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SYSTEM DYNAMICS MODELING OF THE RELATIONSHIP BETWEEN MARKETING AND NET PROFIT

The subject of the research is to explore the hypothetical model of the relationship and the ratio of the deposit and the cost that was spent on marketing - to increase the number of buyers that will affect the deposit. It will be a model of buying some production in an online store.

The relationship between variables in model is described in the following way

$$marketing\ expenses = IF(Second\_deposit\_for\_marketing <= 1000, THEN(10), ELSE(0{,}01*Second\_deposit\_for\_marketing) \quad (1)$$

$$users\ that\ visit = \frac{marketing}{marketing\_price\_per\_person} \quad (2)$$

$$success\ \ purchase\ coefficient = marketing*probability\_of\_purcase \quad (3)$$

$$users\ that\ buy = IF(success\_purchase\_coefficient < 1, THEN(INTsuccess\_purchase\_coefficient*users), ELSE(1*users) \quad (4)$$

$$Process\ of\ sales = initial\_price\_for\_1\_product*users\_that\_buy \quad (5)$$

$$general\ expenses = Expenses\_rate*First\_deposite \quad (6)$$

$$money\ transfer = INT(DELAY1(First\_deposite - general\_expenses; 15)) \quad (7)$$

The model includes two deposits stocks. The funds from the first are used for the manufacture of goods. After the balance from the first deposit, we transfer to the second, from which funds are used for marketing. The amount of money we can use depends on the amount of the second (final) deposit. The number of new users of the site will depend on the amount of money we used for marketing. Then we create a

new variable, it will directly depend on the rate of successful purchase of goods by new users.

Multiplying this ratio by the number of new users, we get the number of real buyers who are willing to buy products. We multiply this quantity by the price per unit of output and receive the first deposit. Approximately 80 percent of the deposit will cover various expenses, such as production and taxes.

After we deduct this 80 percent, we will receive money that we can transfer to the second (final) deposit, the money from which we will start using again for marketing.

Figure 1 represents system dynamic model.

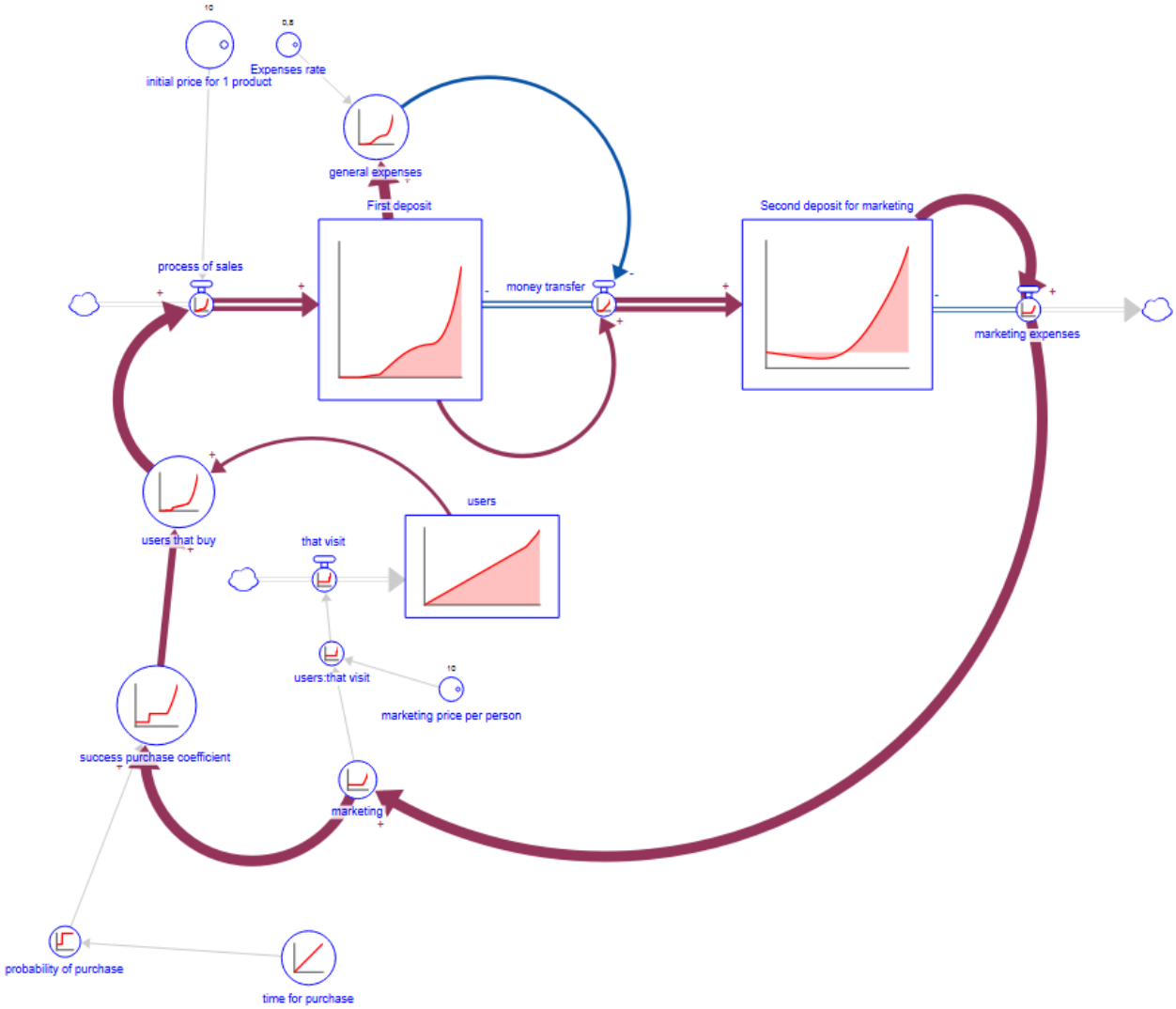

Figure 1. System dynamic model

The model includes two loops. The first loop describe the relationship between the number of users and money invested in marketing. The second loop describes the relationship between the deposit and the number of buyers.

Figure 2 shows the dynamics of first and second deposits over time. The fall of the second deposit illustrates how strongly it depends on the number of attracted users.

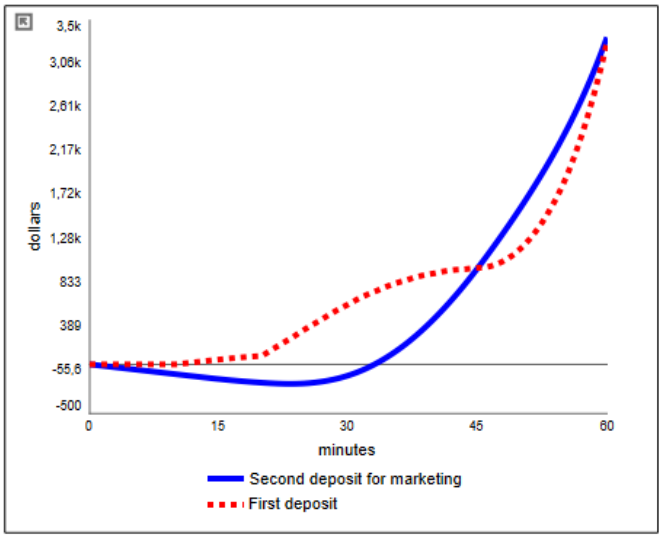

Figure 2. Dynamics of deposits

Figure 3 represents the dynamics of the number of all users and those who are ready to make a purchase. Under the influence of marketing on the success purchase coefficient, two values begin to approach each other.

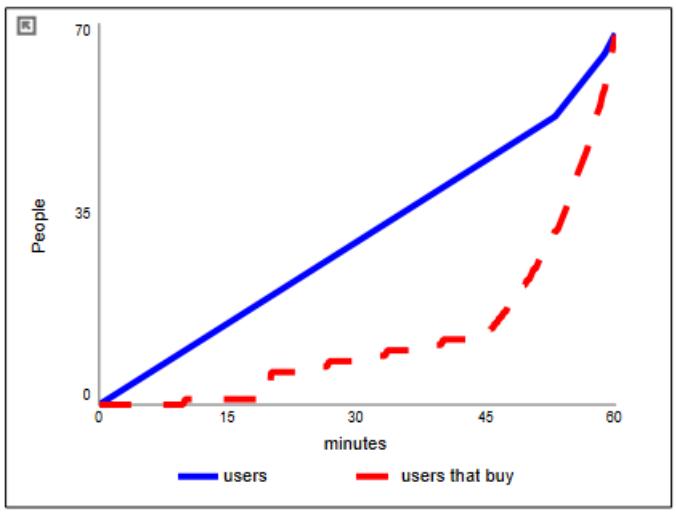

Figure 3. The difference between the users and the amount of users that buy the product

Thus, we had an excellent opportunity to study a hypothetical model of the dependence of the number of users who are ready to make a purchase on the amount of the deposit, from which funds are allocated for marketing, which is engaged in attracting the most users.

References

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SYSTEM DYNAMICS APPROACH IN PROJECT MANAGEMENT

Engineering and construction industry is expected to continue to grow very fast. E&C companies have been considered as active participants in building smart, sustainable future. Project Management of Construction projects has evolutionized during this century due to digitalization of operating activity, automation of construction sites and a raise of qualified workers capable to cope with digital tools.

In today's world project management covers several stages that include key processes such as procurement of materials and equipment, post-ordering services, subcontractor services, quality estimation, solutions provision, work supervision, financial planning, cost estimates, cash flow planning and lots of other day-to-day operational activities.

Numerous delays in procurement works, pandemic-induced supply shortages, unexpected losses or repairs, uncertain future in Covid-19 world, consequently work force losses and drastic decrease in labour productivity are the key shocks that experienced major E&C companies recently.

Complexity of construction projects means that there are so many factors that influence the project, that construction processes appear to be highly dynamic and uncertain.