

Evaluating Sustainable Ceramic Filter Production and Marketing in Nepal

In the last decade, 19 micro-entrepreneurs in Nepal were trained and supported to produce ceramic filters for water treatment at the household level. Qualitative interviews were conducted with them to assess which factors have to be present to have successfully operating businesses. Regula Meierhofer¹, Anne Bogler¹

Introduction

An estimated 1.8 million people do not consume safe drinking water [1]. Household water treatment, if applied correctly and consistently, is a strategy to reduce the health risks related to the consumption of unsafe drinking water [2]. Acceptance and use trials with Household Water Treatment and Safe Storage (HWTS) products have been carried out in recent years and revealed that people have a high preference for filters due to their ease of operation [3]. Organisations such as Village Forward, Unicef/SAPPROS, IDE and Helvetas, therefore, have supported efforts to train local entrepreneurs in the production and marketing of ceramic filters in Nepal since 2005. A total of 19 entrepreneurs were trained in the past decade in producing a ceramic filter that was designed by Potters for Peace, consisting of a pot-shaped filter that fits into a receptacle. This design was modified for production in Nepal, where only the bottom, the filter disk, is made of porous material, not the whole pot. An evaluation was conducted of the 19 potters to collect qualitative information about their business-

es and to identify the factors that support their success, as well as reasons for failure.

Method

Although contact with five of the ceramic filter entrepreneurs could not be established, structured qualitative interviews were conducted with 14 of them. In addition, qualitative interviews were done with the managing staff of the organisations that supported the training and establishment of the production sites. The interviews were complemented with structured observations, and the interview guide covered the different elements of a business model, as well as the enabling environment. It contained 66 questions and covered such issues as production aspects, partnerships with other organisations, customer demand, marketing conditions and marketing measures taken, external market influences, business and management skills of the potter, sales and profit margins and entrepreneurial spirit.

In most cases, the production had never been successfully established. To get a



Photo 1: Potter producing ceramic water filters.

more systematic understanding of the factors that could lead to the successful and sustainable operation of a ceramic filter production business, a Qualitative Comparative Analysis (QCA) was done. Eight potters who had started filter production were questioned to identify the factors that lead to the successful marketing of ceramic filters, which is the outcome variable. This method uses truth tables to find paths that lead to the outcome, whereby a path consisting of causal combinations shows if different factors are present or absent [4].

For the QCA, the information gathered was grouped into the following categories: production (5 questions), collaboration & support (7 questions), customer availability (4 questions), external influences in the market (7 questions), business and management skills (11 questions), marketing skills and effort (6 questions), entrepreneurial spirit (16 questions) and customer interest in filters (10 questions). The answer to each question was rated either as positive (+1), without influence (0) or negative (-1) and was multiplied with an attributed weight between 1 and 3. All the ratings within a category were summed up and divided by the maximally possible score within the category to normalize the scores to a scale from -1 to 1. This score

	Sites							
	D	Pa	K	Ch	Dy	Do	Kb	S
Nr of Filters sold	15 000	4 000	3 750	500	175	150	150	10
Production (P)	0.778	0.778	0.889	0.556	0.167	0.167	0.556	0.944
Collaboration & Support (C)	0.273	0.727	0.909	0.818	0.455	0.455	0.727	0.318
Market (M) joined by logical OR	0.706	0.765	0.912	0.583	0.917	0.917	0.269	0.269
Availability of Customers	0.667	0.417	0.750	0.583	0.917	0.917	0.167	0.250
Ext. Influences Market	0.615	0.615	0.462	0.462	0.846	0.808	0.269	0.269
Interest in Filter	0.706	0.765	0.912	0.412	0.706	0.706	0.118	0.147
Potter (P) joined by logical OR	0.852	0.450	0.630	0.421	0.950	0.650	0.211	0.519
Business Mgmt & Financial Skills	0.816	0.237	0.421	0.421	0.737	0.421	0.211	0.500
Marketing & Effort	0.400	0.450	0.200	0.250	0.950	0.650	0.150	0.400
Entrepreneurial Spirit	0.852	0.389	0.630	0.370	0.593	0.556	0.185	0.519

Table 1: Fuzzy set scores for eight categories/four factors of the different cases.

Site	Outcome Scores		Causal Combinations					
	Cont.	Term.	R*C*~M* ~P	R*~C*~M* P	~R*~C*M* P	R*C*M*~ P	R*~C*M* P	R*C*M* P
D	1.0	0	0.148	0.294	0.222	0.148	0.706	0.273
Pa	1.0	0	0.235	0.235	0.222	0.550	0.273	0.450
K	1.0	0	0.088	0.088	0.091	0.370	0.091	0.630
Ch	0.5	0.5	0.417	0.182	0.182	0.556	0.182	0.421
Dy	0.175	0.825	0.050	0.083	0.545	0.050	0.167	0.167
Do	0.15	0.85	0.083	0.083	0.545	0.167	0.167	0.167
Kb	0.15	0.85	0.556	0.211	0.211	0.269	0.211	0.211
S	0.01	0.99	0.318	0.519	0.056	0.269	0.269	0.269
Consistency for Sufficiency	Cont.		0.623	0.664	0.580	0.811	0.837	0.870
	Term.		0.751	0.636	0.742	0.528	0.482	0.477

Table 2: Membership scores of eight potters in causal combinations ("Production" (R), "Collaboration" (C), "Market" (M) and "Potter" (P)).

subsequently was converted into a value between 0 to 1 by dividing the sum of the score plus 1 by 2.

As only eight cases were available for analysis, the previously formed categories had to be condensed into the four factors "Production", "Collaboration", "Market" and "Potter". "Market" consists of the categories: availability of customers, external influences on the market and customer interest in filters, and "Potter" consists of: business management and financial skills, marketing skills and effort, and entrepreneurial spirit. The categories in the factor "Market" and in the factor "Potter" were joined by using logical OR [5].

The scores for each factor were converted into fuzzy-sets for the QCA. Four factors result in 16 causal combinations. Each potter's membership in each causal combination was calculated using logical AND. The outcome was defined as the successful continuation of ceramic filter production. The scores for continuation were calculated using the number of filters sold by each site divided by 1000. Sites with more than 1000 filters sold received an outcome score of 1. This was done in order to reach a score of 0.5 for one potter who was only producing filters from time to time, i.e., half in and half out of production. If a causal combination had at least one case with membership above 0.5, its consistency and coverage of sufficient conditions were calculated for each outcome [4]. Causal combinations with consistencies above the cut-off value 0.75 were analysed to find which path leads to which outcome.

Results

The qualitative evaluation of the interviews revealed that successfully establishing a production business had been a hurdle for more than half of the trained potters. Eight potters were provided with all the equipment and production resources, while 11 potters were expected to build their own kilns, after receiving training on how to do this. For some, this was too big of a challenge. Lacking equipment, such as the temperature measurement device, prevented two potters from starting production. Some potters found that their clay was unsuitable for firing at high temperatures, and had difficulty finding another source of clay. Two potters are still trying to solve this problem.

Another critical area is demand for the filters. Potters told us that the people in their area are aware of the dangers of drinking unsafe water. However, people often think that their water is safe and does not require treatment. And most of the potters lack resources for marketing and awareness raising. Table 1 shows the fuzzy set scores of the eight cases that successfully established filter production for the factors "production", "collaboration and support", "market" and "potter".

The QCA delivered results that supported the findings of the qualitative evaluation of the potters' cases and yielded more consistent causal combinations for the outcome of continuation than for termination. Production problems or low market demand can end a potter's business. If there are no production problems and there is also high de-

mand, the path to continuation is present. This path also showed that strong collaboration and support, and the potter's expert skills, are exchangeable (See Table 2).

Critical to the further expansion of ceramic filter production in Nepal is the fact that the entire filter business depends on one potter, who helped in its development, and who also produces and supplies the filter disks required by all the potters for their businesses. His production capacity is limited and he cannot meet the demand for filter disks of all the potters.

Conclusion

The evaluation showed that smooth production with good access to all required resources, as well as a good marketing context, are essential for the successful operation of a ceramic filter business. This would include training at least one other entrepreneur in producing filter disks, which would break up the current monopoly held by one person and assure that enough discs are available for all potters. Furthermore, we believe that too many of the entrepreneurs trained in Nepal failed due to problems related to the initial start-up of production. Most of these problems could have been overcome with more coaching on how to set up production and systematic capacity building in how to implement marketing activities.

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