



The Computer Simulator - a Modern Training Method of Objects of an Economic Profile

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ABSTRACT

Interactive nature of business modeling gives ample opportunities to managers and government employees to purchase and develop their initial skills and organizing knowledge, such as creation of strategy, solving the tactical and operational targets. Simulators include learning to do everything that can only be studied in practice where mistakes really stand. The simulator will allow "to study at practice" for finding of optimal solutions and will show the direction as the decision shall be applied. We created the simulator for a financial analysis. At the simulator it is several benefits:

- The reliable zone - a mistake in won't lead to economy crash;
- Increase in scale - an opportunity to take various positions in a management system;
- Improvement of financial literacy - acquisition of new knowledge in an innovative format;
- Team work - strengthening of communication and cooperation in team.

Besides, use of the simulator became an objective necessity of our time as educational methods which generally depend on a lecture format, effective for development of the informative skills necessary in study of students. This method will be corresponding not only on practices, but also and for the main students and will increase practical results of educational activities and aspiration of increase in scientific research.

The interactive nature of business simulation

Key words : Simulator of economic objects, Financial analysis, modern studying, Altman Z-score.

1. INTRODUCTION

Decision making in the public sector as well as in firms is a process of identifying problem and opportunities and choosing the best option among alternative courses of action for resolving them successfully. When there is lack of the information the decisions are made "under uncertainty" (or "under risk") and generally they are inferior compared to decisions made under certainty. As in economics there are

thousands of unknown variables the human mind cannot capture everything from the reality for optimal decisions. The same is true for firms as they can have thousands versions of budget and different corresponding economic results that can vary according to the market performance. The managers cannot be sure about the economic circumstances and how probable each possible outcome of their actions is. Consequently, the decisions are done under risk, according to the perceptions of the economic agents and subjective view about the market. Doing all these decisions without computer programs through relying only on human brains is like using a spade when you can have a tractor. Besides, existing simulator programs model only certain sphere of economy, they rarely capture economy as a unit system (as usual they do not suggest strategic decisions both, for public servants and company managers) and can achieve only local efficiency. In this point for achieving Pareto efficiency under given economic circumstances the necessity of more certainty, of models and simulations becomes clear.

The technical systems operation and management specialists have long been used in the preparation of various types of simulators, simulators [1] - deals with the field of business, training and operation of the simulators used, such as: AdSim Advertising, Baton Simulations, Blue Ocean Strategy Simulation (BOSS), Capsim Foundation and others

The article [2] analysis of the Russian Federation in the training simulators destination. In recent years, medical staff training, advanced training in medical school in a number of countries widely used simulator [3]. This is not surprising in a technical system, medical staff error in the shortest time takes effect, more technical system - a ship or aircraft crew's mistake in the life of the crew itself.

Because of the low level of qualification economist caused by any error Δt time interval thereafter and the person making the decision has actually been going on unnoticed. A mistake can have disastrous results for society would be [4-5].

On the first stage the business models of the economic systems maximally similar to the corresponding real economic units will be created. Then, the economic and non-economic (such as Ecological) important factors of economic development will be determined and the business simulators will be created based on the corresponding economic statistical data. The simulators will simulate different scenarios under different plausible circumstances (states of the influencing variables) and show the expected results in the cases of different combinations of decisions. In order to implement the use of the simulator and its suggestions, we use business simulations to train top managers and civil servants in achieving better economic outcomes [6].

The novelty will be fostering investment in new green technology based factories or capitalization of existing ones and finding the most efficient ways of investment. Besides, as the trainer will include simulators of economic consequences of budgets, it will expectably encourage capital formation, extending the budget of innovation activities and infrastructure. Moreover, through simulations it will show the best ways of investing in innovations (through profitability analysis based on the data from alike projects and risk assessment) and will make clear what and how should be done.

2. LITERATURE REVIEW

Researches on financial simulator programs mostly were oriented to the financial subjects training to students[7-8].

Mentioned a literature review as follows:

- The program is written on VB.NET 2010.[10]
- Most of the university in Georgia do not have such IT product. [9]
- In world practice educational an institution is successfully used by simulators [8]
- The big problem for the university in Georgia do not have computer programs of the solution of practical tasks by means of simulators [9].
- The professional practice shows for of avoiding of the wrong financial decisions to use different simulators [8].

3. METHOD AND RESULTS

The simulator of training of a financial analysis of created by us from several stages of action

- Creation of many scenarios for Altman Z-score company's likelihood of bankruptcy. The choice the best option for firm of criteria of growth of profitability.

Implementation integrated modeling during the business modeling with the following properties:

- Complete (to model activities of firm on high-level management skills);

- Competitive (communication between solutions of one of the parties and other results);*
- Interactive (modeling of presence of a role of the administrator);*
- A total quantity (used for general processes of modeling);*
- Teams;*
- Stochastic (decision making and result have the probabilistic, stochastic nature);*
- Complexity degree (the having choice of problem difficulty when modeling);*
- The simulated time period (3 years).*

Our limited experience in the development of the economic simulations allows us to formulate the charges Requirements: Simulator is implemented:

- Real economic process of modeling a certain task algorithm;
- Linear and nonlinear optimization problems to solve;
- Multivariable plans formation;
- reconciling the options and selection;
- Visualization of the simulation results, diagrams, tables, video or a combination;

Any interested person should be able to work with the simulator without registration and without passwords.

Simulator can be implemented as a modeling, simulation as well as the well-known algorithm for solving the problem. To investigate the effect of this algorithm for solving the problem. The saying here is a clear example Excel-based financial functions, to solve problems. Excel function of the task simulation observe how the values of the arguments result in wax. Arguments reflect the fact wield some, such as loans, investments, amortization and other.

2.1 Structures of "FINSIM1.1"

FINSIM1.1 - Altman model for simulating the financial stability study is carried out as follows:

1. The program will call the window (figure 1), which will be selected for the system to work with the language - Georgian. After selecting the language comes out of the window, in which the student's identification of subject and topic selection will collapse after the selected subject and topic in the list of simulators / Figure 4 /. Figure 2 shows the choice of the main factor, at value change as changes

Figure 3 is about multi variable simulation The basis of the simulation model of Altman. Arguments (variables) values can be changed by the student. Process modeling is carried out in one or two variables, so set aside V_{x_i} - Uri variable and reference variable in modeling. Figure 5 represents results of multi variable simulation at change of value of both factors

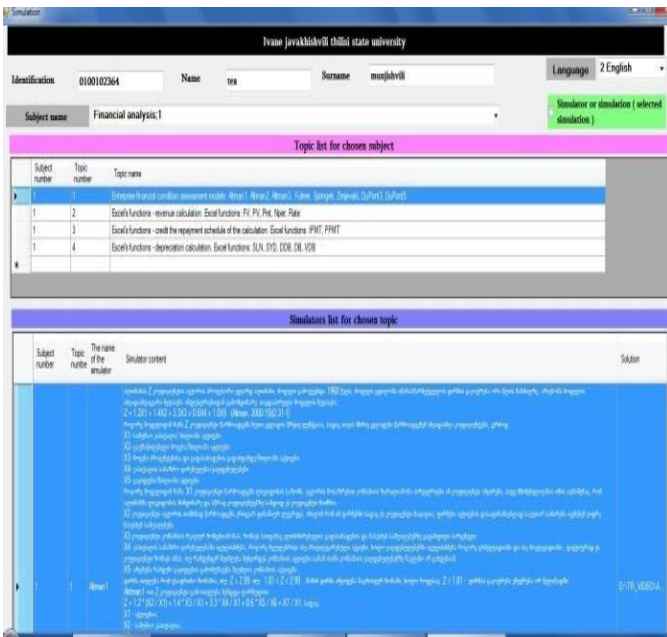


Figure 1: step 1. Input Of Personal User Information And Choice Of The Method Of Assessment Bankruptcy

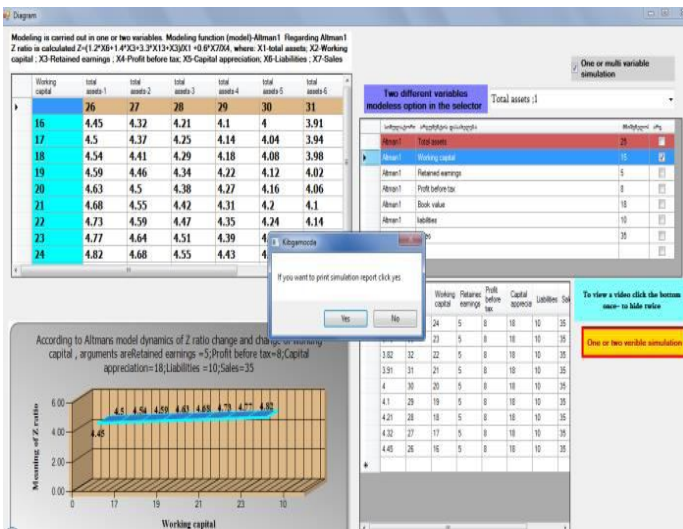


Figure 2: The choice of the main factor, at value change as changes

Regarding Altman1 Z ratio is calculated

$$Z = (1.2 * X_6 + 1.4 * X_3 + 3.3 * X_{13} + X_3) / X_1 + 0.6 * X_7 / X_4$$

Where:

Total assets > Working capital

According to Altman's model dynamics of Z ratio change and change of working capital, arguments are Retained earnings =5; Profit before tax=8; Capital appreciation=18; Liabilities =10; Sales=35

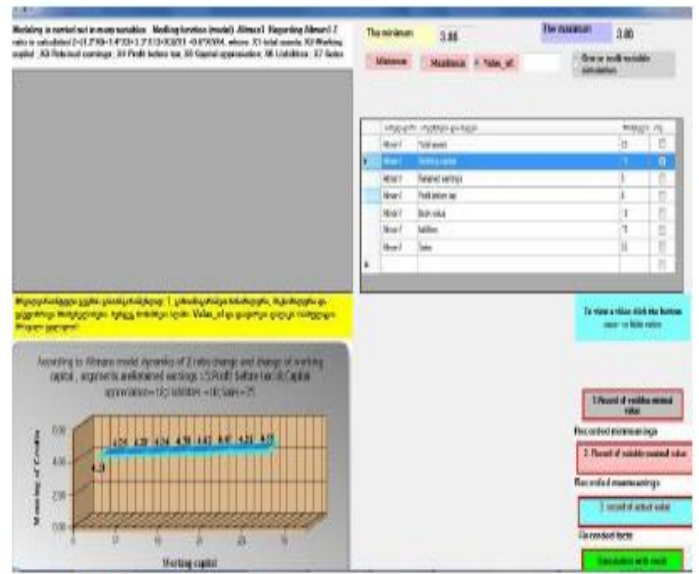


Figure 3: Multi Variable Simulation

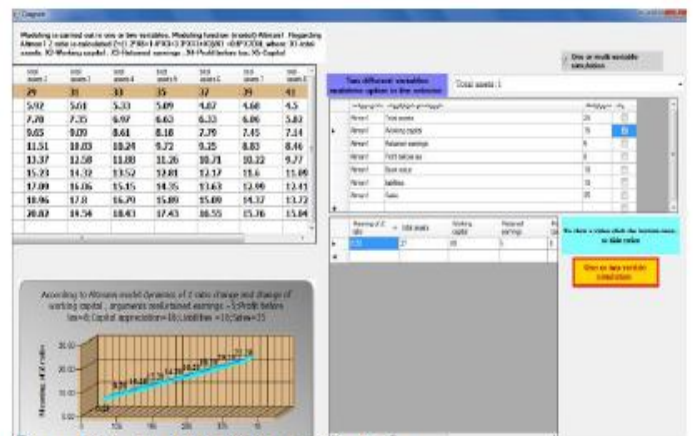


Figure 4: Multi Variable Simulation

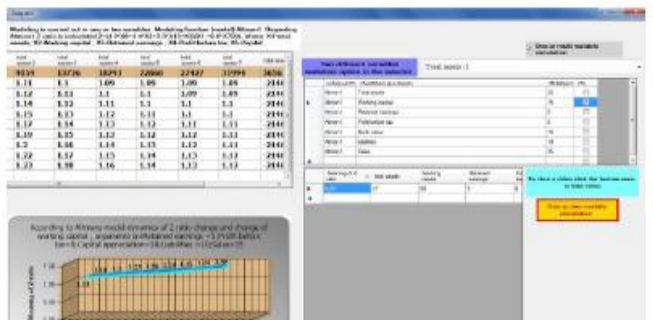


Figure 5: Results of Multi Variable Simulation at change of value of both factors

At multi alternative scenario in the program initial value at most 0.1. One option from another differs with 0.1+ steps.

$$X_i, i = \overline{1,7}$$

Variables are calculated as minimum, maximum, minimum and actual simulation data in the form of a reference plan. Absence of variable data to a minimum, maximum and initial (preliminary) from the data entered by the student. Z is calculated as the ratio of variables to a minimum, and the maximum values and $Z_{min} < Z < Z_{max}$ the range of steps (the step determines the importance of the student) the simulation of the multivariable is performed. This showed that $\forall Z_j \rightarrow X_i, i = 1 \dots 7$ is chosen from the values of any variables. The coefficient Z is determined by a certain value. This model allows us to determine the optimal parameters of the Altman's model, the financial condition of the company, and then monitor and manage the performance of their value.

4. ACKNOWLEDGEMENT

The financial analytical simulator offers the unique wide processed information of the economic and not economic data ready to decision making. It uses the based difficult mathematical models of real data to make the user-friendly environment of decision support and the teacher of skill.

The methods used in the project are unique. The model of computer modeling (with a business simulation platform) will support practically to realize the scenario:

1. By means of forecasting which includes to understand how a few scenarios can be in the future connected to decisions and measures which shall be accepted today;
2. By means of development of the best strategy of the analysis as strategy will be developed in the presence of various scenarios for the future and/or last events, influence perception of a gift.

A. Scenario of modeling

Business simulation of the scenario is executed in the artificial environment, and participants are encouraged to make reasoned decision how to work in any this situation individually or in team. Choosing an integral part of information model, a so-called "tree of decisions" on the basis of which decisions are made. During educational process feedback will be regularly provided. Mathematical modeling in business simulation.

Business simulation means that the model shall have a receipt and outgoing data. The similar will work at a basis of input data, and solutions will be proposed according to of the Conclusion - result of handling of these decisions (on the basis of special algorithms which model real economic processes). Modeling of economic processes in business simulation can be applied to global problems and not only to economic development.

To simplify interactive transfer between mathematical model and the party, we will use the special graphical interface of the user. This interface provides intuitive understanding of initial model of data, and also structure of logical processes. It is also possible to provide on to the principle made a simulator for macroeconomic both microeconomic indicators and not economic (ecological) indicators. Microeconomic indicators will include data of participants of the market, including production which will be used for calculation of industrial production and at last GDP. Data of participants of the market will also be used for training of the manager of the company in budget making and investments.

5. CONCLUSIONS

Any simulator and the simulator developed by us for use in the process of learning is not a panacea. It is a time to explore one topic in depth way. Simulator effect is achieved by the use of trainer and the legalized use of the electronic textbook.

Electronic textbook implies hypertext technology, decorated with sophisticated search engine, graphics and video, the manual;

The training, simulation is an integral part of the results of the review and analysis - debriefing. "FINSIM1.1"- for teacher training will be accepted by the group to conduct the debriefing, the simulation of the protocol. The program is written on VB.NET 2010.

In the program possibilities of Excel 2010 are used, namely: Solver, Data Table, Scenario Manager.

The program works in the environment of Windows. Component of the program are fail of FUNSABLONI.xlsm, Sisedegi.docx

The database is organized on SQLSERVER 2008

REFERENCES

- [1] I. AREFYEV, T. Mundžišvili metod ocenki i prognozirovaniâ finansovoj ustojčivosti transportnovo predpriâtiâ v usloviâh riska. Rossiâ, Sankt- Peterburg 2009
- [2] Z. Munjishvili, T. Munjishvili, A. Meladze. Knowledge Demonstration System. Sakpatenti, certificate of recognition #5222. 2012
- [3] Z. Munjishvili, T. Munjishvili, A. Meladze. E-System for Planning and Management of Instruction. Studies of the North-West Polytechnic Institute. 5pp. NWTU Press. Saint Petersburg. 2011
- [4] Z. Munjishvili, O.Nakashidze, Sistem if Revealing and Evaluating Knowledge. Material International scientific-practical Conference, "Modern Problems of

Social-Economic Development and Informatization: New Challenges and Perspectives”, October 26-27-2013, Kutaisi (Georgia), p.175-179.

- [5] T. MUNJISHVILI; Mathematical methods management and an estimation of risk of the borrower in commercial banks. Problem yiperespektivy razvitiâ sotrudničestva meždú stranami Űro-Vostočnoj. Poland. 2014
- [6] https://en.wikipedia.org/wiki/Altman_Z-score
- [7] <http://www.simulations.co.uk/fineval.htm>
- [8] <https://pd.sim.edu.sg/business-alignment/rk05>
- [9] <http://www.mes.gov.ge/>
- [10] <https://ptgmedia.pearsoncmg.com/images/978073566690/samplepages/9780735626690.pdf>