently (Chamtitigul & Li, 2021) in accordance with their value to the organization, and in order to advance the achievement of the organization's strategic goals (Nguyen, 2020).

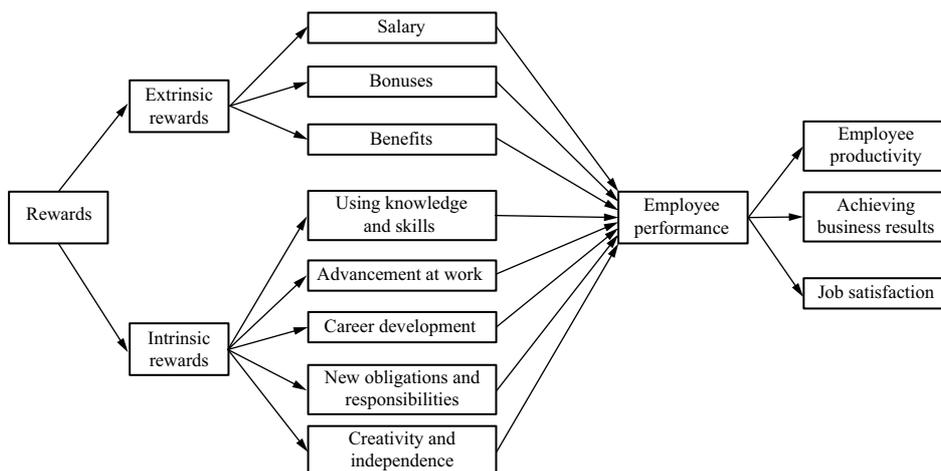
Reward management is not only salary and employee benefits, but also non-financial rewards such as recognition, learning and development opportunities, and increased job responsibility.

Figure 2 shows the total reward system with basic elements: definition of the total reward system; the purpose of the total reward system; the functioning of the reward system; reward system design, types of rewards and social partners in the reward system.



**Figure 2.** Total reward system  
Source: Authors' compilation

The reward is usually something of value (Tan, Teoh & Cheah, 2019), such as money. There are two types of rewards. Extrinsic rewards are concrete rewards that employees receive such as: salary, bonuses and benefits. Intrinsic rewards tend to give personal satisfaction to an individual such as: using knowledge and skills, advancement, career development, gaining new obligations and responsibilities, creativity and independence in performing tasks (Figure 3.)



**Figure 3.** Extrinsic and intrinsic rewards  
Source: Authors' compilation

### 2.3. The success of the information systems development project

The success of the information systems development project is interpreted differently (Razzaq, Huang, Sun & Xie, 2019). One group of authors (Puche Regaliza, Jiménez & Val, 2017) suggests that projects be evaluated as successful if they are completed within the planned time, defined budget and quality. Other authors (Eichhorn & Tukul, 2018) emphasize that the designer must primarily satisfy the wishes and requirements of the user.

The third group of authors (Einhorn, Meredith & Marnewick, 2022) emphasizes that the project must achieve the defined goals of the project, and that it was completed within the foreseen time and within the planned budget.

If we summarize the factors on the basis of which the success of the project is evaluated, we can group them as:

- 1) client satisfaction, i.e. acceptance of the project by the client,
- 2) perceived quality of the project, i.e. that the project affects the improvement of the user's performance,
- 3) successful implementation of the project, i.e. that the project was completed within the plan and budget and meets the specified requirements.

In addition to the numerous tools and techniques developed for managing information systems development projects, we still have a large number of failed projects. Tools and techniques alone will not do much (Ciric Lalic, Lalic, Delić, & Gracanin, 2022). It is similar to having a quality musical instrument. A musical instrument does not create music, but a musician on that musical instrument creates music. The same is true of information system project management. Project management tools and techniques do not manage the project, the designers and the project manager do. Tools and techniques can speed up some activities, but the knowledge and skills of designers and project managers are crucial. Inadequate knowledge and skills of designers and project managers are more likely to cause project failure than lack of project management tools and techniques.

The team of designers is led by a team leader and he or she is in charge of connecting individual competencies of designers with group competencies with the aim of creating team competencies. That's why he needs to create a complementary team, which has good communication and commitment. Then the projects will be cheaper, that is, they will cost less. It will be better and of better quality, that is, it will fulfill the wishes and demands of the users. They will finish faster, that is, they will be finished in the predicted time schedule.

The manager tries to motivate the designers by offering them various types of rewards and achievements to achieve the defined goals of the project (Todorović, Todorović & Tomaš, 2020).

### 3. MATERIALS AND METHODS

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 work on the development of information technology 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.

In this study, an open and closed questionnaire was used. This is because the fact that for sensitive topics that require fixed answers and where less articulation is needed, open-ended questions are suitable.

The study is designed to evaluate the influence of the independent variables on the dependent variable.

Respondents were asked to express their perceptions using a five-point scale Likert scale.

**Table 1.** Five-level Likert scale of perception

Agreement				
1	2	3	4	5
I don't agree at all	I do not agree	I'm undecided	I agree	I completely agree
Frequency				
Never	Rarely	Occasionally	Often	Very often
Significance				
It doesn't matter	Little important	Moderately important	Important	Very important
Probability				
Almost never right	Usually not true	Occasionally true	Usually true	Almost always right

Source: Authors' compilation

The percentage of perception ranges from 0% to 100%. Zero percent is when the perception is negative (1), and a hundred when the perception is maximally positive (5) is 100 %.

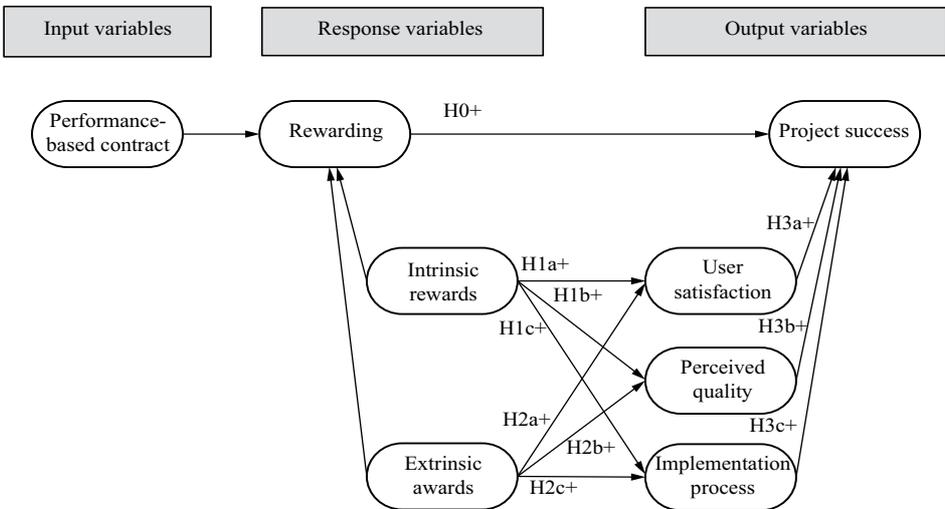
After the research was conducted, a conversation was held with randomly selected respondents and the summary results of the research were presented. We asked them to give comments on certain characteristic items.

**Research design**

The research design is based on the assumption that company owners offer project managers and designers work contracts that are based on business results. Various types and forms of rewards are defined in the contracts. The owners have at their disposal numerous opportunities for motivating and rewarding the designer and manager of the information systems development project.

Extrinsic motivation and rewards influence the satisfaction of designers to achieve rewards or avoid unwanted consequences. In extrinsic rewards, in addition to a fixed salary, bonuses and benefits are offered.

Intrinsic motivation comes from the designer himself who performs certain work activities for his own satisfaction. Intrinsic motivation and rewards refer to: the possibility of using one’s own knowledge and skills, the possibility of advancement, the possibility of learning and personal development, receiving more responsible tasks and creativity and independence in performing tasks.



**Figure 4.** Research model  
 Source: Authors’ compilation

Based on the draft of the research, we set the following hypotheses in the paper:

H<sub>0</sub> – The main hypothesis

If the cost of controlling the manager and the project team is high, then the owner will conclude a full contract based on the achieved business results and using rewards as motivation to achieve project success.

### H<sub>1</sub> – Hypothesis

Intrinsic rewards have a positive effect on user satisfaction, perceived quality and the project implementation process, that is, on the overall success of the information systems development project.

### H<sub>2</sub> – Hypothesis

Extrinsic rewards have a positive effect on user satisfaction, perceived quality and the project implementation process, that is, on the overall success of the information systems development project.

## 4. RESULTS

Awarding managers and designers with the aim of obtaining a quality design and implementation of the information systems development project was carried out on the basis of extrinsic and intrinsic awards. The mean value of perception and percentage of perception of all respondents is shown in Table 2, 3, 4 and 5.

Table 2 shows the mean values and percentage of the perception of all respondents about the impact of rewards on the success of the information systems development project. The respondents' perception was measured on a five-point scale. On the Likert scale, it has a mean value of 3.86 or 77.2% of the total value. The reported values are close to value 4 on the Likert scale, which represents agreement with the stated attitudes.

**Table 2.** Remuneration of managers and designers

Awards	Likert scale from 1-5 Mean value of perception	% of perception
ER Extrinsic rewards	3.95	79.0
IR Intrinsic rewards	3.77	75.4
Total - average	3.86	77.2

Source: Authors' compilation

Rewarding is represented by extrinsic and intrinsic rewards. The respondents' evaluations show that they believe that extrinsic and intrinsic rewards are approximately equally influential as motivators for the successful completion of an information systems development project. Extrinsic rewards have a mean value of 3.95 or 79%, intrinsic rewards have a mean value of 3.77 or 75.4%.

Extrinsic rewards are presented in Table 3 and are divided into three basic constructs: salary, bonuses and benefits. In Table 3, bonuses are divided into

three subcategories: bonuses for achieved results, bonuses for meeting deadlines and bonuses for savings. Benefits are divided into three subcategories: health and safety benefits, time off and flextime benefits, and other benefits. The constructs that were evaluated and have the highest level are basic salary with a mean value of 4.82 (96.4%) and bonuses based on achieved results with 4.71 (94.2%). The construct with the lowest level is other benefits and conveniences with a mean value of 3.21 (64.2%).

**Table 3.** Extrinsic rewards

Extrinsic rewards	Likert scale from 1-5 Average value perception	% of perception
ER01 Basic salary	4.82	96.4
ER02 Bonuses for achieved results	4.71	94.2
ER03 Bonuses for meeting deadlines	3.98	79.6
ER04 Bonuses for savings	3.63	72.6
ER05 Safety and health benefits	3.44	68.8
ER06 Benefits of free and flexible time	3.86	77.2
ER07 Other benefits and benefits	3.21	64.2
Total - average	3.95	79.0

Source: Authors' compilation

Intrinsic rewards are presented in Table 4 and are divided into five constructs, namely: use of knowledge and skills, advancement in work, career development, obtaining new obligations and responsibilities, and creativity and independent work in the execution of tasks. The construct rated at the highest level is career development with a mean value of 4.42 (88.4%). The construct with the lowest level is new obligations and responsibilities with a mean value of 3.38 (7.6).

**Table 4.** Intrinsic rewards

Intrinsic rewards	Likert scale from 1-5 Mean value of perception	% of perception
IR01 Use of knowledge and skills	3.72	74.4
IR02 Advancement in work	3.62	72.4
IR03 Career development	4.42	88.4
IR04 New obligations and responsibilities	3.38	67.6
IR05 Creativity and independence in performing tasks	3.72	74.4
Total - average	3.77	75.4

Source: Authors' compilation

The success of the information systems development project was measured by three dimensions: user satisfaction, perceived quality and the implementation process. The mean value of perception and the percentage of perception of all respondents is shown in Tables 5, 6, 7 and 8.

Table 5 shows the mean values and percentage of the perception of all respondents about the influence of individual elements for the success of the project on the overall success of the information systems project. The perception of the respondents who evaluated the success of the information systems development project based on the five-level scale. The mean value of the Likert scale is 3.88 or 77.6% of the total value. The reported values are close to value 4 on the Likert scale, which represents agreement with the stated attitudes.

**Table 5.** Project success

Awards	Likert scale from 1-5 Mean value of perception	% of perception
SC User satisfaction	4.19	83.8
Q Participated quality	4.07	81.4
I Implementation process	3.37	67.4
Total - average	3.88	77.6

Source: Authors' compilation

Table 6 shows the sub-elements of the user satisfaction construct, namely: the project that was developed is used by its users and the project contributes to increasing the efficiency and effectiveness of employees. Both sub-elements have a high level of agreement over 4, i.e. the project that was developed is used by its users has a level of agreement of 4.31 or 86.2% and the project contributes to increasing the efficiency and effectiveness of employees has a level of agreement of 4.07 or 71.4%.

**Table 6.** User satisfaction

User satisfaction	Likert scale from 1-5 Mean value of perception	% of perception
SC01 The project that was developed is used by its users	4.31	86.2
SC03 The project contributes to increasing the efficiency and effectiveness of employees	4.07	81.4
Overall – average 4.15	4.19	83.8

Source: Authors' compilation

Table 7 shows the sub-elements of the participatory quality construct with values: the project fulfilled the wishes and requirements of the users 4.17 (83.4%), the project showed significant improvements in the implementation of activities 4.14 (82.8%). The project results had a positive impact on business decision-making 3.86 (77.2%) and the project results had a positive impact on the organization’s performance 4.12 (82.4%). The expressed values are above the value 4 on the Likert scale, which represents agreement with the stated attitudes, except for the value of the project results that had a favorable effect on the making of business decisions, which has a value of 3.86.

Table 7. Participating quality

Participating quality	Likert scale from 1-5 Mean value of perception	% of perception
Q01 The project fulfilled the wishes and requirements of the users	4.17	83.4
Q02 The project has shown significant improvements in the implementation of activities	4.14	82.8
Q03 The results of the project had a favorable impact on business decision-making	3.86	77.2
Q04 The results of the project had a positive impact on the performance of the organization	4.12	82.4
Total - average	4.07	81.4

Source: Authors’ compilation

Table 8 shows the sub-elements of the implementation process construct with the following values: the project was implemented without major problems and errors 3.50 (70%), the project was completed within the foreseen deadlines 3.32 (66.4%), and the project was completed within the budget 3.19 (67.4%). The expressed values are above value 3 on the Likert scale, which represents partial agreement with the stated attitudes.

Table 8. Implementation process

Implementation process	Likert scale from 1-5 Mean value of perception	% of perception
I01 The project was implemented without major problems and errors	3.50	70.0
I02 The project was completed on time	3.32	66.4
I03 The project was completed within the budget	3.19	63.8
Total - average	3.37	67.4

Source: Authors’ compilation

## 5. DISCUSSIONS

This research supports the hypothesis that in conditions where the costs of controlling the execution of work activities of project managers and designers in the development of information systems projects are high, the owner of the company concludes a labor contract with the project manager and designers based on the achieved business results. In this way, he will be able to use the reward as a motivation to achieve the success of the project. Analyzing the data collected through the survey, the level of agreement with the questions about the impact of rewards on the success of projects was 3.86 (on a Likert scale from 1 to 5), i.e. 77.2% agreement, which means that the respondents agree with the stated impact (Figure 5.).

In further discussion with the project managers and designers, they believe that the best model for the work contract is a complete contract based on the achieved results. This type of contract further motivates them to increase productivity, achieve defined business results and be satisfied with their work. Therefore, rewarding has a positive effect on the success of the information systems development project, i.e. on its quality, completion deadlines and budget.

For performance-based work contracts for which a fixed salary is determined, they believe it is not applicable for the project manager and designers, but it is applicable for the administrative staff associated with the information systems development project.

Until now, it has not been the practice to conclude employment contracts as incomplete contracts and to protect risks by introducing a third party, i.e. a notary or a court.

Intrinsic rewards, which are based on the personal satisfaction of individuals, that is, their sense of contribution and self-importance, were significantly valued with a total score of 3.77 or 75.4% satisfaction. Based on these data, the first auxiliary hypothesis is confirmed, i.e. that intrinsic rewards have a positive effect on user satisfaction, perceived quality and the project implementation process, i.e. on the overall success of the information systems development project.

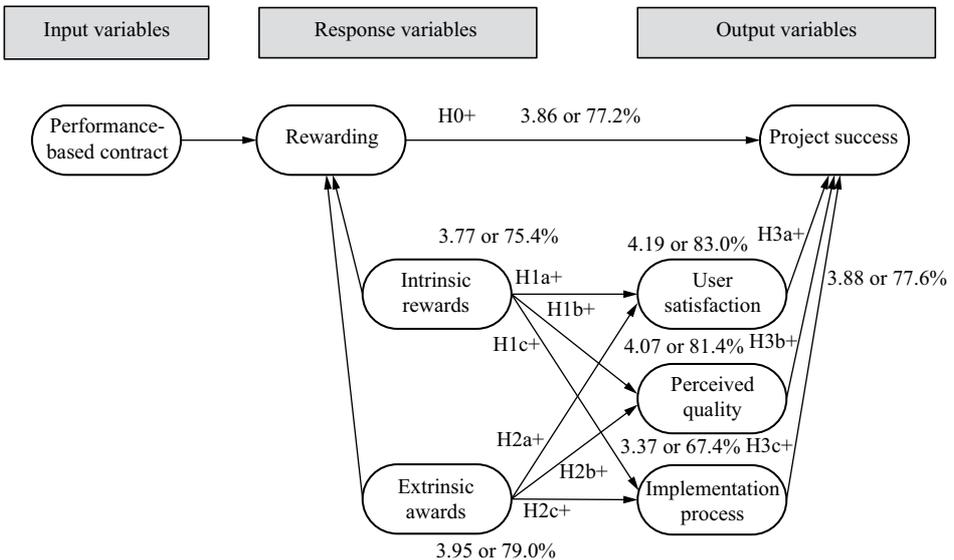
The most valued item was career development with 4.42 or 88.4%. In the conversation with the designers, they pointed out that career development in the field of information technology is very important, as technology, knowledge and skills quickly become obsolete, and thus reduce their competence and competitiveness on the labor market.

Extrinsic rewards based on employee earnings were evaluated with an overall rating of 3.95 or 79% satisfaction. Based on these data, the second auxiliary hypothesis is confirmed, i.e. that extrinsic rewards have a positive effect on user satisfaction, perceived quality and the project implementation process, i.e. on the overall success of the information systems development project.

The most valued items related to material income of employees. The basic salary was valued at 4.82 or 96.4%, and the bonuses for the achieved results were valued at 4.71 or 94.2%. In the conversation with the designers, they pointed out that material rewards are the biggest motivator for achieving business results, but that bonuses and benefits are also an important motivator.

Analyzing how certain items of the project affect its success, we see that user satisfaction is the most important item and was rated with 4.19, i.e. 83% satisfaction, while perceived quality had an effect of 4.07 or 81.4% satisfaction, and the implementation process had an effect of 3.37 or 67.4% satisfaction.

In conversations with respondents, they stated that the implementation process had the least impact on the success of the project, 3.88 or 77.6%. As an explanation, they stated that in practice, during implementation, certain problems and small errors appear that the user tolerates and does not significantly affect his satisfaction and the quality of the project.



**Figure 5.** Model analysis results

Source: Authors' compilation

## 6. CONCLUSIONS

Poor performance of information systems development projects has become a problem for project companies, project users and society as a whole. In order to try to solve this problem, this research tried to give an answer regarding the impact of rewards, i.e. intrinsic and extrinsic rewards, on the success of information systems projects.

The answers to the questions can help owners, project managers and designers create better labor contracts based on business results. Owners can analyze all models of employment contracts and find the model and reward methods that best suit their goals and needs. In addition, owners can have useful information related to motivating project managers and designers to achieve the success of the information systems development project.

Designers can use the information for future labor contract negotiations with owners.

Also, the research confirmed that by using the Likert scale it is possible to obtain information and attitudes of individual respondents on the basis of which valid conclusions and recommendations can be made.

### Conflict of interests

The authors declare there is no conflict of interest.

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## НАГРАЂИВАЊЕ И УСПЈЕХ ПРОЈЕКТА РАЗВОЈА ИНФОРМАЦИОНИХ СИСТЕМА

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### САЖЕТАК

Сврха истраживања се односи на утврђивање узрока неуспјеха пројекта развоја информационих система. Пошли смо до хипотезе да награђивање може побољшати успјешност пројекта развоја информационих система. Стога се предлаже да уговори о раду буду везани за резултате пословања. Екстринзичне и интринзичне награда су добар мотиватор који утиче на побољшање перформанси запослених, односно повећање продуктивности, резултата пословања и задовољства послом, те доприноси повећању успјешности пројекта развоја информационих система. У истраживању су учествовали пројектанти и руководиоци пројекта развоја информационих система који су у анкетним питањима изнијели своје ставове о утицају награђивања на успјешност пројекта развоја информационих система. Ставови су вредновани на основу петостепене Ликертове скале. Додатне податке смо прикупили тако што смо разговарали са руководиоцима и пројектантама који се баве развијем информационих система. Дизајном истраживања утврдили смо независну варијаблу која се односи на уговор о раду темељен на резултатима пословања, који је основа за примјену разних облика награђивања и зависну варијаблу која се односи на успјех пројекта развоја информационих система. Главни налази истраживања су везани

за дефинисање уговора између власника, са једне стране, и руководиоца и пројектаната, са друге стране, чиме се рјешавају проблеми опортунитетног понашања руководиоца и пројектаната развоја информационих система. Поред тога, дефинисани су фактори екстринзичних и интринзичних награда који се најчешће користе код мотивисања руководиоца и пројектаната развоја информационих система. Практичне импликације истраживања односе се на користи које ће имати власник компаније, те руководиоци и пројектанти развоја информационих система. Они ће добити најбољи модел уговора о раду за запослене који раде на развоју пројекта информационих система. Поред тога, добиће информације о ставовима пројектаната и руководиоца пројекта везаних за факторе награђивања који побољшавају успјешност пројекта развоја информационих система. Оригиналност истраживања односи се на креирање модела који повезује уговор о раду темељен на резултатима пословања са факторима награђивања који помажу да се повећа успјешност пројекта развоја информационих система.

**Кључне ријечи:** *интринзичне награде, екстринзичне награде, задовољство корисника, квалитет пројекта, процес имплементације пројекта.*