

Business Simulation for daily decision support
-
a Case Study

Anders Sixtensson, Sune Montán, Robbert Prinselaar and Thorvald Freiholtz
System Dynamics Team at:
Kipling Information Technology - www.kipling.se
Lund, Sweden
phone: +46 708 202177 fax: +46 46 379599
email: anders@kipling.se

Abstract

This paper will describe a practical way to use System Dynamics as a daily tool in business planning processes. It is a case study paper and shows how we as consultants supported a customer in resolving a number of critical factors in their business plan by doing a number of small and focused models in ithink. This approach was new to us compared to previous modelling processes [1,2,3] having turn-around times for fact finding, verification and joint modelling sessions for weeks to come up with commonly accepted models.

The paper describes our methodology exemplified with a number of critical issues for our customer and the relating models that gave us insight.

Introduction

In this case study our focus was to give instant (within some hours) feedback on open questions to support the ongoing business planning process. This was possible by forcing ourselves and the customer to avoid discussions on details (where you easily spend a lot of non productive time) and instead really find and understand the growth engines in their business. The case study describes a software vendor in a start-up scenario. A possible dramatic growth in sales was predicted and the requirements on development, support and sales capacity needed to be visible for the board and the management in order to define an effective business plan.

The process

A business plan were to be defined. The business plan should describe an expected economic scenario for the coming three years and the critical factors to make this scenario be a reality. The board had their expectations on the scenario and now the management team should come up with a plan and arguments for how to run this. Rather soon the discussions were about the critical factors for the business. Some of the critical factors were modelled in ithink to make the discussions more effective and to spread a common insight in the management team. We list some of the critical factors below to give a feeling of how System Dynamics were used in their business development process.

Critical factor 1 - After sales vs new sales

We had a lot of discussions of how to get new customers to this product. Should we go for a partner strategy? What is a good pricing model etc. As process leaders, we discovered that they had a very

vague feeling of the nature of the two major revenue streams; first the development license fee from new customers and then the after-sales revenue from the existing customers. The discussions on this theme were in our view too ad-hoc so we proposed to do a very simple model so we all got the same map to talk around. The resulting model in figure 1 was made on the wyeboard and entered in ithink in less than two hours.

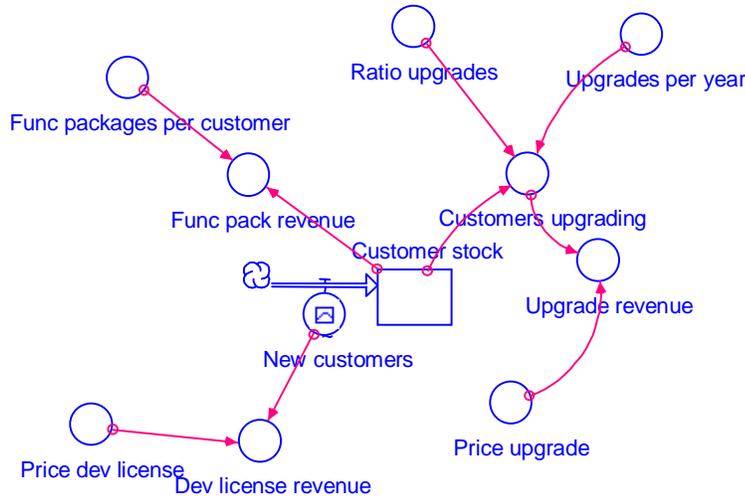


Figure 1: A very simple model to understand the different revenue streams

With this model, a number of different scenarios were made and the team realised very clear that the leverage in revenues comes from the after-sales, see figure 2. Based on that, the discussions now become more focused in answering the question "How can we get an existing customer to spend X money per year on our up-grades, support and functional packages?"

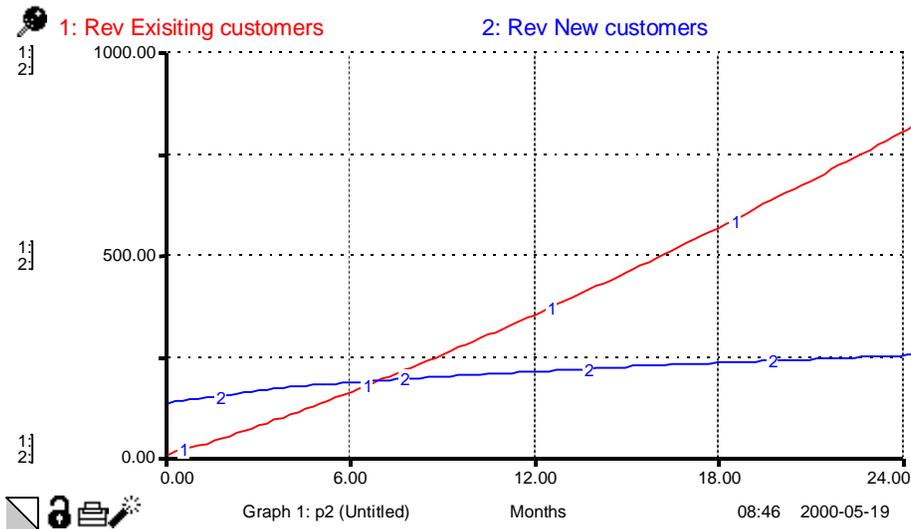


Figure 2: Revenue streams in kSEK/month.

Critical factor 2 - New processes for support

The whole business scenario were based on a dramatic growth and large volumes of sold units to a rather low price. By the end of year 3 in the scenario, 2000-5000 sold units and existing customers

were predicted. Our company also had other products that were very complex and required a high quality support. In our discussions, we heard numbers like the ability to handle 20 customers per support team member. To visualise for the team what this would lead to, a quick update of the model were made where we could change the "No_of_customers_per_support" variable. The first scenario when using the value of 20, we would end up with 100-200 in the support team. This was of course very easy to understand based on the reasoning made above, but you should never underestimate the effect of seeing the curve growing dramatically. In a very short time, thanks to the model, the discussion became focused on the question "How can one member in the support team handle up to 500 customers per year?".

Critical factor 2 - The impact of lead time

We all realised that time was important for different reasons. Initially, the reasons that were heard most were related to the market window. But the timing also had a big impact on the pay-back of this investment scenario and we extended our simple model with a cash flow section to see how much money we needed to invest before we passed the breakthrough point. In figure 3, we can see the sensibility of the variable "Delay_until_aftersales_starts" (in months) and the impact on the required cash. Figure 3 shows three different values; 2 months, 7 months and 12 months.

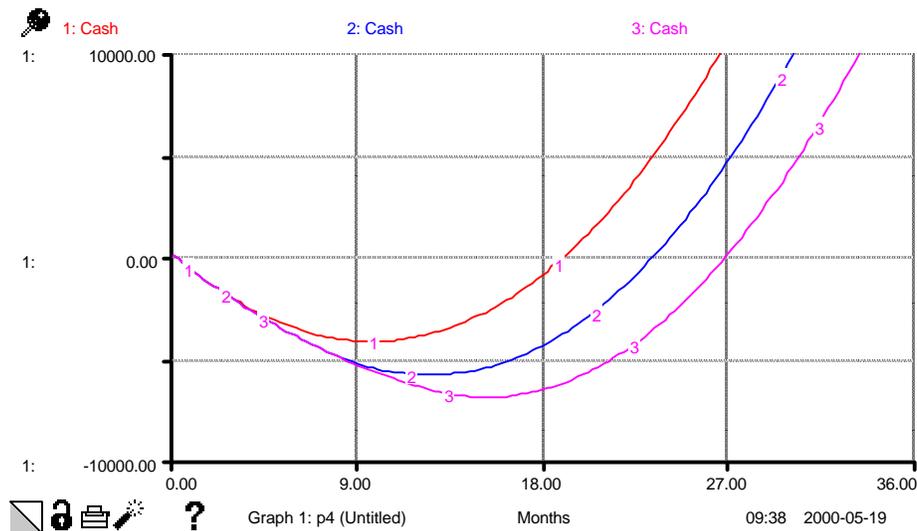


Figure 3: Required investments differs from 4 MSEK with a 2 month delay to 7 MSEK with a 12 month delay. The timing for the positive cash flow also differs from month 9 to month 16, i.e. a difference of 7 months!

The major insight from this simple scenario was to answer the question "How do we get the existing customers active for after-sales from day 1?"

Another interesting effect from this scenario is to understand the effect of getting payment from the customers up-front for support etc. Scenarios were made to show the effect of payments in advance and to pay a "subscription-fee" for coming upgrades and functional add-ons.

Conclusions

The experienced System Dynamics user can have problems to understand what we actually achieved in this case study. The models are very simple, so simple so you could actually calculate the effect on paper sometimes. But, the real effect comes when you see the resulting curves and how they look over

time. Compared to Excel, you get a picture of your business processes and not only numbers and equations. Once again, not many hours have been spent on modelling in this case study. Our role was to facilitate the business planning process and we had our System Dynamics tools ready to support discussions and questions when they popped up. And it was appreciated by the customers. Other conclusions worth to mention are:

1. In our opinion, an experienced ithink-user make simple models faster compared to do the same in Excel. And if you would model reinforcing loops, this would lead to "circualr references" in Excel.
2. The sensibility feature is very good. If you want to understand the impact of a single variable in your model, nothing can handle this in a better way. You build your business model and if you want to understand the impact of different price levels, then you just change this variable and plot the different results in the same graph as shown in figure 3,
3. Stocks and flows are very natural when you discuss business models. You have a number of natural stocks - customers, cash, partners, employees, and you have a number of natural flows - revenue per month, sales volumes, new partners per month etc. The semantics of System Dynamics were never any problem.
4. Feedback loops are difficult to model in a way that they really mean something for the inexperienced user. In our discussions we could hear a number of reinforcing loops like the me-to-effect when the product would be dominant on the market etc. We wrote the loops on the wyeboard but had great difficulties to quantify the effect to enter in a model - how do you put numbers on a me-to-effect? This was a new business and to get numbers hear would be too much of a guess work. So, we quantified what we could and were satisfied with an qualitative understanding of the existing loops. All the time, we were focusing on the 80/20 rule - to get 80% of the desired understanding with a 20% modelling effort.
5. You get a common terminology when you are forced to describe your business rule in terms of stocks and flows. Is factor X a stock or flow - and the rest of the team understands your view and can argue against it or support in an objective way.

As a final concluding remark, the business plan were made in three weeks. The total amount of hours spent in modelling in ithink was less than 20 hours. We didn't even talk about System Dynamics or tried to explain what this is - we just used it and presented the models as a natural ingredient in our discussions and brainstorming sessions. As consultants, we have over four years of experience of trying to sell System Dynamics processes to customers like this and we have tried all different tricks. But this time, we didn't talk about System Dynamics, we just used it as a tool embedded in our business development process . and no one questioned it!

References

1. Vennix, Jac A.M., Group Model Building: Facilitating Team Learning Using System Dynamics. Wiley, UK, 1996.
2. Vennix, Jac A.M., Andersen, David F., Richardson, George P. and Rohrbaugh, John, Model Building for Group Decision Support: Issues and Alternatives in Knowledge Elicitation. In: Modeling for Learning Organizations (Eds.: Morecroft, John D.W. and Sterman, John D.). Productivity Press, Portland, 1994.
3. Sixtensson, Anders., Olofsson, Bengt., and Caldenfors, Dag: A System Dynamics Approach for Return on Investments Calculations. Proceedings of International System Dynamics conference in Istanbul 1997.
4. Sixtensson, Anders. and Bengt Nilsson: Reinventing Process Improvement and Change Management Through Systems Thinking and System Dynamics. Proceedings of International System Dynamics conference in Istanbul 1997

