

Price Finding for CrowdFunding of Niche products

CrowdFunding economics for low volume products with high investment costs

Which price should be chosen for a niche product?

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26.04.2018

I wanted to do a Crowdfunding campaign, but the big problem I had in the beginning was that I couldn't decide on the price for the product. The reason for this was the investment costs to be able to produce the product were quite high, and it's a very niche product, so the number of buyers were expected to be very low.

This is the page of the Crowdfunding project: <http://futureware.at/CrowdFunding/>

I asked an electronic company for an offer to produce the board, and their offer said that they have initial costs of about 500 EUR, and every board that would get produced would then cost about 50 EUR.

I calculated the price per product (including packaging, shipping, ...) for a given number of backers and ended up with the following table:

Products	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Product Price	696	386	283	231	200	179	165	153	145	138	132	128	124	120	117	115	112	110	109

Products	20	21	22	23	24	25	26	27	28	29	30	40	50	100	200	500	700	1000	10000
Product Price	107	105	104	103	102	101	100	99	98	97	97	91	88	82	79	77	77	77	76

Let's take a look at a visualisation of the price structure:

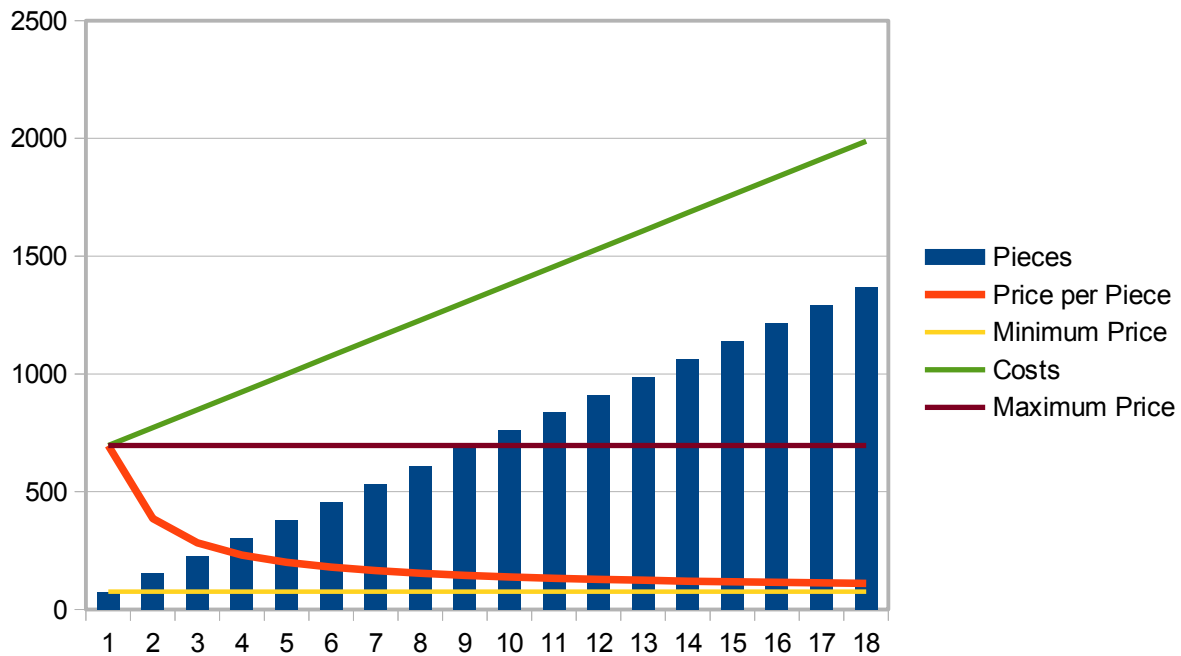


Abbildung 1: Cost Structure

Obviously the real pricing structure can behave more complex than this for more complex products, but this is the general trend for products where you have to invest to be able to produce them.

I thought about how many people might buy the product. The product only targeted people who had bought one specific computer that was produced about 3 years ago (700-1000 people), and of those people only those who were interested in FPGA programming. So I guessed perhaps 3 people, or perhaps 20 people might want to buy it.

I expected either 3, 5 or 20 people to want the product, so I would have had to choose a price of 283€, 200€ or 107€. But I thought with a price point of 283€ or 200€, I would most likely not get any customers, and if I chose 107€ but there would not be enough demand, since there are too few people who are interested in it...

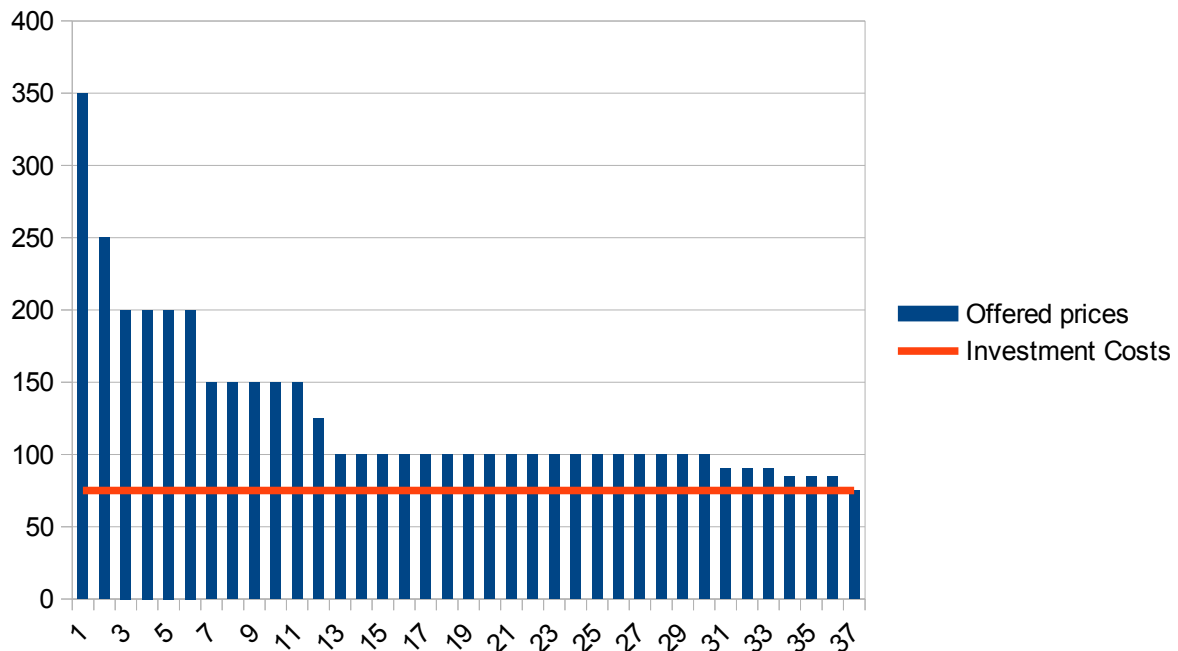
So the problem is that the price depends on the number of people that want it, and the number of people who are interested depends on the price, which is a circular dependency. And the best thing you can usually do with circular dependencies is to break them.

So I gave up trying to find a fixed price, and thought about asking the people what they want to pay instead.

I calculated the minimum price and the maximum price: The minimum price is the cost to produce one product without the investment costs. The maximum price is the full costs to produce one piece plus the investment costs.

Then I setup a campaign website where I explained the minimum and maximum price, and asked everyone to offer the price they are maximum willing to pay for the product, and started the campaign.

I took a look at the offers that came in, and thought about what I could do with them. I visualized, them, sorted them (the offers for several pieces were broken down to individual pieces), the largest offers on the left side, the smallest offers on the right side:



The blue lines show the offered prices, sorted by the largest prices on the left to the smallest prices on the right side.

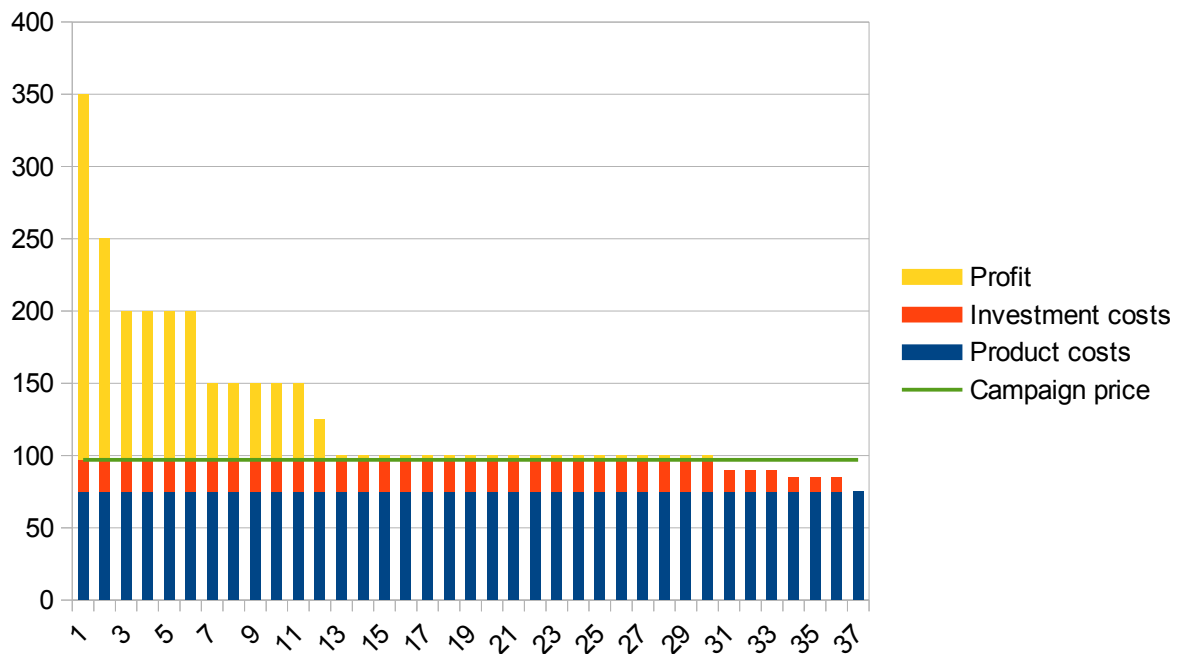
The red line at 76€ shows the minimum price, which separates between the fixed price parts below and variable price parts above. The money above the red line needs to cover the investment costs.

So the next question was, how do we allocate the investment costs from the money above the red line. And I wondered, whether it would be possible with the various offers to reach a fixed price that would be able to fulfil the requests.

I thought that it must be possible to offer a fixed price to all people. It must be possible, to define a fixed price for a product, or not? So had the idea of a „campaign price” which should approximate a fixed price as much as possible. I developed an algorithm that would take analyse all the offers, calculate the total costs, and would then try to calculate the campaign price so that the costs are covered. The campaign price would then be the maximum price the people had to pay. So someone either pays the price he/she offered, or the campaign price, whichever is lower.

Visualizing the effect of the campaign price, we get this:

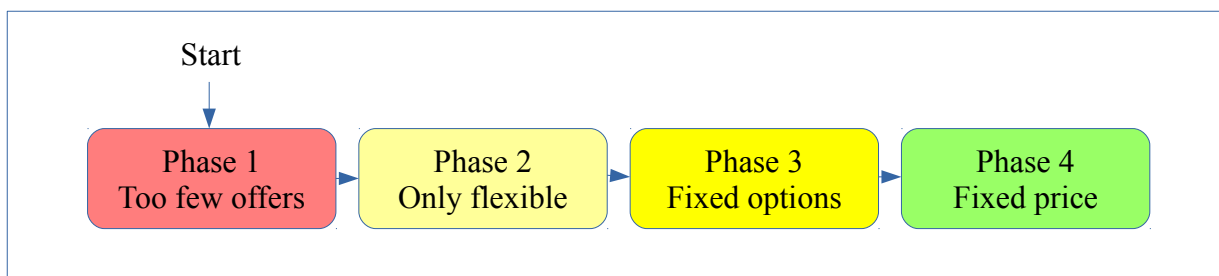
On the bottom we have the fixed prices in blue, the investment costs are nearly evenly spread in the middle in red, and the yellow parts above is the consumer rent, the money the difference the offers can be reduced to the campaign price.



This campaign price would make sure that the campaign would get exactly the amount of money that is needed to produce the goods. And if there were no offers below the campaign price, everyone would have to pay the same, which would be the fixed price we were all longing for to have a fair solution.

So I had a non-optimal solution (non-optimal because it is not a fixed price), that I could run the campaign with, and continued to think about whether it was possible to find an optimal solution for a fixed price instead.

The offers trickled in in waves following the marketing campaigns, and I monitored the progress, and suddenly I realized, that a flexible-price campaign has actually 4 phases, which characterize the demand for an offered product:



1st phase

It starts with the first phase, where if you sum up all the money, you can't cover the investment costs, the campaign would fail, it's not enough money. The reasons for this could be that the niche is too small (perhaps you are not just your best but your only customer), the product is intrinsically too expensive (you should see whether you can reduce the production costs), or something else went wrong with the campaign (did you reach your target audience?).

2nd phase

The second phase (when there are more offers) is when all combined offers bring enough money that you can produce the good, but there exists no single price point where it would be possible to produce it with a fixed price. A fixed priced campaign cannot be financed in this phase.

3rd phase

The third phase (when you have even more offers) is when there exists at least 1 price points where a fixed price would work to produce the good. But in the third phase, you cannot fulfil all orders if you would do a fixed price campaign, so some of the people would be unhappy because they could not get the good. (And often this affects more than 50% of the people)

In this phase there exist price points where a fixed price campaign would fail.

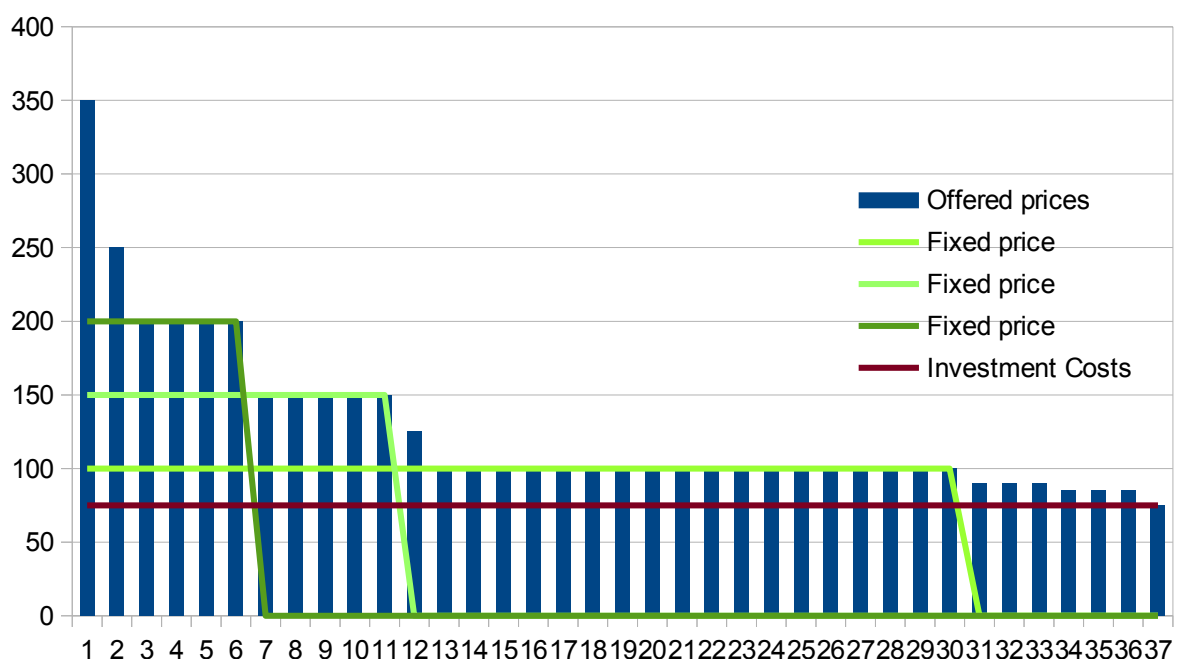
4th phase

And the fourth phase is when there are enough orders that you will have automatically a fixed price that fulfils all orders. This happens when all orders are above the campaign price.

A fixed price campaign on the other hand has only 2 phases: Unfunded and funded:

	Flexible Price	Fixed price
Phase 1	Not funded	Not funded
Phase 2	Funded	Not funded
Phase 3	Funded	Depends on price
Phase 4	Funded	Funded

So let us take a look at the previous example, where the campaign was already in Phase 3, and let us examine the possibilities for fixed prices:



The green lines show the 3 possible fixed prices, 100, 150 and 200 EUR, and the offers that would be fulfilled by them. The money that would be collected with is simply the rectangle below the

green lines. The orders that would not be fulfilled by a fixed price are the orders on the right side of the green lines. The blue lines above the green lines is the money that would not be accepted due to the fixed prices. The money above the red line that is right of the green lines is the money that can be collected to finance the investment costs with flexible prices, that would be lost due to the price level being too high for fixed price scenarios.

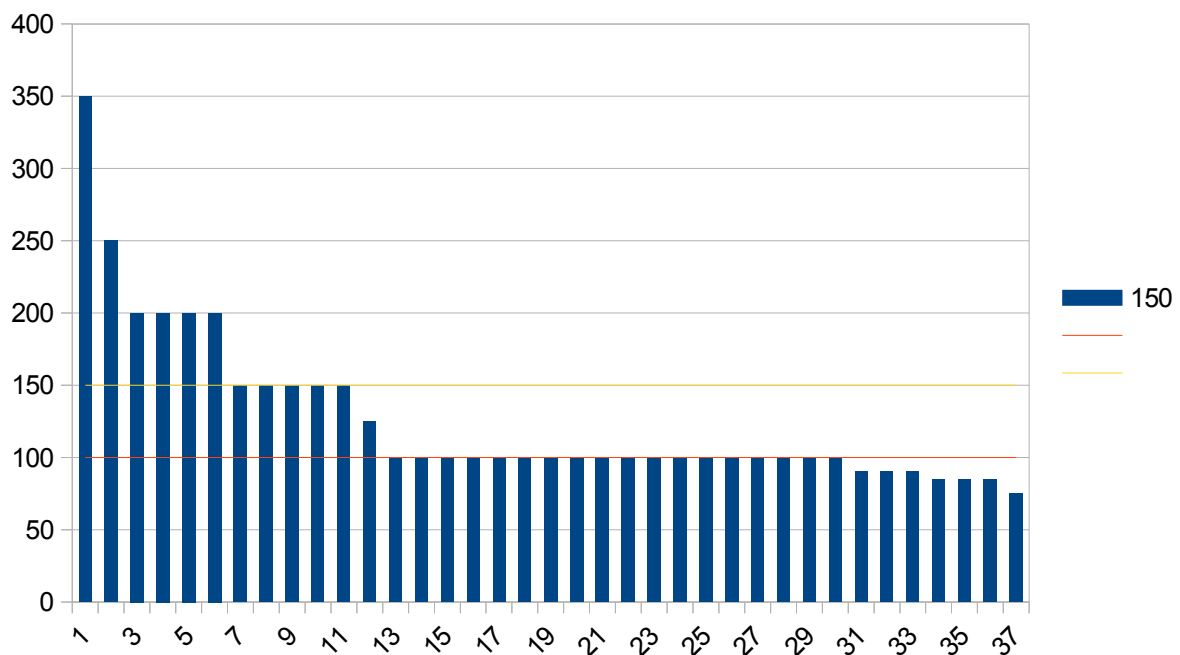
I developed a tool where you can step through the history of the campaign and get explanations about the 4 phases:

<https://www2.futureware.at/cgi-bin/CrowdFunding/status.pl?economics=1>

So it's showing the history of this real campaign I am organizing at the moment, and it can also show some hypothetical scenarios.

<http://www2.futureware.at/cgi-bin/CrowdFunding/status.pl?economics=1&limit=2>

So the first lesson I learnt from it is that fixed prices simply cannot work for Crowdfunding campaigns for products that have a high investment cost : product cost ratio, and a very low number of interested people. (Niche products). The crowdfunding campaign would simply fail with a fixed cost. (Phase 2)



One trend I saw is that usually the medium prices are the ones that are more likely to succeed as fixed prices. (Which is what I have expected from the economics courses I took) But I also have an example situation, where there are 3 price points that would work (100,150,200) for fixed prices, but 1 price point in the middle (125) that could not be financed. So being a price in the middle is not a guarantee that it works for a fixed price. In those situations you would be actually forced to decide for either a higher price or a lower price, but you can't decide for a price in between.

I think the realisation that fixed prices only work for mass market products, and cannot work for niche products might be something quite important for most of the Crowdfunding industry.

I think this is the reason why a lot of Crowdfunding campaigns for niche products actually failed, because they used a fixed price instead of a flexible price.

Transparency

In the beginning I thought whether or not I should display individual offers on the campaign page. I guessed that the existing offers would influence later offers if the previous offers were displayed. I assumed that people would not want to pay more than what others already offered to pay. But this assumption did not hold. Most of the offers were larger than my own initial offer. And at some point of time there was an offer for 350€, while all previous offers were ≤ 100 EUR.

Further risks

Until now we took a deeper look at the initial funding phase of a Crowdfunding campaign. Now let us take a look at the production and fulfilment phase:

With a fixed price campaign, the campaign organizer gets a fixed amount of money when the campaign is successful. Since it usually takes months from the start of the campaign to the fulfilment, things can change and new problems can come up. Needed parts can become cheaper or more expensive. This creates the risk that the money from the campaign is not sufficient for the production and fulfilment in the end. Therefore this risk normally has to be estimated and priced into the campaign, which normally makes the product more expensive.

With flexible price campaign, after the campaign succeeded, the campaign organizer gets the money that is necessary to do the production run (campaign price). But in most cases, the total pledged money will be more than is necessary for covering the costs. So when the time comes that the production needs more money than was originally planned, the organizer can calculate the new campaign price, and if it is within the total budget of pledged money, he/she only has to ask those people who only paid the original campaign price to pay up (or to automatically charge their accounts for the additionally needed sum). Because the backers had already offered more money than was originally needed, they already agreed that they are willing to pay more when needed. Those people who offered less money than the campaign price do not need to be asked to pay up, they already paid their share.

Therefore those campaign risks do not need to be priced into the campaign any more, which leads to cheaper products in the end. And cheaper products are more affordable, which again raises the probability that the financing of the campaign succeeds.

The lowering of the risk that the production and fulfilment runs out of money raises the probability that the Crowdfunding campaigns actually succeed to deliver their products.

And what if there is money left in the end?

In that case the organizer can calculate an updated campaign price, and then pay the money back.

Minimum Price

What if one allows offers below the minimum price?

Phase 4 is not necessarily reachable anymore with such offers, so it might reduce the likelihood of success. Too many offers below the minimum price could make the campaign fail again, even though it would be successful without those offers.

It could be argued that this is unfair for all other people who offer above the minimum price. But on the other hand, there are certain products where the value of the product increases by the number of people who bought it, due to network effects. For example telecommunication equipment: The more

they are bought the more useful they are, since there are more people you can communicate with. Or computers with software-development kits. The more computers with software development kits are sold on the market, the more software will be developed, and the more useful your own computer will get. So in some cases it might make sense to subsidize other users or developers.

Another argument for allowing offers below the minimum price is to collect information, whether the product is too costly. If you only collect offers above the minimum price, you will not know that the production price of your product is too expensive for the interested customers.

So it is suggested that Crowdfunding campaigns should make it possible for the users to offer below the minimum price, but to not guarantee whether their offer will be fulfilled or not.

It might turn out that the production is actually cheaper than expected, in that case you might be able to fulfil orders when the product price lowers.

Maximum price

What if you allow offers above the maximum price?

This would make a lot of sense for investing money into spare parts, replacement parts, since it is likely more economic to do a bigger first production run than having to organize a second production run afterwards.

With the Crowdfunding campaign I did, I asked the people, if the campaign price is below their offer, whether they want their price reduced, or their remaining money invested into the production of spare parts or replacement parts. Approximately 10% of the people wanted their money to be invested.