Capital budget decision in hindsight: ILE for learning and decision making

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Extended Abstract: Consultancy clients benefit little from the project valuation recommended in the relevant literature (Brealey et al., 2011; Ross et al., 2010), especially if a differentiation strategy is to be implemented. Besides, a non-conformity between practice and theory in the application of Discounted Cash Flows (DCF) methods emerge from "hurdle rates" adoption (Titman and Martin, 2008). Considering that simulators can assist in deciding and in reducing barriers to learning (Sterman, 2000), the research purpose is to examine whether the use of an Interactive Learning Environment (ILE) can improve real investment decision making processes made in new start-up businesses. The process involved the construction of an ILE according to System Dynamics (SD) methodology (Martinez-Moyano and Richardson, 2013; Sterman, 2000).

The relevance of start-ups initiatives is growing, and resources allocated on them by governments, businesses, and banks are relevant. Efforts aimed at improving decision maker skills and better decisions in start-up endeavors will lead to relevant value creation. By placing learning at the center of decision-making processes, consequences of using intuition and heuristics are minimized and consequences of decision-maker biases can be limited. Torres, Kunc and O'Brien (2017) propose an SD model to generate scenarios of alternative strategic situations an organization may face, suggesting great opportunities for this kind of tool to support strategy rehearsal within small organizations. Cosenz and Noto (2018) and Groesser and Jovy (2016) advocate that the integration of tools oriented to innovation in business models and strategy definition in SD-based ILE will open relevant learning opportunities. Change in managers' mental models regarding the organization and its markets is considered part of the planning process, which is understood as organizational learning (De Geus, 1988), nonetheless, capital budget decisions still resort in traditional methods rooted in classical conceptions and decision-makers and implementation managers bounded rationality is ignored.

A model and ILE were built in the context of a wine start-up decision process. Entrepreneur's objectives included a project configuration according to a luxury brand mantra and the consultant's task was to support decision making regarding the definition of a business strategy, the production of financial estimates, and the preparation of a Business Plan. The future behavior of working capital was not evident to all stakeholders in the same way. The production cycle was exceptionally long, particularly in the case of Port Wine. Harvesting and production wine would be extraordinarily concentrated in a short period of the year and, even without aging, a product would take at least 8 to 10 months to be delivered to customers. According to the chosen Luxury Brand Mantra, one of the essential elements of the production philosophy to be implemented was to make fermentation processes in wooden vats and for exceptionally long periods of time. The modeling process was here understood as construction for learning (De Geus, 1988; Morecroft, 2007), an intelligible tool needed for decision-makers and consultants to become aware of the challenges they were facing.

The dynamic hypothesis about the problem in hand reflects an underlying strategic choice. In fact, a Luxury Strategy reinforcing loop and a Volume&Value Strategy reinforcing feedback loop

could be favored by managers' decisions reproducing the differentiation or low-cost competitive advantage strategic alternative (Porter, 1980). Market and marketing decisions were out of boundaries and the model was quite simple. An aging chain, with an array for different types of wine, with specific delays, production stages, and physical storage capacity connected to a monetary and financial coflow structure. All sectors were linked with a financial statements module.

The ILE interface was the only point of contact between the model and the user and he could manipulate all main operational business decisions. Information provided by simulations seeks to replicate standard DCF pro forma accounting maps and expected firm performance is measured with Key Performance Indicators easily recognizable by managers. Generated scenarios allowed to challenge users' intuition, to evaluate strategy and policies, and to anticipate project possible outcomes range.

Used as a run comparison simulation, the ILE is an instrument for learning and creativity. A transformational object that allows decision-makers and consultants to better understand the consequences of their decisions and system behavior. The model allowed a simplified view of the problem centered on the iterations between production, transformation, and final outcomes. Dealing with system dynamic complexity and not detail complexity, as it happened with the spreadsheet modeling stage of the assignment. The information gathered about the availability of raw materials, sizing of production capacity, on the consequences of choices in profitability, and in funding needs was collected in the ILE, allowing to identify the spectrum of possible real investment decision outcomes.

Capital budgeting decision is most of the times framed in a strategy setting. Organizational strategies are not deliberate and the fit between resources and ambition is not always considered. Even so, traditional valuation methods recognize a top-down approach to strategic management that was removed from management theory (Mintzberg, 1994). If differentiation is to be sought, choices are not optimization processes as proposed by traditional real investment appraisal techniques. In extreme differentiation strategies contexts, as it happens in luxury businesses, the building of a myth, of a story, and authenticity, cannot be achieved without management flexibility during the implementation stage. Therefore, an assessment using net present value (NPV) will be inadequate, since NPV should only be applied to "now or never" investment opportunities.

Conclusions drawn from simulations included: Working capital needs were substantial and much higher than anticipated. Production pipeline time causes slow growth in cash-in flows and fast and strong growth in working capital requirements; The client should be prepared for important losses in operation early stages; Intended strategy would achieve a positive NPV, but the payback period would be especially long; If fermentation periods were those which were planned, the base case production fixed capacity was tight to fulfill the sales program and raw materials acquisitions would be required.

After the winery construction, business flexibility regarding scale and average unit production costs would be very low, so the strategy would have to be effectively determined during the valuation stage. Capital budgeting using DCF and NPV are heir to classical conceptions and do not consider decision-makers bounded rationality, optimal implementation is always assumed, and managers' decision behavioral dimension is completely ignored. A proper valuation of real investment decisions that impact on strategy, and clearly in the new start-up businesses launching decision, can only be carried out when strategy implementation is considered.

Model relevant limitations include a restricted boundary, a focus on internal choices, and not on external variables, which naturally are relevant sources of uncertainty. The emphasis was put on decisions and not on policies and by transforming the model into an ILE, circular causal relationships were inappropriately cut (Forrester, 1998).

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