Dealing with complexity in telecom: a system dynamics approach for planning new services and technologies

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Extended Abstract

Nowadays, the telecommunications environment is drawn by a plethora of new elements and driving forces, quite different from that of a few decades ago. Such elements and forces are complex by nature and might be understood as the consequence of high competition, deregulation, technology evolution and significant socioeconomic changes around the world.

The resulting telecom scenario is characterised by a number of new players, which compound a rich value chain. The society, concerning users and clients, is demanding new services and applications in such a manner that the telecommunications operators and service providers have continuous challenges in order to attain needs and wishes with adequate time-to-market.

Therefore, the conception and planning of such new services, and the subsequent business modelling, are duty tasks in complex context as hereto mentioned. Several aspects should be considered and all of them are subject to changes in time. Moreover, the requirement specification of such new services should undertake a guideline of paramount importance: the need of conciliating the benefits of all value chain players involved in the enterprise. From a modelling point of view, the service and its business model may be described as non-linear systems and made up of many interrelated elements.

In this sense, systems thinking and system dynamics establish an adequate and useful approach. Systems thinking due to its inherent principle of considering multiple perspectives,

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and system dynamics in function of being a modelling method able to deal with complexity, non-linearity and feedback.

This paper aims at presenting a service planning methodology which has been adopted by CPqD. Such a methodology includes systems thinking and system dynamics as an approach for business modelling and for providing inputs to risk analysis. Besides, this paper shows, in short, an application of such approach in modelling business alternatives for a telecom service: an e-courier service.

The methodology

As shown in figure 1, the requirements capture can be described as the opportunity detection procedures, which are based on the results of two activity branches: the technology monitoring and the market information systems. When an opportunity is detected, the service has its requirements preliminarily specified in order to allow the modelling process.

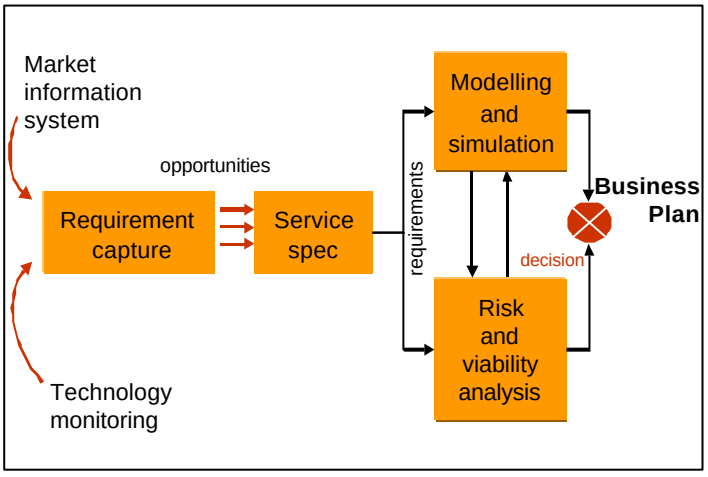

Figure 1 - Service planning methodology

The approach adopted in this process is the systems thinking and it is carried out by means of system dynamics and computer simulation. The service and business models so obtained configure the inputs for the risk and viability analysis, which, in turn, evaluate pros and cons, threats and business opportunities, and the impacts that the enterprise may finally bring to the players. All these analyses provide the means for evaluating the business alternatives in terms of technical, market and economics viability. This work flow, including the inputs/outputs relations, is shown in figure 1.

There is an iterative relation between the modelling process and the risk and viability analysis. As the models become robust, sharper analyses are carried out, which, in turn, provides new information to the models and so on. This feedback loop may be stopped in function of the desired accuracy or limited by the analysis boundary.

An application for e-courier services

E-courier services, the electronic counterpart of conventional courier services, allows electronic documents to be transmitted faster and cheaper, offering more value to users demanding quality.

From the point of view of an already courier provider, launching an e-courier service could have undesired effects: users of old service may stop using it without migrating to new one.

Besides, the operation of an e-courier service requires purchasing IT hardware, acquiring (or licensing) software, training operational staff, launching advertising campaigns and so on. The profitability of this operation should be adequately analyzed.

Other players are in the game, too. The company that planned and developed the e-courier software is looking for alternative business models. Should it sell or license the software? What should be the maintenance charges?

To answer such questions, and others as well, it was developed a dynamic model that aims to support the decision process for the e-courier software developer. The model intends to capture the relevant variables and their relationships along the e-courier value chain. The former variables include market conditions for the e-courier provider and the software licenser, the cash flows for both companies, etc.

Some exogenous variables, such as the royalty fee, the cost for conventional (courier) shipment and the cost per e-courier transaction, have been parameterized in order to provide more information about how they influence the net present value of both companies. This way not only the people in charge in modeling but the clients as well can devise the better alternatives to extract value from the proposed service.

In figure 2, it is shown the market elements from the overall dynamic model, depicting how the introduction of this new service affects already existent ones.

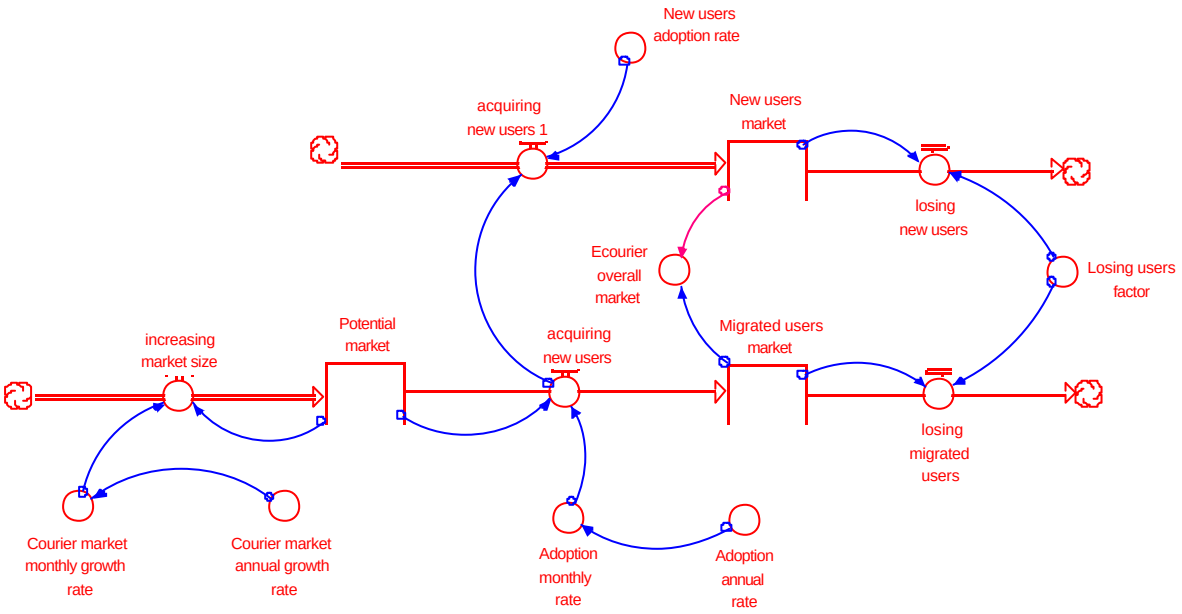

Figure 2 – An alternative e-courier business model

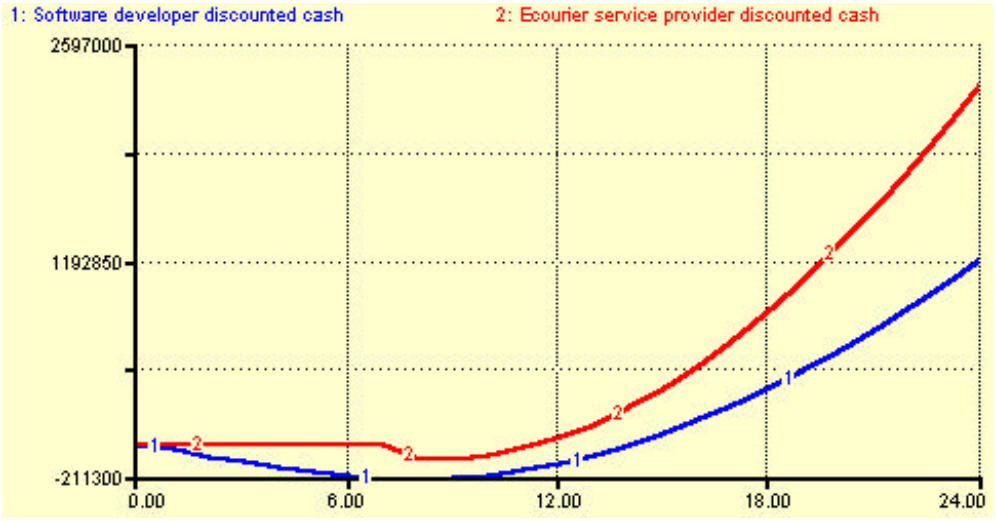

Figure 3: Simulation results of the dynamic model

Figure 3 corresponds to some simulation results obtained from the dynamic model shown in figure 2[3]. According to these results, if the e-courier software is licensed the payback would be 11 months for the licensee (the e-courier service provider) and 14 months for licenser (the software developer). On the other hand, if a pay-per-transaction scheme is adopted – without changing other factors – the service provider payback increases to 13 months while the software payback for the software developer reduces to 8 months.

As can be noted, this kind of analysis allows flexibility and means to evaluate the impacts of the business alternatives from the perspectives of all players involved in value chain. This fact may be pointed out as one of the advantages provided by the dynamic modelling and simulation.

Acknowledgements

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[3] Only partial results are shown here, due to space limitation.

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