S&OP and budgeting: Living Apart Together?

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Abstract

This study investigates the interaction between the supply chain planning process and the budgeting process. While this interaction is key to an effective supply chain, this topic has not yet explicitly been studied in academic supply chain or financial control literature. We employ a case study method, where we look at two business units within a large multinational in the chemical sector. We show that the sales and operation planning (S&OP) and budgeting processes interact and influence each other, yet are not fully integrated nor perfectly aligned.

Keywords: S&OP, budgeting, financial planning

Introduction

The purpose of this paper is to investigate the interaction between the supply chain planning process and the budgeting process by means of an in-depth case study. While the interaction between the operations department and the financial department is key to an effective supply chain, this topic has not yet explicitly been studied in academic supply chain or financial planning literature. More business oriented literature such as practitioner journals, white papers and text books do elaborate on this interaction and highlight its importance. We summarise this literature below.

The two key processes discussed in this study are the Sales and Operations Planning (S&OP) process on the one hand and budgeting process on the other hand. S&OP is an integration process that balances demand and supply. It aligns the demand plan, which starts with the forecasting of demand, and the supply or capacity plan (Vollmann *et al.*, 2005). The typical S&OP is developed at the level of product families or SKUs, with a planning horizon of several months, up to one or two years, and a monthly or quarterly planning frequency. Wallace (2004) describes the S&OP process as a five-step process, starting with the phase of gathering data on actual sales, production, inventories, etc. This is followed by a demand planning phase that leads to an agreed demand forecast and a supply planning phase in which the resources planning takes place. This then leads to the fourth step, the pre-S&OP meeting, involving executives from different functions who revise the plan, solve potential conflicts and identify issues that need to be addressed by management in the fifth step, that is the executive S&OP meeting, which results in an authorised plan. S&OP is cross-functional by nature, as it involves sales, operations, finance and management. It coordinates across departments and aligns plans (Wallace, 2004). The benefits of a properly functioning S&OP process are large and felt throughout the company (Vollmann *et al.*, 2005).

The budgeting process on the other hand, is the heart of the financial control system in many organisations (Anthony and Govindarajan, 2003). The objective of this financial control system is to ensure goal congruence in decentralised organisations where managers have freedom to act. It typically consists of four steps. First, the strategy is translated top-down into a longer term financial plan: this is referred to as strategic planning. The second step is the budgeting process. This typically uses the accounting year as horizon. Different business units budget their financial performance for the next period. The financial department consolidates these budgets into a budgeted income statement, a cash budget and a budgeted balance sheet to be validated by the board of directors as performance targets for the next year. A third step consists of reporting and financial forecasting: reporting is the analysis, mostly on a monthly basis, of the variances (deviations) between the budgeted and actual performance. Most companies prepare forecasts on a regular basis as well. For example, the "3+9 forecast" uses the actuals for the first three months and the best estimate at that moment for the remaining nine months. As a final step, at the end of the accounting period, the budget is compared with the actual results to assess the performance of the company and its different business units and link it to incentives and compensation. Financial analysts and stock markets also use the quarterly and yearly actuals and the financial expectations from companies for the valuation of their shares.

It is commonly accepted that the two processes – S&OP and budgeting – interact and should be aligned. Palmatier & Hirschey, for instance, note that a poorly organised planning process can lead to negative consequences for both budgeting (e.g., poor performance with regard to the financial plan) and operations (e.g., increased inventories). Dougherty and Grey (2013) highlight the role of S&OP in financial planning, budgeting, monthly updates of the financial plan and managing cash flow. Furthermore, Wallace (p.5 7; 2004) describes "identifying variances to the business plan (budget)" as one of steps of the S&OP process. And Vollmann et al. (p. 173; 2005), with reference to the Master Production Schedule, which is an aspect of the S&OP, write that "since the MPS is an important input to the manufacturing budget, it follows that financial budgets should be integrated with master production scheduling activities." However, little is known about how the processes interact and influence each other. These two different worlds meet, but do they collide or do they merge fluently? Can we provide directions for optimising the relationship? To the best of our knowledge, S&OP is not discussed within the academic budgeting literature, nor is budgeting discussed in the S&OP literature. Therefore, in this paper, we aim to fill this gap by studying the impact of both processes on each other and on the performance of the company. The nature of the questions posited above, combined with a current gap in the existing literature points towards a qualitative research design, i.e., a case study. In what follows, we describe our case setting, our methodology and our findings.

Method

In this paper, we analyse and discuss the interaction between S&OP and budgeting in two business units in a large, publicly traded, multinational company in the chemical sector. The company produces and distributes its chemical product to customers active on the automotive market as well as other specialised industries. It employs more than 13 000 people and is active in more than 100 countries.

We selected the company as our case study because of the high level of maturity in its production and operations processes. The company started to implement the S&OP process about a decade ago, following the Oliver Wight framework and methodology (Wight, 1995), and has since then continuously improved the planning process. This systematic and mature S&OP process offers a relevant setting for investigating the alignment between the S&OP and the budgeting process, the potential benefits and downsides of the existing interaction and how it is experienced by the different parties.

Moreover, the case offers the possibility to compare the interaction between the S&OP process and the budgeting process in two business units that differed significantly in their customer base, growth potential and market. Business Unit A has a limited number of large clients (120) and operates in a market that is highly competitive. Growth in demand is accomplished mainly by increasing the company's share of the customer's portfolio of purchased products. The typical customer of Business Unit A, the automotive OEM, shares forecasts not more than two to three weeks in advance of ordering. As a consequence, longer term forecasts are based on historical demand data and economic indicators. The sector has recently been disturbed by events such as the 2015 Volkswagen scandal. These market dynamics lead to the observation that demand is volatile and difficult to predict. Demand predictability is considerably higher in Business Unit B. This Business Unit has over 140 000 customers, some quite small in size, it operates in a large and stable market and growth occurs mainly from acquisitions and price increases. While the company's market share in this market is quite stable, the main difficulty in forecasting is to predict the decline or growth of the overall market. Studying the S&OP and the budgeting process in these two business units allowed us to draw conclusions across different settings, while holding factors such as company culture and S&OP maturity consistent. The processes in both business units are aligned and largely the same – the differences lie in the market and the product.

We conducted in-depth, semi-structured interviews with managers involved in the S&OP process (supply chain managers and demand planners) and in the budgeting process (financial planners) in the two business units and with the S&OP leader at company level. The purpose of the interviews was to map the S&OP process and the budgeting process, and to identify the interaction between the two processes. These interviews lasted between 45 and 90 minutes. The information obtained through the interviews was supplemented with follow-up e-mails (e.g., clarification questions after the interviews) and archival data collection, in particular internal documents from S&OP training sessions and visualisations of the internal processes. As a conclusion to the case study, a half-day workshop was organised with representatives of the company to discuss the findings of our investigation.

The theoretical framework underlying our analysis of the S&OP process and the budgeting process has been drawn from Vollmann et al. (2005) and Anthony and Govindarajan (2003) respectively.

S&OP at the case company

The S&OP process in the case company is a monthly iterative process that starts with a product review per business unit focusing on the demand for its products. Forecasts are developed based on information from customers, historical sales data and economic indicators. This information is consolidated in the demand review meeting in which demand forecasts are agreed on. These forecasts do not take into account the aspirations of management (i.e., the sales targets) but they do include the expected impact of some scenarios for new sales opportunities if the likelihood of the scenario is estimated at 80% or higher. The demand meeting is attended by a large group of people from different departments in order to optimise communication and prevent post-hoc discussion. This includes representatives from supply, finance, operations (generally a manager who is familiar with the different plants and their capacity), representatives from the respective business units, a customer service leader, demand planners, and occasionally a dedicated sales person if an unusual event is taking place for a specific business. The representative of finance is present, not to influence the forecast, but to provide input on the current state of finances and margin reports. The demand forecast provides the input for the supply meeting, in which the focus is on the capacity needed to supply the required volumes, at the level of product families. A meeting with finance is organised to hand-over the demand plan as well as the supply plan, which determines the projection of revenues, costs and working capital. This process prepares for the monthly management business review meeting, where consensus is reached on the operating plan, and decisions are made that give directions for the next monthly cycle. This then serves as input for the budgeting process. This process is re-iterated every month.

Budgeting at the case company

While the S&OP process is characteristed by its iterative nature throughout the year, rolling ever forward, the budgeting proces is fixed in the calender year and follows the accounting period from January 1 to December 31 (See Figure 1). Assume that we focus on the budget process for year two.

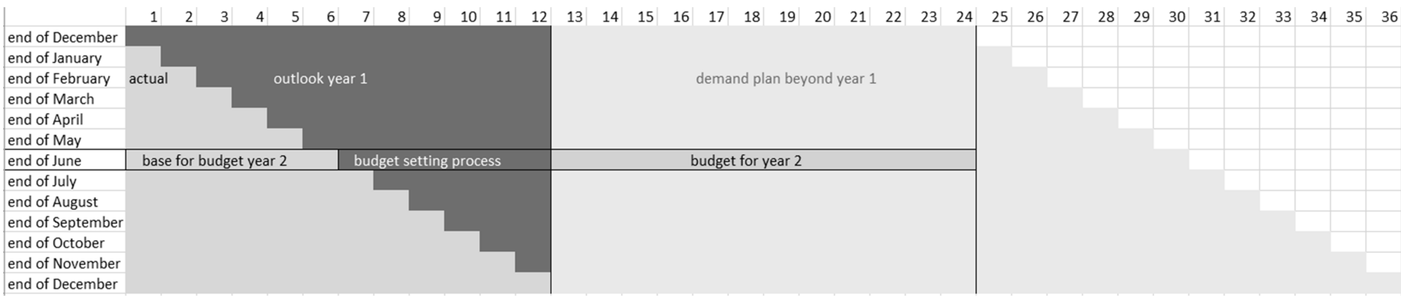

Figure 1. comparison of timing of the S&OP process and budgeting process.

Halfway through the calendar year, the budget preparation commences. The starting point for this preparation is the 6+6 forecast from the S&OP process: six months of history (January – June) and six months of forecasts (July – December). The budgeting process typically starts with the sales budget. The preparation of the sales budget for year two starts from the 6+6 demand forecast at the end of the sixth month of year one as shown in Figure 1. This 6+6 forecast can be adjusted for new trends in the market and new insights coming from the S&OP process. In August year one, top management convenes and records its aspirations to be achieved in the next year. Additional financial targets are included in the budget as top-down expectations of the financial market are often higher than the forecasted numbers coming from the S&OP process. Those financial expectations are allocated to the different decentralised business units and reviewed end of the following month (September year one) per region. A global review takes place end of the month thereafter (October year one). In November year one, the CFO tours all regions to follow-up on the budget preparations for year two.

From February year two onwards, follow-ups of the yearly budget take place. Every month the company makes a forecast including the available actuals and the best estimate for the remaining months. The data for the forecast used in the financial control process is drawn from the S&OP process. Take for example the 3+9 forecast at the end of March year two. This forecast includes the actuals for the first three months of year two and the forecast coming from the S&OP process for the remaining nine months. Every month in year two the company reports a variance analysis comparing the actuals year to date with (1) last year's figures, (2) the budget and (3) the forecast.

The company reports every three months to the financial market. Financial analysts and shareholders closely follow up these quarterly and yearly reports and have clear expectations on the financial performance of the company. At the end of the accounting period, the company compares the budgeted financial results with the actuals and uses those financial performance measures for incentives and compensation.

The budgeting approach is an iterative budgeting process. This means that lower level managers are involved in the process but at the same time it is ensured that the numbers are in line with the expectations of top management and the board of directors. As a consequence, the variance between the budget and the actuals is often higher than the variance between the S&OP forecast and the actuals. The original budget is never adjusted. Once the budget is determined for the calendar year, it is never changed as it reflects the required financial performance of the business units and the company as a whole. If targets are not reached for a region or a product, they can be redistributed to other regions or other products.

Interplay between S&OP processes and budgeting processes

"Everybody knows about the gaps between S&OP and budgeting."
– S&OP process owner

In this case study, we find a two-way interaction between the S&OP and the budgeting process, as each process is providing input to the other one. The S&OP, and more specifically the demand plan, provides a starting point for the sales budget. It includes the impact of some scenarios for generating extra sales, provided the scenario has a probability of more than 80% to materialise. The S&OP's supply plan provides the data that is required to estimate costs and investments in the financial plan. The S&OP also provides a monthly update of the demand forecast, which allows comparison between the financial plan and the best estimate. Based on this, management can identify actions for remedial measures if the actual performance deviates from the financial plan. The budget, in turn, sets the targets for the S&OP. Because of the iterative budgeting process, additional sales targets are included by top management, often related to market expectations and incentive systems.

There are some differences, however, in the characteristics of the S&OP and the budget that cause difficulties in the interaction between the two processes. We summarise these differences in Table 1.

(1) Granularity of data. A first difference lies in the granularity of the data that is used in the two processes. The S&OP focuses on planning at SKU-level, while the budget is set at a higher level of aggregation. The budget therefore lacks the detailed data that is required for the S&OP.

(2) Planning dynamics. The S&OP and the budget have a different time horizon and different frequencies of updating the plan. S&OP works with a monthly rolling forecast for a two-year horizon, while budgeting follows a rigid yearly system with fixed deadlines and reporting dates per calendar year. The plans within the S&OP are expressed in days, weeks and months, while the budget is expressed in months, quarters and years. Quarterly financial reports are required by the regulators and the financial markets.

(3) Language. While the S&OP focuses on volumes and is expressed in SKUs, the budgeting process focuses on financial data. The budgeting process more specifically starts from the budgeted income statement with monthly budgets for gross sales, discounts, cost of goods sold and operating expenses. Afterwards, a cash budget and a budgeted balance sheet is prepared. The S&OP influences the gross sales budget, the budgeted discounts, the budgeted cost of goods sold, working capital and investments in the balance sheet and parts of the cash budget.

(4) Goals and (5) Risks. An important difference is the purpose of the two processes and – related to this – the risk managed through these processes. The purpose of S&OP is to provide optimal service levels and optimal inventory levels in the short term and to facilitate capacity planning in the longer term. As a consequence, the short term risk managed in the S&OP process is having too much or too little inventory and not being able to react in a timely manner to customer requests. The purpose of budgeting on the other hand, is to impact the behaviour of managers to achieve targets as set by the board of directors in line with the expectations of the markets. Top managers translate those targets into expectations for lower level managers during the budget preparation process by making lower level managers accountable for the budget of their business unit. The risk here lies in over- or under promising to headquarters or to the financial markets.

This difference in purpose has some negative implications on the interaction between the S&OP and the budget. The budget puts pressure on the S&OP at fixed moments in the calendar year. In particular, occurrences such as quarterly reports to the financial markets and an incentive system based on yearly performance can disturb the operational process. Because market expectations for every quarter need to be reached and because of incentive systems related to achieving the budgeted figures at the end of the year, people resort to high peak sales right before the quarterly deadline and at the end of the budget year. This was most apparent in Business Unit B, with customers who typically have sufficient warehouse space to store significant quantities and are therefore eager to order large volumes – ahead of the real need - at favourable conditions. It was less apparent in Business Unit A, in which many customers have adopted the lean philosophy and are therefore reluctant to increase inventories through advanced ordering. The S&OP can try to anticipate this influence but the financial position of the company will be negatively impacted. High peak sales can result in loss of revenue because of high discounts being granted (and anticipated by customers) to increase the sales volume or delay of price increases till the next accounting period. High peak sales can also lead to an increase in the cost structure because of direct delivery promises that are less efficient than traditional delivery methods. The motivation for the direct delivery is found in the revenue recognition rules of financial accounting which state that revenue should be recognized when transfer of property and of risk occurs. With direct delivery, this transfer of property and risk occurs more rapidly, enabling recognition of revenues before the end of the accounting period. The altered sales pattern distorts the operations process and leads to inventory problems (shortages or increased inventories), which in turn creates a bullwhip effect. It also increases the outstanding accounts receivable positions in the balance sheet at the end of the accounting period. Alternatively, if targets have been reached before the end of the quarter or the budget year, sales deals may be postponed until the start of the next quarter, to make them contribute to the next quarter's target. This practice creates periods with artificially low sales. Also in this case the financial position of the company is negatively impacted.

Table 1. Overview of the main differences between S&OP and budgeting processes.

	S&OP	Budget
Granularity of data	SKU level	Product family level/more aggregated
Planning	Continuously rolling forward (monthly)	Per calendar year (monthly, quarterly and yearly)
Language	Volumes	Money
Goals	Optimisation of service levels and stock	Respond to top-down imposed targets
Risks	Over – or understock Slow reaction time to respond to requests	Under- or over-promising to HQ or financial markets

As a consequence of the difference in purpose of the two processes, the S&OP was often cited by the interviewees as *reality*, while the budget plan was described by terms such as *wishes, dreams* or a *commitment*. The budget plan was always higher than the S&OP plan and a consistent gap existed that had to be closed to achieve the targets set for the budget. It required a stretch of the bottom- and top-line. Compensation was needed by implementing actions, initiating new projects or exerting pressure on other areas (e.g., other business units or regions that have to fill in the gaps to reach the targeted performance at the global level). This has implications for the way the quality of the process is measured and perceived. Whilst accuracy is an important aspect of the quality of the S&OP process, this is less the case for the budgeting process. In the case company, an accuracy of 96% at SKU-level was achieved in the S&OP process, due to the process of developing a demand forecast based on historical data, complemented with demand estimates of high-probability opportunities for additional sales. Budgeting accuracy on the other hand, was much lower, hovering around 70%. This gap between the two plans is a source of stress for the organisation.

The tension between S&OP reality and budgeting dreams is seen as a yearly struggle that, despite the company's maturity in S&OP, continues to exist. The language used by the interviewees active on the S&OP side suggests that this is 'just the way it is', as can be deducted from the following quotes from the interviews:

"There is not a lot I can do if I don't reach the budget; I have to look for more in the future."

"It would be logical to have a budget for 2018 that is based on the demand of 2017 plus the assumptions for growth. However, targets are added to this. The budget is always a stretch of top-line and bottom-line."

"When we budget for 2018, we already have demand data in the S&OP for 2018. The budget includes top-down targets, so there will be a gap with the S&OP data. We, as management, have to compensate with actions/projects or we have to compensate in another area."

"*We have to fulfil what the analysts (on the stock market) think should be our target for 2018*".

The organisation attempts to overcome the inherent differences between the S&OP and the budgeting process by focusing on *communication.* This communication aspect is cited by several interviewees as a significant factor in improved relations between the departments, in both business units. The involvement of different parties in the demand review meeting (not just demand managers) is seen as especially important since all parties involved not just receive numbers, but are also informed of assumptions underlying these numbers, and can ask for clarifications. This increases the acceptance of these numbers as valid sources of information. To achieve better communication, the financial responsibles and S&OP responsibles meet often and occasionally share an office.

However, upward communication, that is to top management, can be a source of pressure on the relationship between S&OP and budgeting. The budget is seen as fixed, as a commitment that cannot be changed. However, it is a stretch of the S&OP plan, which in itself cannot be changed. Reporting up the ladder often draws attention to these gaps and influences S&OP credibility.

Conclusion

The S&OP process in the case company provides the starting point for the sales budget discussions, provides data for scenario analysis at the moments of preparing the budget and reporting actuals and is used as monthly forecast in the budgeting process. The budget impacts the S&OP due to the quarterly pressure of the financial market and the end-of-year target pressure of the different managers. Those two pressures have an impact on the targets set during the budget preparation and also lead to artificially high or low levels of sales at the end of every quarter and at the end of the budget year. The accuracy of the S&OP improves by anticipating those peaks when a communication line between both departments has been established but also then negative consequences of the two pressures continue to exist. Thus, political issues may interfere with an optimal process: pressure from the financial markets can cause reactions that are opposite to actions required to meet pressure for operational optimisation. The two processes interact and influence each other, yet are not fully integrated nor perfectly aligned. A clear communication between both is necessary to optimise planning on both the short and long term.

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