

# STUDY ON FORECASTING AND PREDICTION, THEIR ROLE AND IMPORTANCE IN SPORTS TRAINING HIGH PERFORMANCE

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**Abstract:** *Forecasting and prediction are among the important elements of management training high performance athletes. The work was done in order to present the most important theoretical concepts related to forecasting and prediction, concepts used in all fields and can be adapted and implemented successfully in sports training. If athletic training was planned and organized properly, the results are obtained more easily. Thus, we can achieve outstanding performance with lower costs, if the purpose is correctly estimated, this will increase training effectiveness. That forecasts are necessary for planning, scheduling and controlling of sports activities in order to increase efficiency and achieve desired training performance.*

**Key words:** *technique forecasting, prediction, training, high performance.*

## 1. Introduction

For further clarity approaches are needed some clarifications on the concepts of forecasting and prediction. The term forecasts makes reference to use of the data entered for the purpose of determining future events and is done by peer review and calculations objectives.

Forecasting leads to an estimate of upcoming events and is carried out by combining systematic and extrapolating data about the past in a way it already established.

The term prediction makes reference to subjective estimates of the future and "is the estimation of the event which will take place in the future, is carried out through the analysis and subjective considerations, other than data entered; the analysis is

carried out in a manner which is not pre-determined" [3]. In Explanatory Dictionary of Romanian language [9] and in Dictionary of synonyms, [8] prediction is synonymous with omen.

## 2. Material and methods

The aim of the experiment is to demonstrate that the athletic training was planned and organized properly, the results are obtained more easily and the performances increasing.

For the purposes of the research approach was used the bibliographical study method, theoretical analysis and synthesis of information. [2] The primary method used in research was longitudinal observation [7] (evolution of the principal means used during training and competition), in order

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to gather data and information on previous training athlete for a period long enough. Thus, we resorted to direct observation, natural, made under normal conditions, which aimed to capture some aspects regarding the athlete general behavior, and conditions of race walking high performance specific activities.

### **2.1 Forecast models used in practice of the high-performance sports**

In the forecasting of high performance sport training, the techniques were grouped in qualitative models, quantitative models and causal models [3]. The following are some theoretical concepts related to some theoretical concepts relating to forecast models used in all of the areas of activity, and that can be implemented successfully in sports activity.

- Qualitative Models

Delphi technique is a technique of qualitative forecasts, in which a group of experts, the different bands, working separately, and do not meet, reach a consensus by summarizing ideas by a coordinator with experience. Two doctors, a coach, an informatician, an engineer, may form a group of experts, which to formulate each have a forecast linked to its scope, but with applicability for sports practice. The supervisor must be so experienced that they can to build efficient statements various and to constitute a lot of trouble-structured and to formulate a forecast.

Nominal Group Technique it's a qualitative forecasting technique, in which a group of experts (coaches, nutritionists, physicians, psychologists, sponsors) work together in a meeting and reach a consensus through discussion and ranking of some ideas.

- Quantitative models are those models which use previous data (historical) to calculate an average value of earlier

applications. In general, this average is used then as forecast. In sports training it is very important in predicting the volume of training stages, taking into account the previous volume. A few methods of these arithmetical calculation are as follows:

- Simple average - the average applications marked in all periods prior; applications in all the periods are weighted evenly. The method wishes to find the model general education or central tendency of the volume effort, in the case presented in the last three years of training.

- Easy mobile Media - combines data relating to the application of the most recent periods, resulting in their media forecast for the period which follows.

- Moving average weighted - method of calculation on the average which allows different weighting of old applications.

If it aims to establish the racewalker somatically profile, which must be properly with the model of future olympic champion or world. In that case it will have to be within the values of anthropometric indicators (height, scale, length lower limbs, biacromial diameter) of athletes who held supremacy in international competitions in previous Olympic cycles. It can make use of all the three variants of calculation or the one that appears to be more suitable for the indicators to be taken into account.

- Causal models forecast

Regression analysis represents a causal model forecast in which, for historical data, a functional relationship between variables, that is subsequently used to forecast the values of dependent variables. Causal models are often more expensive to deploy and does not provide desired for forecasting accuracy in the short term, required by many times the drivers of clubs and sponsors.

Qualitative forecast models are used, usually, for long-term planning, in preparation of the plan in perspective for

one or even two Olympic cycles. Causal forecast techniques are especially useful in planning for the medium term, in the annual schedule of preparation and in the plan of preparing the stage or week cycle.

### 3. Results and Discussions

From the foregoing, it is clear that the forecasts may be only if there is a record of the data in the past. Forecasting requires statistics techniques, basics of the science of management and requires a record showing the content training carried out in the previous step. In the case prediction in sports activity, the estimates correct, subjective, is based on skills, experience, the logic and coach intuition. Generally, when we speak of forecasts, is taken into account a combination of forecast and prediction.

In the provision of training of high-performance athletes, not always the error of forecast may not be expressed in numeric values. It can be reached, however, for example, to differences in the timing, number of repetitions in a training session, number of hours of training, kilometers travelled to a specific intensity. In the field of management of current forecast, are dominant two approaches for witted: intuitive estimates of the future and formal statistical modelling.

Intuitive approach, which is based on experience, it is usually a summary of coach's assumptions, judgments misgivings and reasons related to the future events. Statistical modelling approach combines systematically certain numerical data; it converts into a value summary, subsequently used as forecast.

In the statistical approach, there are two basic models which differ depending on the type of data used and can be successfully used in high performance sports training:

- models based on request are use in

modelling only historical data related to the item for which forecast is made. For example, if it is necessary to forecast of performing times sports to certain control samples, the model based on request, requires data related to the processing times entered obtained said testing, comparing them;

- causal models can also use additional types of data. For example, considering the obtained times on certain distances, it may consider data on the frequency of competitions, the conditions of preparation and providing training. The following may be established certain relations between the results obtained in control samples and additional data considered. As examples, in the likely level of performance they will get future Olympic title in the women's 20 km walking, will analyze dynamic performances obtained at the last Olympic Games, as well as at European and world championships. It will also consider real data that led to these performances, such as: weather conditions, route profile, and the surface route that competition was held. At the 2008 Olympic Games in Beijing, for instance: walking race samples have been carried out on a synthetic surface, very fast, which resulted in some very good performance. All of these data have a word to say in obtaining the future olympic title.

It is possible to estimate the long-term overall performance athlete or estimates in the short term for each stage of preparation or participation in competitions. It is elaborates the main objectives of the training and performance of the training process and training tasks [5].

For athletic samples, so in tests of race walking, are necessary even estimates in more detail for the volume and the intensity of training means, for the methods of training, for the venues of training, for participation in competitions and even for the performance to be

achieved in these competitions [1]. These estimates will be recorded in the annual schedule of preparing, at the season's beginning.

It can distinguish between several types of foresight needs if account is taken of the degree of concentration in the future. Detailed estimates of the means of preparation, those listed above to which we can add and others are used in the planning in the short term that is for implementation of the training annually plans.

Global projections are used for planning capacity and preparedness framework on a much longer time. Such a forecast, and generally relate to a period of four years, the final objective for the Olympic will participate in an account of other important competitions (World and European Championships). Nicu A. and al. [4] considers that this type of global forecast is the most difficult to be carried out, taking into account the fact that they relate to the perspective for preparing for a prolonged period of time, activity particularly complex, in which a slight error may cause uncontrollable consequences and even harmful, in meeting the objectives. To devise such a plan of training it is necessary to take into account the size and quality of the information received, stored, processed and analyzed, information which will be used to predict performance with which would have been obtained, for example, the future Olympic title. Also, there will be elaborated the model of future Olympic or world champion, with reference to the indicators morphological, physiological, biochemical, bio motives, psychological and ultimately will be the training model.

After Ruggero Salla [6] walking means training are divided in two categories: principal means and secondary means. The

principal means of training include those exercises directly addressing to technical execution and specific muscle development. Among those consecrated remember the following: continuous walking in uniform tempo; continuous walking in varied tempo; repeated walking distance; walking tempo contest performed; slope walking.

The example shown below refers to the preparation athlete C. D., in the period from 2001 to 2002, for previewing preparation in the year 2003. It is stated that C. D. has been part of the Romanian Olympic team athletics, for the participation in the Olympic Games in Athens. From need to have a unified vision on the characteristics of athlete training, they resorted to the daily exercise recording, during the period October 2001 to August 2002, and then they made monthly totals, expressed in units of measurement specific to each means of preparation. (table 1) The next step was made in order to transpose the data of training in tabular form, operation following which it is possible a holistic view, express and fast.[10] In this respect, has been travelled since following the steps below:

- setting up a database comprising means of preparation used and performance obtained from the important competitions in the years of preparation 2001-2002;
- data analysis results of the plans in the preparation and performance obtained in this period;
- correct assessment of these data, ways to improve the management of the data base;
- implementation of the plan in preparation for 2003, on the basis of the data above. (table 2)

*Analysis of training means in 2001 – 2002*

Table 1

The main competition Principal means used / year [km]				c.n. 12:43				C. B. 1:36.				C. N. 1 :36			C. m. 1 :35	total
	2001 Nov	2001 Dec	2002 Jan	2002 Feb	2002 Mar	2002 Apr	2002 MaY	2002 JunE	2002 JulY	2002 Aug	2002 Sep	2002 Oct				
Running	204	263	380	164	310	200	336	315	175	306	220	90	2962			
Volume Walk	-	60	230	160	231	213	278	290	148	394	300	135	2500			
Walk lasting	-	-	128	28	45	70	91	70	13	47	10	52	552			
Walk tempo I	-	50	80	77	110	62	83	81	53	237	128	62	968			
Walk tempo II	-	5	-	38	64	56	87	98	40	78	125	-	648			
Walk tempoIII	-	-	-	25	40	30	40	30	-	-	-	10	165			
Walk repetitions	-	-	-	6	-	-	-	17	7	20	20	11	80			
Walk launched	-	-	8	8	16	15	8	14	12	12	17	-	126			
Walking gradient	-	5	14	3	12	10	9	9	6	-	-	1	63			
Total [km]	204	323	610	324	561	413	614	605	323	700	520	235	5587			

Below are presented specify performances obtained at the most significant competitions in the year that was analyzed. Thus, they are the following:

- 20.04. Balkan Championship, 20 km, 1.36.40 place I II;
- 14.07. National championships, 20 km, 1.36.50 place I youth, and III seniors ;
- 15.09. National championships (seniors and youth), 10 km, 43.30 Personal best ;
- 12-13.10. Walking World Cup 20 km, 1.35.38 place 26 individually and place III with Romanian team.

In the same manner they was made the table for the other year of preparation. Information derived from these tables study served as a basis for departure in the performance model, for the purposes of determining workloads specific to each means of training in the year 2002-2003. By analyzing the data obtained, was performed the forecasting training model, materialized through the preparedness training plan for year 2002 – 2003, shown in Table 2.

*The forecast means preparation for the year 2002 - 2003*

Table 2

The main competition Principal means used / year [km]			c.n. 12:32			C.E. 1 :38	C. I. 1 :32	c.m 36.0			total
	2002 Dec	2003 Jan	2003 Feb	2003 Mar	2003 Apr	2003 May	2003 Jun	2003 July	2003 Aug		
Running	438	335	226	306	246	190	188	235	156	2410	
Volume Walk	50	351	289	408	384	363	293	385		2892	
Walk lasting	50	205	20	7	2	55	60	57	10	466	
Walk tempo I		111	175	167	195	192	151	223	165	1431	
Walktempo II		25	55	176	120	47	67	52	19	623	
WalktempoIII			31	53	42	56			19	201	
Walk repetitions			3		15	3	8	43	10	92	
Walk launched		6								6	
Walking gradient		4	5	5	9	10	7	10	11	72	
Total [km]	489	691	516	714	630	553	481	620	390	5302	

Below are presented specify performances objectives proposed to be accomplished in the significant competitions of the year. Thus, they are the following:

- 19.05.2003, Walking European Cup, 20 km, 1.32.0 place III - V with Romanian team
- 09.06.2003, Romanian International Championships, 20 km, 1.32.0 – place I - II
- 24.07. 2003, achieving scale participation in World Championships, Paris, 20 km, 1.31.0

The trainings gone after that schedule, and the performances increased. So that, the personal best in 2002 was 1.35.38, and in 2003 was 1.31.30.

#### 4. Conclusions

Obtaining an accurate forecast is very difficult, but that effort deserves to be made, since it may lead to an improvement in efficiency athlete training. Presence of the computer can put each coach in front of the information technology (IT).

Forecasting and prediction are among important elements of management training for high-performance athletes. Thus:

- ideal is to go on a variant which combine forecast with prediction;
- these techniques must find a large and ever-growing space in preparation techniques of coaches' bench;
- many times estimates are made in successive steps; in the field of sports training, forecasting steps may include for example, at the beginning athlete performance forecasting and then forecasting means and conditions for preparing for the attainment of the objectives proposed;
- the determination of means of preparation used and avoiding unnecessary training volumes, can be one of the important reason of performances improvement;
- the forecasts made are important because they allow application of the Taguchi method sport training. It establishes a hierarchy of the means of training to optimize athletic preparedness;

- in expectation of judgment and the accomplishment of a prediction must be taken into account human behaviour;
- it is a good idea to see several specialists in establishing witted and prediction practice in high-performance;
- coach is unable to make predictions better than a model, regardless of his professional experience;
- using a computer can determine the performance of athletes in the following periods, starting from current and future possibilities of the athletes.

So, opens the door to an effective forecast training plan and the computer is the one that can establish the means of preparation used and the entire context of factors that contributes toward achieving intended purpose.

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