

Implementation and Analysis of Information System in a Wood Processing Company

Primjena i analiza informacijskog sustava u tvrtci za preradu drva

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ABSTRACT • *The main goal of this paper was to analyze and compare two information systems before their implementation. Analysis has been made of advantages of a contemporary information system (IS) and possibilities of its upgrading to a higher version. The method of SWOT analysis has been used. Strengths and weaknesses have been defined, as well as opportunities and threats of these IS. On the basis of the results reached, the strategy and particular solutions have been suggested. It can also be concluded that this information system is suitable for wood processing companies and forest companies.*

Key words: *information system analysis, strength, weaknesses, opportunities, threats, strategy*

SAŽETAK • *Cilj rada bio je usporediti i analizirati dva informacijska sustava prije početka njihove primjene. Pokušale su se analizirati prednosti suvremenoga informacijskog sustava (IS-a) te mogućnosti njegove dogradnje i usavršavanja u primjeni. Za to je primijenjena metoda SWOT analize. Definirane su snage i slabosti te mogućnosti i prijetnje suvremenog IS-a. Na osnovi postignutih rezultata predložena su određena rješenja i strategija razvoja IS-a. Na temelju provedenih istraživanja može se zaključiti da je istraživani informacijski sustav pogodan za primjenu u tvrtkama za preradu drva i u šumarstvu.*

Gljučne riječi: *analiza informacijskog sustava, snaga, slabosti, mogućnosti, prijetnje, strategija*

1 INTRODUCTION

1. UVOD

Information system can be described as a complex information system suitable for the detection and monitoring of an enterprise's processes (Dudinská, 1995). It is fully ready for the market of the European Union. It can be used on the basis of EDI (electronic

data interchange) communication. Recently, the tools of e-business within contemporary information system (IS) have been presented in Great Britain, Czech Republic and also in Slovakia. The information system presented in our article has been successfully implemented not only in Slovak Republic but all over the world. The number of sold and installed systems reached some hundreds.

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2 COMPARISON OF TWO INFORMATION SYSTEMS

2. USPOREDBA DVAJU INFORMACIJSKIH SUSTAVA

2.1 Previous information system

2.1.1. Prijašnji informacijski sustav

A complex IS was provided by Beset Ltd., a member of CEE IT GROUP, which is an association of IS/IT companies from the Central and East Europe. This IS is designed for industrial companies. It is necessary to implement this IS step by step according to particular requirements of each company. It took six months to implement it in the investigated company. However, IS seemed then to be incompatible with other corporate systems. This Information System consists of 5 parts: Sales; Purchase; Production; Marketing; Finance.

2.2 New information system

2.2.1. Novi informacijski sustav

It is an upgrade version of the above mentioned IS. The main difference between them is in the format. The first one works in text format and the other works in graphic format. On 1st January 2007 the new IS was put into operation and it took more than 1 year to carry out its implementation. Some changes had to be made on the new IS so as to comply with the new Slovak law. In future, the company plans to implement the latest version of IS.

3 SWOT ANALYSIS OF THE PREVIOUS INFORMATION SYSTEM

3. SWOT ANALIZA PRIJAŠNJEGA INFORMACIJSKOG SUSTAVA

3.1 The method of SW (strengths and weaknesses) analysis

3.1.1. Metoda SW (snage i slabosti) analize

1. For the analysis of strengths and weaknesses, the method of conversation has been chosen with indi-

vidual employees of the department. On the basis of the conversation, key factors have been specified affecting the company performance (activity) related to IS function. 5 levels of evaluation within an Activity indicate how well or badly a given activity is performed.

2. Then factors have been evaluated according to their importance for the company and according to their impact on the company's management.
3. The result of evaluation is presented in the matrix of 2 variables: power – importance.

3.2 SW (strengths and weaknesses) analysis of the previous Information System

3.2.1. Analiza SW (snage i slabosti) prijašnjega informacijskog sustava

Most of the factors evaluated (Table 1) are placed in upper quadrants (Fig. 1). Factors indicating the strengths of the company are in the right upper quadrant: Technical security of IS, Connection of programs, Quality of work, Production costs, Quality, In-plant information, Purchase, sales, marketing, Company atmosphere, Faster communication, Reduction of total costs, Trend of income, Control and monitoring.

These factors have a positive impact on the company development.

The following factors are in the left upper quadrant: Development of IS, Maintenance of IS, Technology preparation of production, Flexibility, Competitiveness, Communication, Working performance, Costs of IS purchase, Costs of implementation, Costs of software, Decision making flexibility.

3.3 OT (opportunities and threats) analysis of the previous Information System

3.3.1. Analiza OT (mogućnosti i prijete) prijašnjega informacijskog sustava

On the basis of opportunities and threats analysis that characterize company's environment, the threats in Table 2 have been defined.

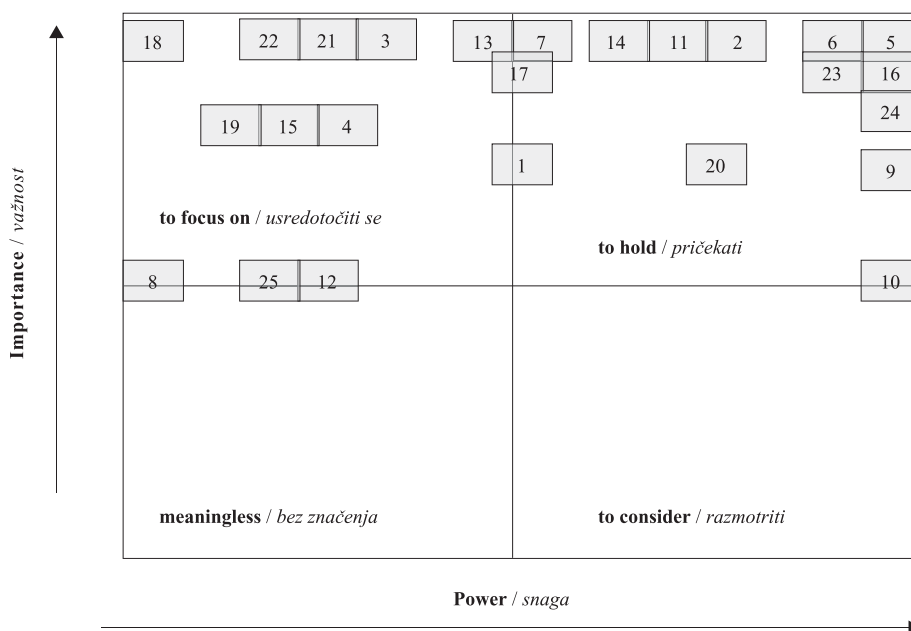


Figure 1 Matrix power – importance of the previous IS

Slika 1. Matrica snaga – važnost za prijašnju IS-i

Table 1 Analysis of strengths and weaknesses of the previous IS

Tablica 1. Analiza snage i slabosti prijašnjega IS-a

Evaluated factors/ Ocjenjivani činitelj	Activity Aktivnost					Importance Važnost				
	0	1	2	3	4	0	1	2	3	4
1. Information technology / Informacijska tehnologija										
1. Development of IS / Razvoj IS			x						x	
2. Technical security of IS / Tehnička sigurnost IS-a				x						x
3. Communication/ Komunikacija		x								x
4. Maintenance of IS/ Održavanje IS-a		x							x	
5. Connection of programs / Povezanost programa					x					x
2. Human resources / Ljudski resursi										
6. Quality of work / Kvaliteta posla					x					x
7. Company atmosphere / Radna okolina			x							x
8. Working performance / Radni učinak	x							x		
9. Faster communication / Brža komunikacija				x						x
10. Work-time reduction / Skraćenje radnog vremena					x			x		
3. Production/ Proizvodnja										
11. Production costs / Troškovi proizvodnje				x						x
12. Technology preparation of production Tehnološka priprema proizvodnje		x						x		
13. Economy in production / Ekonomičnost proizvodnje			x							x
14. Quality/ Kvaliteta				x						x
15. Flexibility/ Fleksibilnost		x							x	
4. Management/ Upravljanje										
16. In-plant information / Uvođenje informacija					x					x
17. Control and monitoring / Kontrola i nadzor			x							x
18. Competitiveness / Konkurentnost	x									x
19. Decision making flexibility / Fleksibilnost u donošenju odluka		x							x	
20. Purchase, sales, marketing / Kupovina, prodaja, marketing				x					x	
5. Finance/ Financije										
21. Costs of IS purchase / Troškovi kupovine IS-a		x								x
22. Costs of implementation / Troškovi primjene		x								x
23. Reduction of total costs / Smanjenje ukupnih troškova					x					x
24. Trend of income / Kretanje prihoda					x					x
25. Costs of software / Troškovi programske opreme		x						x		

Note/ Napomena: Activity/Aktivnost, 0 – very bad (vrlo loše), 1 – bad (loše), 2 – adequate (odgovarajuće), 3 – good (dobro), 4 – very good (vrlo dobro); Importance/ Važnost, 0 – not important (nevažno), 1 – little importance (mala važnost), 2 – medium importance (srednja važnost), 3 – high importance (visoka važnost), 4 – very high importance (vrlo visoka važnost)

Table 2 External risk analysis of the previous IS

Tablica 2. Analiza vanjskih opasnosti za prijašnjeg IS-a

Evaluated factors/ Ocjenjivani činitelj	Probability of appearance Vjerojatnost pojavljivanja		Importance Važnost	
	high / visoka	low / niska	high / visoka	low / niska
1. Increasing number of competitors Povećanje broja konkurenata	x		x	
2. Competitiveness/ Konkurentnost	x		x	
3. Entry of low cost foreign competitors Pojavljivanje stranih konkurenata s niskim troškovima		x	x	
4. Decreasing number of customers Smanjenje broja kupaca	x		x	
5. Unpredictable economic situation after introduction of the new currency / Nepredvidiva ekonomska situacija nakon usvajanja nove valute	x		x	

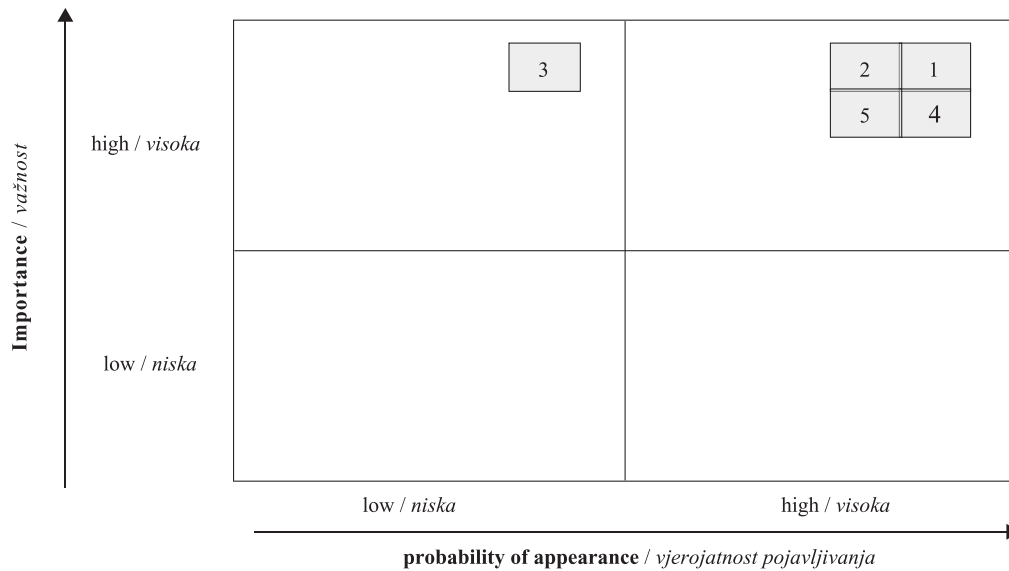


Figure 2 Threat matrix of the previous IS
Slika 2. Matrica prijatnji za prijašnji IS-i

On the basis of these risks, threat matrix has been designed according to the probability of their appearance and importance. It is given in Figure 2.

Very important factors with high probability of appearance are in the right upper quadrant. These are the most important threats that a company may face in the

near future. The company should make arrangements for minimizing them. Opportunities have also been defined that are evaluated in the next external analysis.

On the basis of the opportunities evaluation (Table 3), the matrix of opportunities has been designed (Fig. 3).

Table 3 External analysis of opportunities of the previous IS
Tablica 3. Analiza vanjskih mogućnosti za prijašnjeg IS-a

Evaluated factors / Ocjenjivani činitelj	Probability of success Vjerojatnost uspjeha		Attractiveness Privlačnost	
	high / visoka	low / niska	high / visoka	low / niska
1. Ability to find new customers / <i>Sposobnost pronalaska novih kupaca</i>	x		x	
2. Ability to reach new markets / <i>Sposobnost pronalaska novih tržišta</i>	x		x	
3. Ability to be a market leader <i>Sposobnost postizanja uloge tržišnog lidera</i>		x	x	
4. Ability of business growth after entry into Schengen area / <i>Sposobnost poslovnog napretka nakon ulaska na shengensko područje</i>		x	x	
5. Ability to improve the economic situation after introduction of the new currency / <i>Sposobnost poboljšanja ekonomske situacije nakon usvajanja nove valute</i>	x		x	

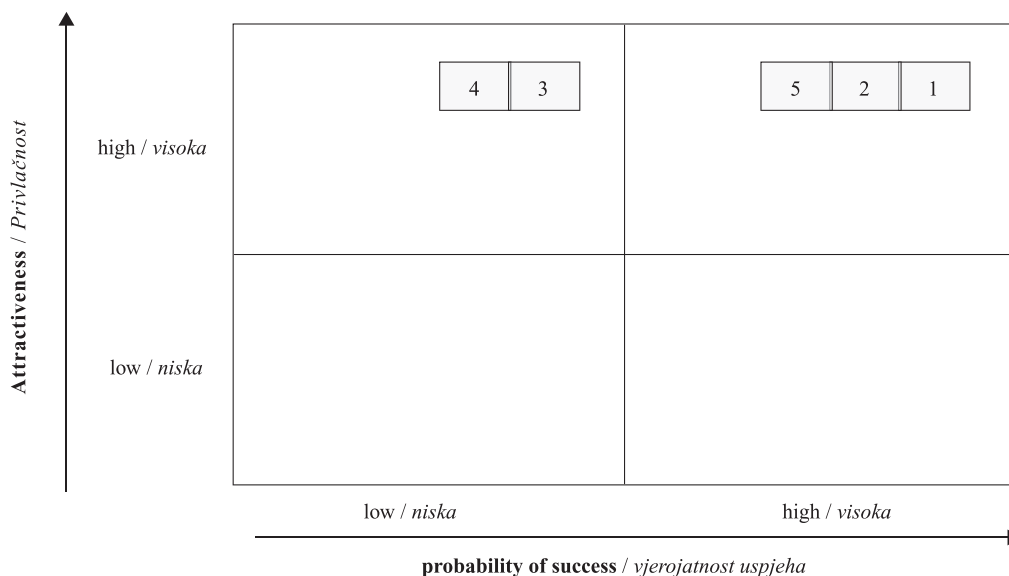


Figure 3 Matrix of opportunities of the previous IS
Slika 3. Matrica mogućnosti prijašnjeg IS-a

In right upper quadrant of opportunities matrix, very attractive and important factors for the company are presented. The company should effectively utilize these opportunities as soon as possible.

4 SWOT ANALYSIS OF THE NEW INFORMATION SYSTEM

4. SWOT ANALIZA NOVOG INFORMACIJSKOG SUSTAVA

4.1 SW (strengths and weaknesses) analyses

4.1. Analiza SW (snage i slabosti)

SW analysis is used for the definition of strengths and weaknesses of a company (Rajnoha, 2005). The strengths are: Development of IS, Technical security of IS, Communications, Maintenance of IS, Compatibility of programs, Quality of work, Company atmosphere, Faster communication, Work-time reduction, Produc-

tion costs, Technological preparation of production, Economy in production, Quality of production, Flexibility in production, In-plant information, Control and monitoring, Competitiveness, Decision making flexibility, Purchase, sales, marketing, Reduction of total costs, Trend of income.

The weaknesses are the following: Costs of IS purchase, Costs of implementation, Working performance, Costs of software.

Efforts should be focused on them so as to regulate them.

4.2 OT (opportunities and threats) analysis

4.2. Analiza OT (mogućnosti i prijetnje)

The new IS provides new possibilities of its utilization. The same opportunities and threats have been evaluated as during analysis of the previous IS (Tab. 5 and 6.). However, of course the probabilities are different.

Table 4 Analysis of strengths and weaknesses of the new IS
Tablica 4. Analiza snage i slabosti novoga IS-a

Evaluated factors / Ocjenjivani činitelj	Performance efficiency Snaga učinkovitosti					Importance Važnost				
	0	1	2	3	4	0	1	2	3	4
1. Information technology / Informacijska tehnologija										
1. Development of IS / Razvoj IS-a				x					x	
2. Technical security of IS / Tehnička sigurnost IS-a				x						x
3. Communications/ Komunikacija					x					x
4. Maintenance of IS/ Održavanje IS-a				x					x	
5. Compatibility of programs / Mogućnosti programa					x					x
2. Human resources / Ljudski resursi										
6. Quality of work / Kvaliteta posla					x					x
7. Company atmosphere / Radna okolina				x						x
8. Working performance / Radni učinak			x						x	
9. Faster communication / Brža komunikacija					x					x
10. Work-time reduction / Smanjenje radnog vremena					x					x
3. Production/ Proizvodnja										
11. Production costs / Troškovi proizvodnje				x						x
12. Technological preparation of production Tehnološka priprema proizvodnje					x				x	
13. Economy in production / Ekonomičnost u proizvodnji				x						x
14. Quality/ Kvaliteta					x					x
15. Flexibility/ Fleksibilnost				x					x	
4. Management/ Upravljanje										
16. In-plant information / Uvođenje informacija					x					x
17. Control and monitoring / Kontrola i nadzor				x						x
18. Competitiveness/ Konkurentnost					x					x
19. Decision making flexibility / Fleksibilnost u donošenju odluka				x					x	
20. Purchase, sales, marketing / Kupovina, prodaja, marketing					x				x	
5. Finance/ Financije										
21. Costs of IS purchase / Troškovi kupnje IS-a		x								x
22. Costs of implementation / Troškovi primjene		x								x
23. Reduction of total costs / Smanjenje ukupnih troškova					x					x
24. Trend of income / Kretanje prihoda					x					x
25. Costs of software / Troškovi programske opreme			x					x		

Note/ Napomena: Activity/Aktivnost, 0 – very bad (vrlo loše), 1 – bad (loše), 2 – adequate (odgovarajuće), 3 – good (dobro), 4 – very good (vrlo dobro); Importance/ Važnost, 0 – not important (nevažno), 1 – little importance (mala važnost), 2 – medium importance (srednja važnost), 3 – high importance (visoka važnost), 4 – very high importance (vrlo visoka važnost)

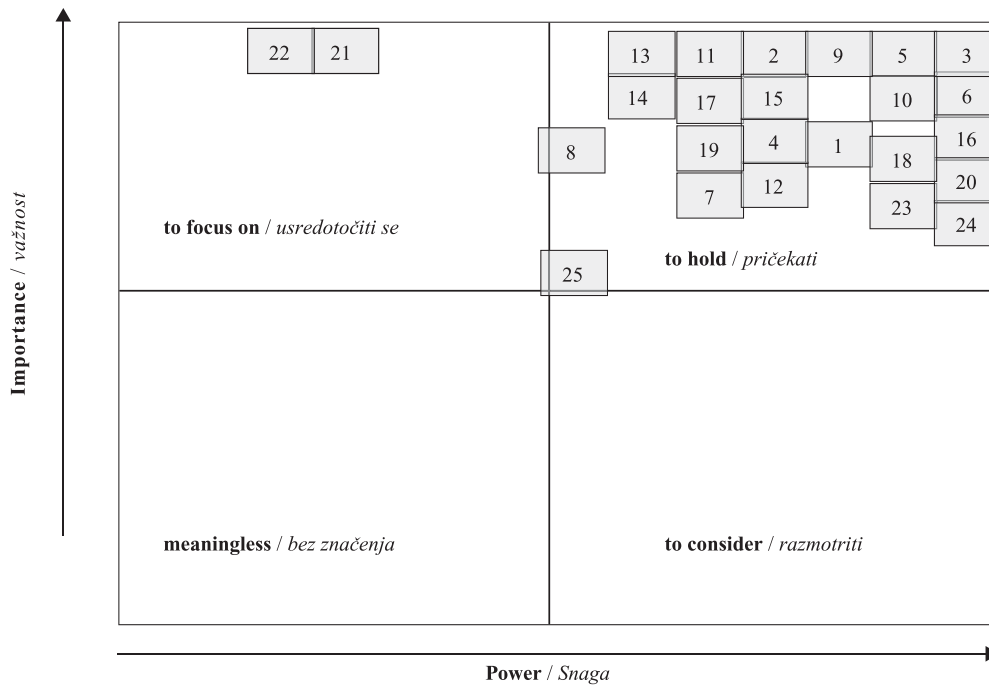


Figure 4 Matrix power – importance of the new IS
Slika 4. Matrica snaga – važnost novog IS-a

Table 5 External analysis of threats of the new IS
Tablica 5. Analiza vanjskih opasnosti novog IS-a

Evaluated factors / Ocjenjivani činitelj	Probability of appearance / Vjerojatnost pojavljivanja		Importance / Važnost	
	high / visoka	low / niska	high / visoka	low / niska
1. Increasing number of competitors / Povećanje broja konkurenata	x		x	
2. Competitiveness/ Konkurentnost	x		x	
3. Entrance of low cost foreign competitors / Pojavljivanje stranih konkurenata s niskim troškovima		x	x	
4. Decreasing number of customers / Smanjenje broja kupaca	x		x	
5. Unpredictable economic situation after introduction of the new currency / Nepredvidiva ekonomska situacija nakon usvajanja nove valute	x		x	

Evaluated threats of external analysis are presented in the matrix in Figure 5.

It is evident that the application of the new IS does not affect the threats of the company's back-

ground. In the right upper quadrant, important factors with high probability of appearance are presented. They can affect the success of the company and therefore they should be monitored.

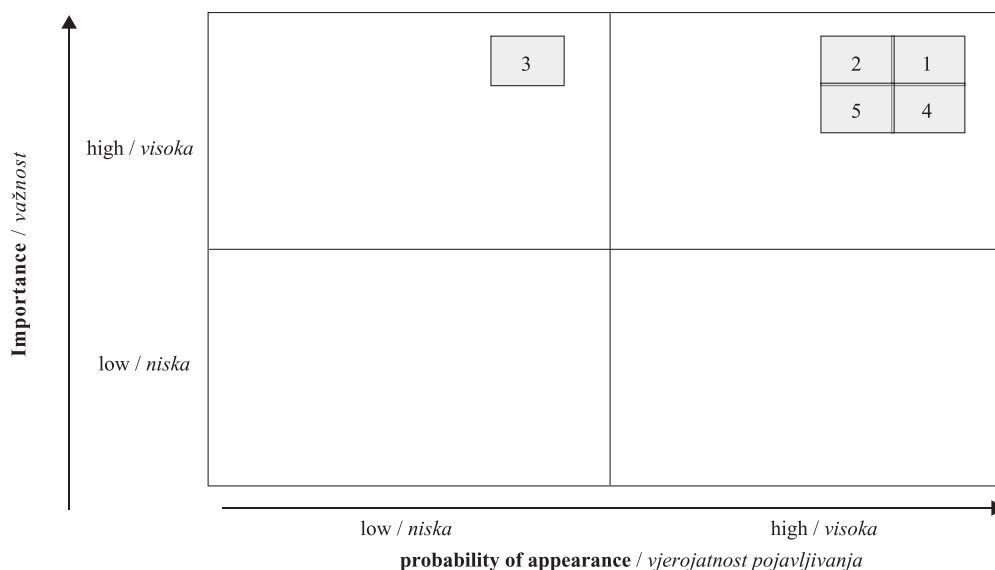


Figure 5 Matrix of threats of the new IS
Slika 5. Matrica prijetnji novog IS-a

Table 6 External analysis of opportunities of the new IS
Tablica 6. Analiza vanjskih mogućnosti novog IS-a

Evaluated factors / Ocjenjivani činitelj	Probability of success Vjerojatnost uspjeha		Attractiveness Privlačnost	
	high / visoka	low / niska	high / visoka	low / niska
1. Ability to find new customers <i>Sposobnost pronalaska novih kupaca</i>	x		x	
2. Ability to reach new markets / <i>Sposobnost pronalaska novih tržišta</i>	x		x	
3. Ability to be a market leader <i>Sposobnost postizanja uloge tržišnog lidera</i>	x		x	
4. Ability of business growth after entry into Schengen area <i>Sposobnost poslovnog napretka nakon ulaska na schengensko područje</i>	x		x	
5. Ability to improve the economic situation after introduction of the new currency / <i>Sposobnost poboljšanja ekonomske situacije nakon usvajanja nove valute</i>	x		x	

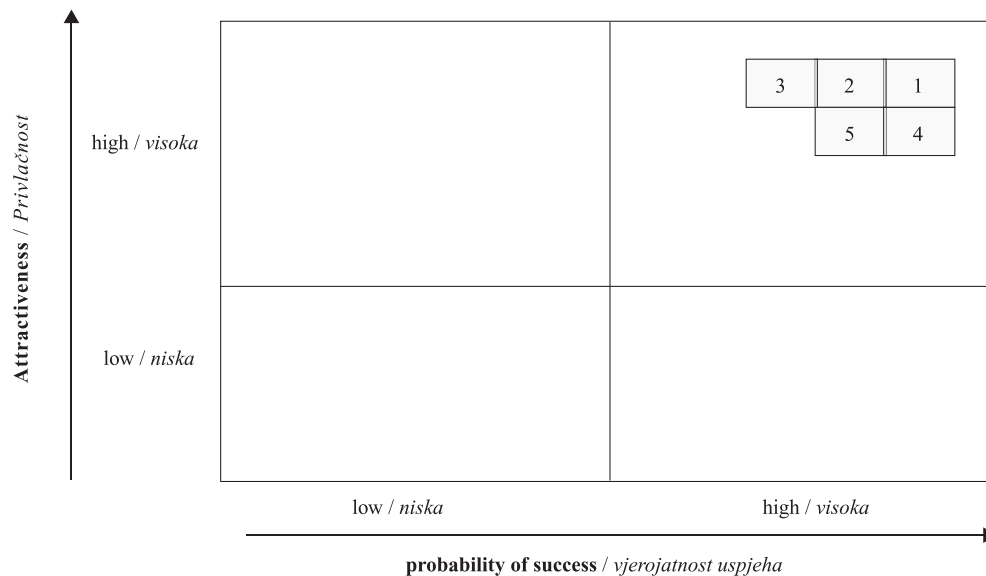


Figure 6 Matrix of opportunities of the new IS
Slika 6. Matrica mogućnosti novog IS-a

In the left upper quadrant there is one factor – entry of low cost competitors. The company has to monitor these external factors in order to avoid them in the future and to strengthen its position in the market.

The opportunities are evaluated by external analysis. Then they are inserted in the matrix of opportunities (Fig. 6).

By the application of the new IS, it will be possible to seize many market opportunities. All evaluated factors are in the upper right quadrant. All these factors are highly attractive for the company with a high probability of success.

5 COMPLEX SWOT ANALYSIS

5. SLOŽENA SWOT ANALIZA

By the combination of SW and OT analysis, a complex SWOT analysis is obtained. It shows and quantifies strengths and weaknesses, opportunities and threats.

Absolute values have been designed in this way.

1. SWOT analysis of the previous IS (Tab. 7)

SWOT analiza prijašnjeg IS-a

Strengths/jakosti – weaknesses/slabosti = 57 – 56 = / 1 /

Opportunities/mogućnosti – threats/prijetnje = 16 – 23 = / -7 /

2. SWOT analysis of the new IS (Tab. 8)

SWOT analiza novog IS-a

Strengths/jakosti – weaknesses/slabosti = 86 -19 = / 67 /

Opportunities/mogućnosti – threats/prijetnje = 21 – 19 = / 2 /

The reached results have been designed in SWOT matrix as presented in Figure 7. The strategy has also been defined of both Information Systems. This strategy determines ranking into one of 4 quadrants according to prevailing features of IS.

The SWOT analysis of the previous IS shows that this system needed changes and it is good that the company decided to perform these changes.

6 CONCLUSIONS

6. ZAKLJUČCI

On the basis of the SWOT matrix, WT (weaknesses, threats) strategy has been defined as divestment and defensive strategy. So, the matrix also confirms

Table 7 Evaluation of SWOT analysis for the previous IS
Tablica 7. Ocjena SWOT analize za prethodni informacijski sustav (IS)

Strengths of the company / Jakosti tvrtke		Weaknesses of the company / Slabosti tvrtke	
Technical security of IS / Tehnička sigurnost IS-a	4	Development of IS / Razvoj IS-a	5
Compatibility of programs / Kompatibilnost programa	5	Maintenance of IS / Održavanje IS-a	5
Quality of work / Kvaliteta rada	5	Technological preparation of production / Tehnološka priprema proizvodnje	5
Production costs / Troškovi proizvodnje	4	Flexibility in production / Fleksibilnost u proizvodnji	3
Quality of production / Kvaliteta proizvodnje	4	Competitiveness / Konkurentnost	5
In-plant information / Uvođenje informacija	5	Communication / Komunikacija	5
Purchase, sales, marketing / Kupovina, prodaja, marketing	5	Working performance / Radni učinak	4
Company atmosphere / Radna okolina	4	Costs of IS purchase / Troškovi kupovine	5
Faster communication / Brža komunikacija	4	Costs of implementation / Troškovi implementacije	5
Reduction of total costs / Smanjenje ukupnih troškova	5	Costs of software / Troškovi programske opreme	5
Economy in production / Ekonomičnost u proizvodnji	3	Decision making flexibility / Fleksibilnost u donošenju odluka	4
Trend of income / Kretanje prihoda	5	Work-time reduction / Smanjenje radnog vremena	5
Control and monitoring / Kontrola i nadzor	5		
Total / Ukupno	57	Total / Ukupno	56
Opportunities / Mogućnosti		Threats / Prijetnje	
Ability to find new customers / Sposobnost pronalaska novih kupaca	4	Increasing number of competitors / Povećanje broja konkurenata	5
Ability to reach new markets / Sposobnost pronalaska novih tržišta	3	Competitive force / Konkurentna snaga	5
Ability to be market leader / Sposobnost postizanja uloge tržišnog lidera	2	Appearance of competitors in the market / Ulazak na tržište konkurentnih tvrtki	3
Ability of business growth after entry into Schengen area / Sposobnost poslovnog napretka nakon ulaska na schengensko područje	4	Decreasing number of customers / Smanjenje broja kupaca	5
Ability of improving economical situation after new currency adoption / Sposobnost poboljšanja ekonomske situacije nakon usvajanja nove valute	3	Possibility of degradation in case of using new currency / Mogućnost propadanja u slučaju primjene nove valute	5
Total / Ukupno	16	Total / Ukupno	23

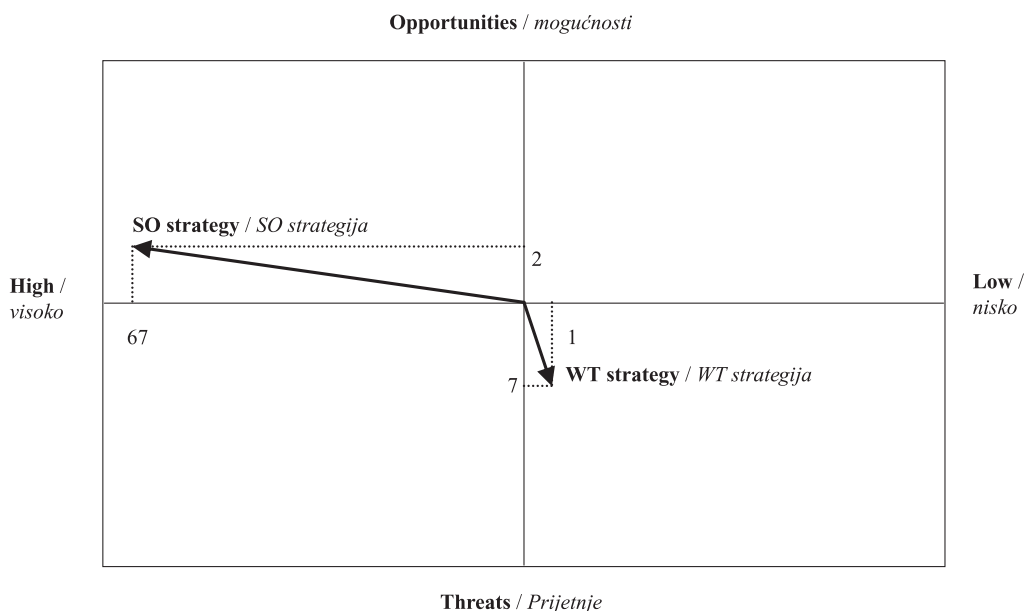


Figure 7 SWOT matrix
Slika 7. SWOT matrica

Table 8 Evaluation of SWOT analysis for the new IS

Tablica 8. Ocjena SWOT analize novog IS-a

Strengths spots of company / Snage tvrtke		Weak spots of company / Slabosti tvrtke	
Technical security of IS / Tehnička sigurnost IS-a	4	Working performance / Radna učinkovitost	4
Compatibility of programs / Kompatibilnost programa	5	Costs of IS purchase / Troškovi kupnje IS-a	5
Quality of work / Kvaliteta posla	5	Costs of implementation / Troškovi primjene IS-a	5
Production costs / Troškovi proizvodnje	4	Costs of software / Troškovi programske opreme	5
Production quality / Kvaliteta proizvodnje	4		
In-plant information / Uvođenje informacija	4		
Purchase, sales, marketing / Kupovina, prodaja, marketing	4		
Company atmosphere / Radna okolina	3		
Faster communication / Brža komunikacija	3		
Reduction of total costs / Smanjenje ukupnih troškova	5		
Technological preparation of production Tehnološka priprema proizvodnje	4		
Work-time reduction / Skraćivanje radnog vremena	4		
Competitiveness / Konkurentnost	5		
Maintenance of IS / Održavanje IS-a	4		
Communications / Komunikacija	5		
Production flexibility / Fleksibilnost proizvodnje	3		
Economy in production / Ekonomičnost proizvodnje	3		
Development of IS / Razvoj IS-a	5		
Decision making flexibility Fleksibilnost u donošenju odluka	4		
Trend of income / Kretanje prihoda	5		
Control and monitoring / Kontrola i nadzor	3		
Total / Ukupno	86	Total / Ukupno	19
Opportunities / Mogućnosti		Threats / Prijetnje	
Ability to find new customers Sposobnost pronalaska novih kupaca	5	Increasing number of competitors Povećanje broja konkurenata	4
Ability to reach new markets Sposobnost pronalaska novih tržišta	5	Competitive force / Konkurentna snaga	4
Ability to be market leader Sposobnost stjecanja uloge tržišnog lidera	3	Appearance of competitors in the market Ulazak na tržište konkurentnih tvrtki	3
Ability of business growth after entry into Schengen area Sposobnost poslovnog napretka nakon ulaska na schengensko područje	5	Decreasing number of customers Smanjenje broja kupaca	5
Ability of improving the economic situation after introduction of the new currency / Sposobnost poboljšanja ekonomske situacije nakon usvajanja nove valute	3	Possibility of degradation in case of using new currency Mogućnost propadanja u slučaju primjene nove valute	3
Total / Ukupno	21	Total / Ukupno	19

that the company did its best when it decided to improve its previous IS.

The second SWOT analysis of the new IS shows the improvement in the company's performance. By the SWOT matrix, SO (strengths, opportunities) strategy has been defined for the new IS, meaning offensive and developing strategy. This strategy focuses on strengths of the company and it uses opportunities from the environment.

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