BUSINESS SUCCESS PREDICTION MODELS IN TEAM SPORTS OF FOOTBALL, BASKETBALL, HANDBALL AND VOLEYBALL

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Abstract

The research results of global trends of sport in Europe and the world specified the crossroad of sport in Europe in 2002. The chosen ways were various, but all of them that accepted similar to „business approach", based on management, were successful. Keeping in mind such trends, the focus of this research is directed towards sport organization management models (football, basketball, volleyball and handball organizations of Sarajevo Canton during 2003/04 Season) on the aspect of organization process – sport as a business. Using multiple regression analysis, actually, stepwise method of predictor inclusion in prediction model, the model of business success prediction was objectified and confirmed. According to this model it is possible to reliably design and develop management models of sustainable development of team sports. Within a frame of this statistical procedure, coefficients of multiple correlations and regression (beta) coefficients were calculated, as well as the levels of their significance and the selection of variables that most contribute to its prediction was conducted. Based on percentage value of described criteria determinacy variance it was concluded that model 4 presents business success prediction model of sport organizations/clubs of team sports (football, basketball, volleyball and handball) in Sarajevo Canton during 2003/04 Season. According to results of analysis it was determined that scientific model of sport success prediction has valuable predictive power considering the sum of total variances explained in ambient conditions of external environment which confirms scientific basis of designing and objectifying prediction models.

Key words*: design, prediction, model, business success*

Introduction

Different public will direct their different views, demands and expectations towards sport organizations where they recognize their goals and because of that the management of sport organization will have different concepts of their balance. For example; Board of directors will balance the implementation of its objectives sought in the sphere of profit and value creation of sports. Managers will set goals in sphere of profit and specific sport results, coaches-managers will set goals in top sport results, athletes in sport results and income, amateurs-volunteers in satisfying their needs, employees in working conditions and income, sports public (fans) in sport quality and success, business partners in quality of sport service and timely payment, social community – public authorities in care for people and their needs… Research-methodological frame in this work is based on appliance of scientifically objectified methodology of model creation of business success prediction for team sports of Sarajevo Canton in 2003/04 Season (football, volleyball, basketball and handball) by which, within the framework of these sports, we reach sustainable development on the market. Such methodology of sports success prediction model could have wider application to other sports organizations in Bosnia and Herzegovina and surrounding countries.

Problem and the aim

The research refers to appliance of modern design approach and process of innovation, according which we analyze management model structures and estimate quality management system of sports organizations aimed at sustainable development of football, basketball, volleyball and handball. The goal of this research is design and implementation of methodology evaluation of management structure model and model of business and sport success prediction based on result generalization of analyzed team sport clubs of Sarajevo Canton in 2003/04 Season. These sports are able to achieve financially sustainable development in the system of competition on the Canton, international, Europe and world level.

Methods

The sample of respondents for this research was defined as the cluster of 62 analyzed team sport clubs (football, basketball, volleyball and handball) in Sarajevo Canton during 2003/04 season, which were previously determined to have high level of marketing and entrepreneurial potential (Mašala, 2002). The following 46 generically significant segment variables were analyzed for this research: Percentage of club advertisement income expressed in money (PRREKL), percentage of club donation income

expressed in money (PRDONAC), percentage of club budget income expressed in money (PRBUDZ), percentage of planned club requirements expressed in money (FINPOT), percentage of totally realized financial craft expressed in money (FINOBRT), percentage of club ticket selling income expressed in money (PRULAZN), percentage of club's TV broadcast income expressed in money (PRTVPREN), percentage of club's player compensation income (PROBTAKM), percentage of club's membership income (PRCLANR), percentage of club's sponsorship income (PRSPONZ), percentage of club's facility renting income (PRTEREN), percentage of club's equipment renting income (PROPREM), percentage of club's business entity income (PRPOSUBJ), percentage of private fund income engaged in the club expressed in money (PRLSREDS), percentage of club's other income (PROSTAL), president of sports organization (PREDS), director of sport organizations (DIR), sport's organization consultant (KONS), sport's organization general assistant (GSEK), sport's organization sports director (SPDIR), sport's organization marketing and public relations director (DMPTP), sport's organization scout team manager (MENG), Head of facility maintenance dep. (SEFOD), Head of Professional staff dep. (SSTAB1), coach A (TRENA), coach B (TRENB), coach C (TRENC), team leader of the youth (TLOP), sport school team leader (TLSS), Head of monitoring department (SEFOM), number of officially held sport events – senior men (ZVMANSM), officially held sports events totally – senior women (ZVMANSZ), number of officially held sports events – junior women (ZVMANJZ), number of officially held sports events – cadets men (ZVMANKM), number of officially held sports events – seniors (UKZMANS), attendance by one official event (POSJECEN), number of TV announcements (TVOBJ), number of TV commentaries (TVKOM), number of TV broadcasts (TVPREN), number of radio announcements (RDIOOBJ), number of radio commentaries (TVKOM), number of radio broadcasts (RADIOPREN), number of newspaper announcements (NOVINOBJ), number of newspaper commentaries (NOVIKOM), titular about right to dispose property (TPRVLAS), number of professional staff engaged totally (UBSTRK), number of engaged licensed professional staff totally (UBSKLIC) and business success (POUSP). With the aim to determine and objectify model of business success we applied multiple regression analysis procedure, actually, stepwise method of predictor inclusion in prediction model. Within this statistical procedure, the coefficients of multiple correlations and regression (beta) coefficients were calculated, as well as the levels of their significance and the selection of independent variables that most contribute to its prediction was conducted.

Results and discussion

Statistically significant parameters of multiple correlation predictor variables, essential for selection of business prediction model are presented in a table 1. According to multiple regression analysis four (4) statistically significant multiple correlations were noted and four (4) different variable combinations of business success predictors. Among them the biggest predictive power (expressed through absolute value of R-coefficient) demonstrates model 4 (R=705) which involves predictor variables: coach B (TRENB), president (PREDS), donation income (PRDONAC) and ticket selling income (PRULAZN). According to the size of multiple correlation coefficient, number of predictors and how big prognosis error is, we can conclude that model 4 shows the biggest predictive power considering it has four (4) significant predictor involved variables.

The basic standpoint for accepting model 4 as a model of business success prediction is its economy in terms of passing responsibility and efficiency in certain processes of managers, which is also confirmed by predictor variables of president and coach B. Such management structure averagely influences financial functioning of model 4 and is additionally confirmed with variables donation income and ticket selling income. Combination of predictor variables in model 4 is considered as the most optimal predictor alternative, which helped us to select this model for further analysis as a possible model of business success prediction.

The combination of predictive variables, model number 4 reflects the economics of sports organizations of team sports such as football, basketball, volleyball and handball in the Sarajevo Canton during 2003/04 Season especially in the absence of human resources which confirms their typo specific hierarchy (pyramidal) management structure of professional type of organization configuration which is innovative. In current practice they were quite frequent and they present peculiar environment where these sports organizations make their income. Testing of multiple correlation coefficient statistical significance R was conducted with appliance of univariate variance analysis ANOVA (table 2). The results of ANOVA analysis confirmed statistical significance of multiple correlations through F-test (ratio) values expressed with correlation of regression and residual variance (prognosis error variance). According to values and levels of t-test significance we determined the significance of standardized beta-coefficients that indicate variable criteria with the unit of value change in only one predictor, while other predictors are controlled or constant table 3.

Table 1. Multiple regression analysis parameters of business success prediction model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,564 a	,318	,307	26,06	,318	27,52	1	59	,000
2	,634 b	,402	,382	24,60	,084	8,19	1	58	,006
3	,675 c	,456	,427	23,68	,053	5,58	1	57	,022
4	,705 d	,497	,461	22,97	,041	4,59	1	56	,037

a. Predictors: [Constant], TRENB
b. Predictors: [Constant], TRENB, PREDS
c. Predictors: [Constant], TRENB, PREDS, PRDONAC
d. Predictors: [Constant], TRENB, PREDS, PRDONAC, PRULAZN

Table 2. Univariate variance analysis – ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18682,457	1	18682,457	27,518	,000 [a]
	Residual	40055,528	59	678,907		
	Total	58737,986	60			
2	Regression	23639,457	2	11819,728	19,532	,000 [b]
	Residual	35098,529	58	605,147		
	Total	58737,986	60			
3	Regression	26770,994	3	8923,665	15,912	,000 [c]
	Residual	31966,991	57	560,824		
	Total	58737,986	60			
4	Regression	29190,515	4	7297,629	13,831	,000 [d]
	Residual	29547,471	56	527,633		
	Total	58737,986	60			

a. Predictors: [Constant], TRENB
b. Predictors: [Constant], TRENB, PREDS
c. Predictors: [Constant], TRENB, PREDS, PRDONAC
d. Predictors: [Constant], TRENB, PREDS, PRDONAC, PRULAZN
e. Dependent Variable: POUSP

Table 3. Regression (dependent Variable POUSP)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	29,75	6,964		4,272	,000
	TRENB	41,62	7,933	,564	5,246	,000
2	(Constant)	,00	12,300		,000	1,000
	TRENB	29,72	8,567	,403	3,469	,001
	PREDS	41,65	14,553	,332	2,862	,006
3	(Constant)	,00	11,841		,000	1,000
	TRENB	28,87	8,255	,391	3,497	,001
	PREDS	34,65	14,320	,276	2,419	,019
	PRDONAC	,41	,174	,239	2,363	,022
4	(Constant)	,00	11,485		,000	1,000
	TRENB	25,67	8,145	,348	3,151	,003
	PREDS	35,05	13,892	,280	2,523	,014
	PRDONAC	,39	,170	,225	2,292	,026
	PRULAZN	1,50	,698	,208	2,141	,037

Based on coefficient values presented relative predictor value was determined in a prediction model 4. According to results of beta coefficient predictor value, relative and standardized significance of each predictor within each prediction model was estimated. Analysis of results determined the biggest significance and contribution to business success prediction has coach B variable (TRENB).

Determination of percentage participation of each of the predictors in model 4 was conducted based on product value Pearson correlation prediction coefficient table 4 and values of standardized beta predictor coefficient presented in table 3. The value of Pearson's predictor coefficient correlation in model 4 and business success variables (POUSP) were presented in table 4.

Table 4. Pearson's correlation coefficients of model 4 and business success

	POUSP
POUSP	1,000
TRENB	,564
PREDS	,528
PRDONAC	,373
PRULAZN	,332

Correlation coefficient results served the purpose of further business success prediction model analysis in the following table where we have derived values of variance determination percentage, which describes the role of specific predictors included in selected optimal prediction model – model 5. Percentage values were derived from beta coefficient and Pearson's correlation coefficient and calculated according to form:

Percentage of described criteria variance = beta coefficient x Pearson r x 100 (%)

The way of deriving described percentage values from beta coefficient and Pearson's correlation coefficient as well as percentage variance values of model 4 and certain predictors is presented in table 5.

Table 5. Model 4 – business success model

Predictor	R	St. BETA	Described (%)
TRENB	0,564	0,348	19,63
PREDS	0,528	0,280	14,78
PRDONAC	0,373	0,225	8,40
PRULAZN	0,332	0,208	6,90
Total (%)			49,71

According to percentage value of described criteria determination variance we can conclude that **model 4** presents a for team sports organizations /clubs such as, football, basketball, volleyball and handball of Sarajevo Canton during 2003/04 season and it was described with 49,71 % of total variance. The biggest percentage contribution of 19, 63 % of explaining has variable coach B (TRENB).

Such phenomena explaining the total percentage of variance reflects economic behaviour of sports organizations due to absence of human resources when there is a need to conduct multiple functions of one person, which means this person could, at the same time, serve as a head of professional staff, coach B and C or some other management combination depending on need and economics of sports organizations/clubs.

This additionally confirms typo specific hierarchy (pyramidal) management structure of professional type of organization configuration which is innovative in team sports such as football, basketball, volleyball and handball in Sarajevo Canton. The prediction model of business success in predictor variable president (PREDS) occurs 14.78% of the totally explained variance.

The product of such percentage implication comes as a result of a complex president's function in sports organization. He is responsible for management and public appearance (model of manager's roles, Mintzberg, 1989) which reflects through resource of president's personal reputation ensuring financing particularly emphasizing targeted public market and market of public authorities (government as targeted market) in order to create income out of donations and funds from the budget. Its confirmation comes from described predictor variable variance income from donations (PRDONAC) which is 8, 40% and presents significant financial income of sports organizations which was confirmed in all analysis of this work.

Percentage of described variance predictor variable; income from ticket selling (PRIHULAZ), which is 6, 90% of totally explained variance, indicates that majority of team sports organizations (football, basketball, handball and volleyball) on the market own an image, attractiveness and resource reputation through historical sport success. Comparing previous researches, this percentage is growing in Sarajevo Canton. Public largely supports launching of the main sports product on the market by reconstructing and modernizing sports facilities in Sarajevo Canton and also improves quality of public sports media. Percentage of predictor variable contribution to business success model was presented in Chart 1.

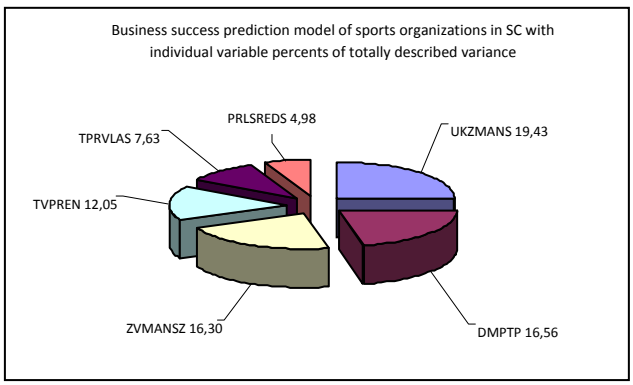

Chart 1. Business success prediction model of sports organizations in Sarajevo Canton with individual variable percents of totally described variance.

Conclusion

With this research we confirmed formation of innovative, scientific – methodological frame of objectifying management model of team sports organizations (football, basketball, volleyball and handball) in Sarajevo Canton that can be basic for conclusions of other type of sports organizations (locally and wider) in order to achieve successful business and sports results, sustainable development on the market as well as additional scientific contribution to innovative management.

According to statistical significance of totally described variance percentage for business success model and included predictors it is possible to predict appliance of business success model in environmental conditions of external environment. With the results of conducted analysis we confirmed scientific basis of presented prediction model of business success, and we can conclude that with designing scientific management models of sustainable development sports organizations, we are creating environment for bigger investments in sports and thus empower their mission.

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MODELI PREDIKCIJE POSLOVNOG USPJEHA TIMSKIH SPORTOVA NOGOMETA, KOŠARKE, RUKOMETA I ODBOJKE

Sažetak

Rezultati istraživanja globalnih trendova razvoja sporta u Europi i svijetu, ukazuju da je u razdoblju do 2002. godine sport u Europi došao do raskrižja. Putovi za skretanje su različiti, ali svi oni koji su usvojili pristup 'sličan biznisu', temeljen na zvučnom menadžmentu, imaju uspjeha. Imajući u vidu takve trendove fokus ovog istraživanja usmjeren je na modele menadžmenta sportskih organizacija nogometnih, košarkaških, rukometnih i odbojkaških sportskih organizacija Kantona Sarajevo u natjecateljskoj sezoni 2003/04. sa stanovišta organizacijskih procesa sporta kao biznisa. Uz pomoć postupka Multivarijantne regresijske analize, step-wize metode inkluzije prediktora u model redukcije, objektiviziran je i potvrđen model predikcije poslovnog uspjeha na temelju kojega je moguće s velikom pouzdanošću projektirati i razvijajati modele menadžmenta sportskih organizacija održivog razvoja timskih sportova. U okviru ovog statističkog postupka izračunati su koeficijenti multiple korelacije, razine njihove značajnosti, regresijski (beta) koeficijenti i proveden odabir varijabli koje najviše doprinose njihovoj predikciji. Na osnovu vrijednosti postotka objašnjene varijance kriterija determinacije konstatirano je da model 4 predstavlja model predikcije poslovnog uspjeha sportskih organizacija/klubova timskih sportova nogometa, košarke, rukometa i odbojke Kantona Sarajevo za sezonu 2003/04. Na temelju rezultata analize utvrđeno je da znanstveno utemeljeni model predikcije sportskog uspjeha ima značajnu prediktivnu moć uzimajući u obzir količinu ukupno objašnjene varijance u ambijentalnim uvjetima eksternog okruženja čime se potvrđuje znanstvena zasnovanost projektiranja i objektiviziranja predikcijskih modela.

Ključne riječi*: projektiranje, predikcija, model, poslovni uspjeh*

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