



## Calculations in Strategic Marketing-Controlling

by Peter Hoberg

In spite of the fact that great amounts of money have been invested, **many product innovations still result in a failure**. Beside the known mistakes (such as unrealistic data, ignoring competition, no real benefit for the customer, too late launch on the market etc.) this article will present yet another cause of product innovations failure: it might be the case that the calculation was methodically incorrect right from the start so that the product innovation should not have been launched at all. It is the function of controlling to methodically support marketing here.

### Proper Evaluation of Innovations

**The question about the benefits of long-running innovations is to be resolved by strategic marketing** which deals with important, long-term tasks assignments. So, for example, it must be determined whether new business fields should be opened up,

whether high investments for new product families are justifiable (cf. e.g. Götze, p. 311 ff.) or whether it is profitable to invest much time and money into a long-term customer relation etc..

Beyond the strategic perspective, marketing deals typically with single-period calculations, especially with contribution margin analysis (for characteristics, assumptions and problems cf. e.g. Hoberg (2008), p. 58 ff.). In that way we can, for example, determine whether a new advertising campaign is profitable. In this context, the starting point for a contribution margin analysis is the assumption that in the decision-making process a considerable portion of costs should not be taken into account because they are fixed costs. In addition, costs and revenues in the single-period area are taken into account without considering how they accrue in time.

However, in strategic marketing more comprehensive approaches are necessary because our decisions bear consequences for many years to come and almost all costs can still change. Thus investment appraisal indisputably serves as the right method of supporting decision-making. That is why we need in the relevant dynamic approach<sup>1</sup> payments instead of costs and sales<sup>2</sup>. By doing so, we encounter the problem of how to derive payments from costs and revenues. Unfortunately, at that point even in recognized standard literature mistakes occur, which results in false decisions. Mistakes in strategic marketing, however, can have devastating consequences as we run the risk of investing in areas which are in longer terms not profitable. The author agrees with Homburg/Krohmer (p. 17) that quantitative analyses force precision, which can be only too seldom achieved through verbal execution. **That is why precise and**

**realistic calculations are necessary.** The calculations are also of the essence because hardly any board of directors would be ready to give a green light to huge investments if the investment appraisal was not in the black. It is all the more important that the marketing-investment calculations are carried out in a methodically correct way.

Therefore this article examines how to make a consistent transition from single-period contribution margin analysis of marketing into long-term oriented marketing-investment calculation. For that reason the up-to-date problems will be analyzed and dealt with. **It will turn out that some innovations which are seemingly positive can with proper analysis end up in the red, and vice versa.** A correct analysis can protect companies against wrong decisions.

**Introductory Example**

In order to illustrate the problems in a transparent way, an example will be provided which presents an innovation from the relevant marketing literature. In Homburg/Krohmer, p. 569, there is the case of decision-making in an innovation project (presented in [image 1](#)).

In addition to the original, whose content was not changed, there are dimensions added in the second column. The added dimensions enable us to better distinguish unit values, especially price and variable unit costs from periodic values. According to that t€/pe means, for example, that the contribution margins are calculated in thousand euros in the respective period. Then fixed costs are deducted from the contribution margins so that we get the profit for each period. As we naturally deal here with a project stretched over a number of years, the sales in subsequent years are discounted to the time t=0. For this purpose an interest rate of 9% p.a. is chosen.

According to the sample data the innovation is very profitable, because after the last year has been added the net present value ends up clearly in the positive range. **Therefore the project is profitable. Really? Probably not.** The calculation-manner contains in fact some crucial flaws presenting the benefits in a too favorable way. It will be illustrated in the following passage.

period	dim	0	1	2	3	4	5	6
number of units	unit/pe	48,600	54,600	72,300	75,360	95,000	110,000	120,000
unit price	€/unit	127.46	125.18	123.79	122.42	121.06	121.06	121.06
variable unit costs	€/unit	90.89	88.79	85.16	81.20	79.13	77.10	73.20
contribution range	€/unit	36.57	36.39	38.63	41.22	41.93	43.96	47.86
contribution margins	k€/pe	1,777	1,987	2,793	3,106	3,983	4,836	5,743
fixed costs								
depreciations	k€/pe	1,205	850	550	280	100	90	50
personnel costs	k€/pe	650	550	450	450	420	400	380
material costs	k€/pe	435	650	700	690	720	765	787
marketing costs	k€/pe	3,500	2,420	500	250	120	100	80
profit	k€/pe	-4,013	-2,483	593	1,436	2,623	3,481	4,446
discounting factor		1.000	0.917	0.842	0.772	0.708	0.650	0.596
<b>profit present value</b>	k€ t=0	-4,013	-2,278	499	1,109	1,858	2,262	2,651
net present value	k€ t=0	-4,013	-6,291	-5,792	-4,683	-2,824	-562	2,089

Image 1: Exemplary New Product Evaluation Based on Homburg/Krohmer p. 569

**Problem Analysis and Solution: Time-Oriented Registration Structures**

The first step deals with time-oriented concept that is adequate to the problem. In the example in question we are talking about time spans and periods. These are terms of contribution margin analysis that cannot be simply taken without proper transformation into an examination that stretches over several years. For the question is: what is meant with *period*? Is it the beginning, the middle, the end or some other point in time? It was demonstrated that while calculating costs and services the values accrue in the middle of a period (cf. Hoberg (2004), p. 271-279).

On the other hand, in investment appraisal almost all authors assume that payments come, for example, from a sales process which takes place at the end of the year (cf. e.g. Ewert/Wagenhofer, p. 44). These are, however, exceptional cases, which seldom resemble reality. When we deal with a single payment, it can be received on each day of the year and even in the subsequent periods, when, for example, long payment terms were agreed upon. The benefits of the options for action can depend on the time when the account was credited with payment. It will be hardly ever the day of sales realization.

Therefore a time-oriented registration structure must be previously designed to cover on the one hand time-span specified

costs and sales and on the other hand payments (see [image 2](#)).

The upper part of [image 2](#) shows payments that come at the beginning or at the end of each year. So these payments meet the requirements for the use of classical investment evaluation process. How does the time concept of contribution margin analysis suit this structure? The first period or the first time span begins at the point in time t=0 that is on the 1.1 of the year 1 and ends on 31.12. of the year 1.<sup>3</sup> Also the point in time 0 is typically the starting point for an investment. Our example will be analyzed according to this structuring. The first step is to correct periodic dimension. **Strategic marketing-investment calculation deals with points in time rather than with time periods.** According to [image 1](#) the company manages already at point 0 to generate the entire annual sales, paying at the same time for the machine and marketing activities. The latter will take naturally some time before it brings effects and, moreover, customers will not buy out the entire quantity already on the first day. So there is a great need for corrections.

In order to omit a total modification of the time structure in the example in question, we assume that the market launch occurs at t=0 and therefore also the main payment of the new investments occurs at that time (see below for details). After that marketing measures start to operate so that sales occur during the first year.

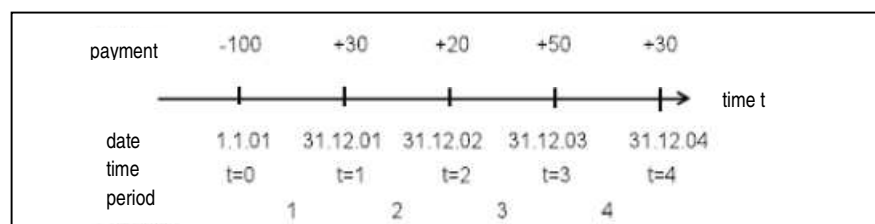


Image 2: Time-Oriented Registration Structure for Payments or Costs and Sales

As mentioned above, there is an implicit premise in one-period calculations stating the payments come on average in the middle of a period, which is reasonable. The sales come over the whole year so that average sales arise often in the middle of the year.<sup>4</sup> Sales do not mean that the company has already received the payments. Therefore sales can be converted into payments only by means of precise transformations. This will be presented in the next paragraph.

## Appropriate Registration of Financial Consequences

As the question about receiving payments is crucial for the profitability of an option for action, it must be addressed in a careful and explicit way. *Explicit* because also the decision-maker who is not aware of the problem makes implicit assumptions (mostly: everything occurs – without regard to reality – at the end of the year). For strategic marketing-investment calculation we need to calculate for all payments when and at what amount they will arrive.<sup>5</sup>

In practice the problem is not easy to deal with because in marketing calculations costs and sales (management accounting) or income and expenses (external accounting) are usually registered with no regard to the time of payments. Financing effects which occur by earlier or later received payments are not at all registered or registered in the financial results as lump payments.

## Transformation of Sales and Costs into Payments

**Unfortunately, only too seldom sales turn immediately into money.** This effect (usually a delay) has to be taken into consideration. The path of average capital employed (receivables, raw materials, semi-

finished and finished goods) is not exact; because while booking sales (at the moment of risk transfer) money can in one extreme case already be received (advance payment) or in second extreme case money can flow in only after many years. It is evident that the economic values of these two circumstances are radically different.

That is why we need an additional bit of information which says **at which moment in time sales turn into payments.** Such payments can appear on every single day of the year, so during ca. 250 working days. However, in economical calculations such numbers of days cannot be taken into account without registration effort becoming inordinately big. In this respect, there is an agreement among the authors who recognize the problem that financial values shall be compared only on certain days. Other authors adopt implicitly the standard calculation method, which makes sense only under the assumption that “everything is received at the end of the year”. **The end of the year, that is 31.12., has evolved into a balance day and maintained its role.** The fact that this is the end day of fiscal year weighs also in favor of its being a balance day.

In costs and sales calculation, which are mainly used in marketing, the question about time reference point is at first surprising. As it was above illustrated, after some consideration one tends to adopt the implicit assumption that it must be the middle of a period (cf. Hoberg (2004), p. 75-81).

Because the assumption for evaluation of investment (and therefore also for the net present value used by Homburg/Krohmer) represents the end of the year, the incompatibility is evident. By transition from costs and sales into payments at the end of the year, compounding in the middle of the

year does not suffice. **For periods of payments have to be also taken into account.** Under no circumstance should it be taken for granted that costs and sales accrue at the end of the year. The possible false conclusions can be observed, for example, by Ewert/Wagenhofer (p.65). In this case costs from the middle of the year were balanced with payments from the end of the year, which naturally led to absurd results.

In reality it needs to be determined when average sales arise, which is, as already mentioned, often in the middle of the year. Then the period of payment is added to that, actually both these agreed upon and not approved periods of payment are added. Anybody with practical experience knows that not only retails groups, but also the state take mercilessly full advantage of their market power and hardly ever pay on time. As time reference point lies at the end of the year, the remaining months are to be calculated. If the sales in the amount of 6,195 t€/pe (48,600 unit/pe \* 127.46 €/unit; see [image 1](#)) from the first period arise on average on 1.7., with period of payments amounting to two months, then the average receipt of payment will occur on 1.9.. So there are still four months left till the end of the year, which are to be bridged by an act of compounding (intra-periodic compounding<sup>6</sup>). With an unchanged effective interest rate of 9% we get the compounding factor  $1.09^{(4/12)} = 1.02914$  so that the sales at the end of the year are worth t€ 6,375.

Even more complicated is **sometimes the transformation of costs into expenses.** For if deliveries should be made on average on 1.7., the products definitely need to be ready. In order to manage it a preceding production is necessary. Material procurement has to be launched even earlier.

So several storage operations are to be considered, when we are not dealing with a just-in-time production. In order to do that it is again also necessary to determine periods for payments. Provided that factors of production arrive in the warehouse on average four months before sales realization and there is a month-long period of payment, then an average payment is received on 1.7.

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		P O I N T S I N T I M E								
value	dimension	-1	0	1	2	3	4	5	6	7
∅ sales accrual, end of month				8.0	8.0	8.0	8.0	8.0	8.0	8.0
unit price per end of year (ye)	€/unit at ye			131.17	128.83	127.40	125.99	124.59	124.59	124.59
annual quantity	unit/pe			48,600	54,600	72,300	75,360	95,000	110,000	120,000
payments	k€ at ye			6,375	7,034	9,211	9,494	11,836	13,705	14,951
∅ variable costs accrual end of month	€/unit at ye			3.0	3.0	3.0	3.0	3.0	3.0	3.0
variable unit costs ye				-96.96	-94.72	-90.85	-86.62	-84.41	-82.25	-78.09
expenses	k€ at ye			-4,712	-5,172	-6,568	-6,528	-8,019	-9,047	-9,370
cash flow of contribution per unit	k€ at ye			34.22	34.11	36.55	39.37	40.17	42.34	46.50
cash flow contribution margin	€/unit at ye			1663	1862	2643	2967	3817	4657	5580
equipment expenses	k€ at ye	-1,563	-1,563							
expenses for marketing costs	k€ at ye		-3,500	-2420	-500	-250	-120	-100	-80	0
∅ fixed costs accrual end of month				5.5	5.5	5.5	5.5	5.5	5.5	5.5
expenses for material and personnel costs	k€ at ye			-1,137	-1,257	1,205	-1,194	-1,194	-1,221	-1,223
total cf	k€ at ye	-1,563	-5,063	-1,894	105	1,188	1,652	2,522	3,357	4,357
<b>cash value cf</b>	<b>k€ in t=0</b>	<b>-1,703</b>	<b>-5,063</b>	<b>-1,738</b>	<b>88</b>	<b>917</b>	<b>1,170</b>	<b>1,639</b>	<b>2,002</b>	<b>2,384</b>
net present value cumulated	k€ at t=0	-1,703	-6,766	-8,503	-8,415	-7,498	-6,327	-4,688	-2,686	-303
final value cumulated	k€ in t	-1,563	-6,766	-9,268	-9,998	-9,710	-8,931	-7,213	-4,506	-554

Image 3: Corrected Evaluation of Innovations Proposal

less four months plus one month, that is on 1.4. in the current year. For that reason it is necessary to compound nine months to reach the end of the year. If variable costs from the first period (especially material) amount to t€ 4,417 as in the example in question, their value will be at the end of the year t€  $4,417 \cdot 1.09^{(9/12)} = \text{t€ } 4,712$ , so we are talking about a significant increase.

Personnel costs accrue at the end of each month, which brings the average of accrued costs to 15.7.. As the works of personnel are also supposed to be done before delivery, there will be a month in advance, so that they are payable till 15.6. For simplicity, let it also facilitate material costs. Thanks to compounding of 6.5 months, the entry of personnel and material costs will be transformed from t€ 1,085 (650+435) into an expense of 1,137 t€ at the point in time t=1 (see [image 1](#) and [image 3](#)).

Investments in the brand have to take place at the beginning of market launch. In this respect, it is assumed that the costs of market launch turn into expenses at the point in time t=0. Also further marketing costs will turn into expenses at the beginning of each year (= the end of the preceding year). This corresponds to the operation from the example in question, so that no compounding is necessary.

## Registering Financial Consequences of Investments

The situation is different when it comes to the registration of investment outlays, which concerns again their accrual in time. This

extends over several points in time as, for example, orders for investments require typically payments according to the degree of completion.

The following exemplary payment conditions are typical for the industry:

- 30% on order placement
- 30% on completion
- 30% on receipt by the customer
- 10% on achievement of agreed performance specifications.

In the example in question these investment outlays are unfortunately twice incorrectly registered. Not only payment conditions are neglected, but also investment outlays run only via depreciation into the calculation. We naturally cannot permit that. For that reason we assume that the total investment outlay is distributed from t€ 3,125 (= sum of depreciation) into two points in time. Let 50% accrue for production start at t=0 and 50% a year before as a payment. It is evident that this will render profitability considerably worse, because it will accrue more interest. But it better reflects the realities of the situation.

If in the example **period-oriented interest amounts** had been calculated, then they could have naturally been omitted in favor of the here presented, more precise approach. Optionally, there would have still been at the end residual values to be considered or expenses for terminating the product life cycle. However, there is no information about that in the example.

## Modified Calculations

After it has already been set out how we are supposed to translate all the important calculation elements into the system of payments, the correct profitability can be now prepared.

Amazingly there can be observed an **enormous difference between the results of the old calculation and the new proper one**:

The positive net present value of 2,089 t€ falls into a negative one of t€ -303; deterioration of t€ 2,392. In relation to the investments for equipment of 3,125 this is a **discrepancy of over 76%**. This is certainly not acceptable.

The question now is about the composition of the difference. Therefore, the sum of the present values of the type of costs is to be considered each time. As described, the payments from sales accrue unfortunately not at the beginning of the year, but on average eight months later. This effect triggers a present value-related deterioration of 2,936 t€. It is true though that the deterioration will

be partly counterbalanced by the later accrued expenses, which brings a present value benefit of t€ 743. So summarized the cash-flow deteriorated by the later accrued contribution margins is worth t€ 2,193.

The later accrued expenses for human and material resources create an improvement of 244 k€. The correction of the investment expenses that were too late credited deteriorates the image by t€ 443. Summarized

cash flow of contribution margins	-2,193 k€
deterioration through investment payments	-443 k€
improvement at human and material resources	+244 k€
total modification	-2,392 k€

Image 4: Corrected Evaluation of Innovations Proposal

the present value-related modifications look like in [image 4](#). With this modification the innovation is not profitable anymore. So a wrong decision could have been made.

## Conclusion

The analysis presented here has proved that there is a real danger in wrong judgments or, as it is often the case, in too good judgments as far as innovations are concerned. The exposed mistakes are related to:

- inappropriate logical time registration systems for payments
- failure to take into account the precise accrual of the current payments
- wrong recording of outlays for investments via depreciation

That is why the approaches were developed by means of which the above mentioned problems can be solved. So the costs and revenues typical for the marketing department can be correctly converted into payments. Innovations that are evaluated on this basis will not “flop”, at least not for methodical reasons.

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## Footnotes

<sup>1</sup> Though the approaches of the statistical investment calculation are based on sales and costs, their disadvantages right in more periodic cases do not make their use sensible. Cf. for details about the characteristics and problems of a statistical approach Hoberg (2007), p. 75-81.

<sup>2</sup> The relation between on the one hand payments and on the other hand costs and services is analyzed in the so called Lücke-Theorem (Lücke, p. 310-324). However, his assumptions are not realistic. Moreover, they take into account a whole concern instead of a single problem.

<sup>3</sup> In principle each point in time can be taken as a starting point. However, because in the advanced calculations the income tax aspects has to be also considered, it is advisable to choose 1.1. as a general starting point. If the day before was chosen, that is 31.12. of the year 0, then for this day a separate tax calculation would have to be conducted.

<sup>4</sup> In most industries this assumption functions quite well. Only few firms such as Christmas tree vendors would have to introduce modifications here.

<sup>5</sup> Further dimensions of the payments lie in their currency and in the security of their amount. However, these aspects will not be deeper analyzed here.

<sup>6</sup> Cf. in detail Hoberg (2010), p. 412-415.