

An Analysis of Product Design, Development, and Support System of Homly Brewed Alcohol Products in Nepal

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ABSTRACT

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Before selling a product to an ultimate consumer, the product must go through a number of processes to be suited to the targeted customer. Product design is a crucial task in product development. This study aims to shed light on the product design of alcohol products that are locally brewed. The method of the study is based on a survey of literature on the product design concept and application of design to alcohol products. The findings show that in the country, alcohol products were designed to meet the expectations of local consumers at the time of feasts and festivals. Both distilled and undistilled products are prepared with different names, though the government has restricted them to production, distribution, and consumption. The transactions seem unrecorded. Findings show that alcohol products are produced in Nepal without introducing a design framework and management innovation. Design management can help improve products and gain competitive advantages over products imported from outside.

Keywords: Design, Design Management, Product Development, Small scale producers, Competitive Advantage,

INTRODUCTION

Every product must pass through three distinct phases within its life cycle: product design, product development, and product support system. Among these, product design is the first and arguably the most crucial phase, essential for clarifying the service and product and realizing its importance. As identified by researchers like Dell' Era, Marchesi, and Yeganti (2010), it is a time to innovate to gain competitive advantages. According to other researchers, it is a time and opportunity to be flexible regarding the products and services the business is selling (Cox, 2005). It is not only about innovation and gaining a competitive advantage but also about ensuring sustainability for the organization. Though it is the beginning of the product development process, it is the most important one in the product development cycle. It increases the potentiality of the marketers. After the product design and development phase is over, the product supporting phase starts for selling the product and retaining customers.

Another comprehensive and integrated practice from the beginning to the end of a product's process is supply chain management, which defines a set of activities to be executed while designing, developing, and distributing a product. The concept of supply chain management divides activities into three critical phases while focusing on the product. They are before the production phase, production phase, and after the production phase, commonly known as upstream, midstream, and downstream. (Yusuf, Gunasekaran, Adeleye, Sivayoganathan, 2004).

Researchers and industrial practitioners persistently endeavor to perfect product design, development, and support systems (PDDSS). They consistently point out that the essentialities of the product design and development process need to be improved in the supply chain (Mozota, 2006). Many entrepreneurs need to gain adequate knowledge and specialize in product design and development processes at each stage of the supply chain (North, Smallbone, and

Vickers, 2001). Most small-scale entrepreneurs do not have design knowledge, although they know it is essential (Brazier, 2004; Abdullah, Zahari & Lamat, 2013).

Entrepreneurs or producers often consider creating a new product while also positioning it in a specific sellable position in the market. At each stage of the product, some activities are undertaken to make the product the best possible by embodying the features that customers like, a process termed design management. Acklin(2010) and Mozota(2002) prescribed designing activities to maintain networking with the different stakeholders and take support for securing the safe position of the product in competition. Producers and entrepreneurs, whether small or big, must invest in designing if they want to ensure sustainability through the sale of the product.

This paper focuses on the design and development of Alcohol, a product produced by a small organization, including households in Nepal. In much literature, such producers have been termed small-scale producers, whose main objectives are twofold: domestic use and sale on a small scale. However, some theoretical concepts of product design, development, and support systems are applicable to small organizations and small producers.

Statement of the problems

There is still a need for a systematic review of the literature to generate knowledge on product design, development, and support systems (PDDSS) for succession in small-scale production processes of alcohol products of small producers and analyze their products from a design point of view.

LITERATURE REVIEW

The difference between product design and development and support systems of big-scale organizations and small organizations provides six significant characteristics.

A number of studies undertaken by many authors have identified that one major issue is a need for more skills, which is a significant shortcoming in the case of small-scale undertakings while designing, so they are not able to take advantage of designing. The opening of Cox (2005), Acklin (2010), Wainwright (1995), Abor and Quartey (2010), and Acklin(2013) reveal the skill shortage in small-scale enterprises.

The studies undertaken by Acklin(2010), Salmimen, Rinkimen, and Khan(2015), and Brazier(2010) prescribed the importance of the need awareness of the design of the product creation of the product that is creating the product at once, even though design costs extra money.

The third shortcoming is that scale organizations can not get expert designers because they need more resources to pay for them, nor can they develop their employees this way(Cox, 2005' Brazier, 2010' Bruce, copper, &Vazquer, 1999).Further, Bruce, Cooper, and Vazquez(added) state that such a producer can not hire an expert designer.

The fourth problem is that it has a deficient level of marketing chance because it can form strategic partnerships with national and international brands(Abor and Quartey, 2010; Laude, Boocock and Pressley, 1994; North Smallbone and Vickers, 2001; Lope-Caros, Atinger, Blanke, Drzeniek and mia, 2006)

The fifth is product design, which is costlier, so it was a subject of financial problems. Product designing often incurs a significant portion of product costs, and small-scale organizations need more capability because their marketing opportunity is confined to a local place. Cox (2005) pointed out that small organizations can not manage financial resources for this because Wainwright warned that such designing costs could even go up to seventy percent of the total costs.

Last but not least, an issue for product design for small-scale organizations is their inability to access new design technology and other operational resources like congenial location and policy and government support to abstain from the competitive power of the giant entrepreneurs(Abor and Quartey, 2010' Noth Smallbone, and Vickers, 2001' Lopez-Claros, Altinger, Blanke and Mia, 2006).

The problems encountered by small-scale producers have been addressed by many authors and practitioners who have done research in this field. Such issues are related to the field, like product design and development, skill management, awareness, access to experts, marketing of the product, economic problems to invest in, accumulating resources to produce design, and policies and laws to make favorable. Authors who devoted are: Abor and Quartey

(2010), Rink-inen and Khan (2015), Abor and Quartey (2010), Utilize technology and Abor (2010), Vickers, North, and Smallbone (2001), Abor and Quartey (2010);Acklin (2010); Acklin (2013); Brazier (2004); Acklin (2010), Bruce, Cooper, and Vazquez (1999); Brazier (2004); Cox review (2005); Acklin (2013), Abor and Quartey (2010);Cox review (2005), López-Claros, Altinger, Blanke, Drzeniek, and Mía (2006), North, Smallbone, and Vickers (2001).North, Smallbone, and Vickers (2001); Wainwright (1995)

Supply Chain Management

A product, whoever has produced it in small or big-scale industries, is an integrated activity of long sequences, which means that a successful product is a result of the appropriate activities of a long process. Each activity in the process needs to be better than rivals if it is to be competitive in the group of industries. Studies by Chang(2009) support the need for better supply chain management to be competitive. Through supply chain management, producers maintain networking with stakeholders and carry out scheduled processes to handle resources and materials in each chain. A well-defined supply chain can forecast the problems that could occur in the production process and take steps to manage them in a timely and efficient manner. The study of Lau, Huang, and Mark (2004) pointed to the need for practical coordinated activities to make better organization through better protection activities and products.

Design Management

Entrepreneurs need a strong knowledge of design management to create a successful product design and development process. Understanding the findings of many studies helps increase competitive advantages.

Mozota (2006) has expressed that design management makes every actor involved in the production have a similar understanding of customer needs and production activities, bringing the same sense of accomplishment by giving the same meaning to the product so that there would be any deviation to define the product and its importance. Design management is further explained by Cooper, Junginger, and Lockwood(2009), stating the harmonious relation among many actors in a production, that is, technicians of the output, distributors of the products, and societies that get the product. It suggests that design and production problems can be solved this way. Many studies look at effective design as an increase in the internal strength of an organization in the name of a resource-based view. An example of this is the study conducted by Fernandez-Mesa, Algre-Vidal, Chiva-Gomez, and Gutierrez-Gracia(2013).

Conclusively, it is true that design management must be embodied in the business strategy with the active involvement of the design team, as expressed by Sebastian & Pins (2009).

RESULTS AND DISCUSSION

Alcohol Design mainly focuses on alcohol concentration. The study, based on 284 samples, revealed different levels of alcohol products. The research related to the alcohol concentration of Home Brewed Alcoholic Beverages in Nepal. Table 1 shows this.

Table 1: Alcohol concentration (%) in 284 samples of Home Brewed Alcoholic Beverages by types and local Nepalese name.

Beverage		Alcohol concentration (% v/v)		
Types	Local Name	No. (%)	Median(IQR)	Total Range
	Total Samples	284 (100)	10.7 (7, 16)	1 – 40
Distilled	Local Raksi (Ayela,tharra)	175(61.6)	14(10, 19)	3 – 40
Non-distilled	Total non-distilled	109(38.4)	5.2 (3.6, 9.8)	1 -18.9
	- Jaand	61(21.48)	5.2 (3.4, 11.1)	2.1-18.9
	- Chhyang	45(15.85)	5.4 (3.6,9.6)	1 -17.1
	- Tongba	3(1.06)	3.5 (2.8, 5.6)	2.1 -7.7

Source: Thapa,¹Aryal,Paudel, Puri, Thapa, Shrestha, Shrestha, Stray(2015).

Home Brewed Alcoholic Beverages include mainly two types of beverages: distilled and non-distilled. Under distilled, two famous names are Ayela and Tharra. Their median alcohol content is 14, their interquartile range is 10-14, and their overall range is 3 to 40. Non-distilled contents have a lower alcohol percentage concentration than distilled contents. Non-distilled has different brewery designs with different names, mainly Jaand, Chyyang, and Tongba, containing alcohol percentages of approximately 21, 16, and 1 percentage of alcohol concentration, respectively, offering different choices to users.

Regarding ecological belts, areas, and input of the product design, Table 2 speaks a lot about alcohol contents in the alcohol products of topological regions and locations. Topologically, Nepal has three ecological belts. In all belts, Alcohol is produced and distributed. Still, there are no significant differences in alcohol contents among the Alcohol made in the mountains, hills, and Tarai ($p > .05$). This result is accurate for the distilled and non-distilled types of Alcohol.

In the case of urban and rural areas, people in the metropolitan regions alcohol products have more alcohol content than the alcohol products of rural areas ($p < .05$). Whereas this is not true in the case of non-distilled types of alcohol products.

Regarding the ingredients, the alcohol content applied seems to be fruits, sugar, cereal, and mixes, and their application seems to be significantly different ($p < .05$). Their orders of input are mixes, fruits, sugar, and cereals with 19, 15.2, 14 and 12.8 respectively.

Table 2: Alcohol Concentration (%) of Home Brewed Alcoholic Beverage by Ecological Belt, Location, and Ingredients Used.

	Distilled (N=175)				Non Distilled (N= 109)			
	No	Median (IQR)	Range (% v/v)	P value	No	Median (IQR)	Range (% v/v)	P value
By Ecological Belt								
Mountain	33	13(10,20)	5-40	0.995	22	5.3 (3.6,9.4)	2.1-18.9	0.289
Hill	58	15 (9, 21.8)	3-40		44	4.4 (3.3,8.2)	1-14.8	
Terai	84	14.5 (11,18)	6-30		43	6.9 (3.5,12.9)	2.1-17.1	
By Location								
Urban/Semi-Urban	30	18 (15,25.8)	6-40	0.001	11	4.8 (3,8.1)	1-10.4	0.36
Rural	145	13 (10,18)	3-40		98	5.3 (3.5,9.8)	2.1-18.9	
By Ingredients								
Cereal	108	12.8 (10,18)	3-40	0.002	100	5.6 (3.5,9.9)	1-18.9	NA
Fruit	12	15.2 (14,16.2)	10-30		1	4.1	4.1-4.1	
Sugar	36	14 (10,18)	6-30		8	3.7 (3.3,4.5)	2.3-13.5	
Mixed	19	19 (17,27)	7-32		0	NA	NA	

Source: Thapa, ¹Aryal, Paudel, Puri, Thapa, Shrestha, Shrestha, Stray(2015)

Alcohol consumption by the proportion of gender

According to the 2019 Nepal STEPS Survey, 57.4% of unrecorded Alcohol in Nepal is homebrewed spirits, such as Aila or Raksi: Jaad, a homebrewed wine. This data means the proportion recorded is 42.6 %, which includes alcohol products made in the country and imported into the country. Table 3 displays that 61.4 % of males and 89.2 % of females have not consumed Alcohol since 2015. (according to estimates based on the research 2015 by Tahapa et al. 2015). Table 4 displays that 11.7 percent of males were daily drinkers, and 2.9 percent of females were daily drinkers.

Table 3: Alcohol abstainers

Results for adults aged 15-69 years (incl. 95% CI)	Both Sexes	Males	Females
Lifetime abstainers ¹	72.2 (68.7-75.5)	56.0 (50.9-61.2)	86.5 (83.5-89.1)
Former drinkers ²	4.0 (2.9-5.1)	5.3 (3.9-6.8)	2.7 (1.5-4.0)
Abstainers in the past 12 months	76.1 (73.0-79.0)	61.4 (56.5-65.9)	89.2 (86.4-91.5)

Source: Nepal STEPS Survey 2019, Alcohol Consumption and Policy Fact Sheet

Table 4: Current users

Results for adults aged 15-69 years (incl. 95% CI)	Both Sexes	Males	Females
Percentage of persons who consumed Alcohol in the past 12 months	23.9 (21.0-27.0)	38.6 (34.0-43.5)	10.8 (8.5-13.6)
Percentage of persons who consumed Alcohol in the past 30 days	20.8 (18.3-23.4)	34.4 (30.2-38.6)	8.8 (6.6-11.0)
Percentage of persons who are daily or almost daily drinkers	7.0 (5.7-8.6)	11.7 (9.5-14.3)	2.9 (1.9-4.3)

Source: Nepal STEPS Survey 2019, Alcohol Consumption and Policy Fact Sheet

Alcohol consumption by the types and proportion of gender

All alcohol products are not sold equally. For instance, Table 5 shows that in Nepal, nearly 51% of people drink Raksi (a traditional alcoholic beverage spirit), which is followed by *Jaad* (a conventional alcoholic beverage-wine), as 24.5% drink it. There comes Beer, and 16.8% drink it.

Table 5: Type of Alcohol most often consumed among those who reported consuming Alcohol in the past 30 days

Results for adults aged 15-69 years (incl. 95% CI)	Both Sexes	Males	Females
Beer	16.8 (12.5-22.1)	20.7 (15.6-26.9)	3.0 (1.6-5.7)
Wine	1.7 (0.6-4.5)	1.9 (0.6-5.7)	0.9 (0.3-3.2)
Spirit (whiskey, vodka, gin)	5.3 (2.6-10.4)	6.6 (3.3-13.0)	0.7 (0.15-3.4)
<i>Jaad</i> (a traditional alcoholic beverages-wine)	24.5 (18.4-31.9)	17.0 (12.1-23.2)	50.8 (39.9-61.6)
<i>Raksi</i> (a traditional alcoholic beveragespirit)	50.9 (44.2-57.6)	53.2 (45.9-60.3)	43.1 (33.3-53.4)
Other traditional (<i>Aila/Tungba</i>)	0.8 (0.3-2.3)	0.6 (0.2-2.3)	1.4 (0.4-4.7)

Source: Nepal STEPS Survey 2019, Alcohol Consumption and Policy Fact Sheet

Designing and distribution of alcoholic products in Nepal.

Some religious people have been producing, distributing, and drinking alcoholic products. Primarily, those religions that come under "Matwali" are entitled to create, distribute, and use Alcohol. The Muliki Ain 1854 divided the caste system of the country, looking at alcohol drinkers and non-drinkers. Alcohol drinkers are known as "Matwali," which consists of Magar, Gurung, Sunuwar, Newar, and Bhote. Chepang, Kumal, Hayu, Tharu, Gharti, etc. The population of Matwali is more numerous than that of Tagadhari (traditionally, they were not allowed to drink Alcohol). Each

Matwali family consumes and produces Alcohol on their own, and they even distribute it, so alcohol production, distribution, and consumption are expected in the country. However, this practice has not taken the form of recorded commercialized products on a large scale. So, some observations were made on the alcohol production distribution practices of Matwali families. The observation results are described in Table 6. The table shows the supply chain of traditional alcohol products. These local kitchen utensils, like "kitli," "Kasaudi," and "Fosi," are used to prepare alcoholic products.

Kitli/Chiyadani: Kitli is a type of pot specialized for boiling water, with a lid, spout, and handle. Traditionally, it was used for boiling water. Kasaudi: Kasauti is a thick brass, bronze, or aluminum cooking pot used primarily in the Hilly and Terai region. This cooking pot is used to cook rice, pulses, and vegetables. Fosi: Fosi is a utensil made of copper that has an opening and a broad base. It is more prominent in size, which is of diverse sizes, can contain ten-plus liter liquid substances, and is used to boil cereals used for producing alcoholic products.

Table 6: Observation of the supply chain of streams and findings

Supply chain stream	Observation	Findings
Upstream	Policy	Mainly, liquor products are produced in a variety of ways.
	Funding/Financial	They use household savings of up to 5000 NPR.
	Long-term strategic planning	They are produced entirely for domestic use and meet the local rituals, feasts, and festivals. The producers make the alcoholic product for orders from the local market and neighbors.
	Incubation/ Education	The producers have learned through ancestors. They have yet to receive any further formal education and training.
Midstream	Design management and Design Support (design sourcing and design briefing, etc.)	Producers make plans for 3 to 6 months when they have to observe ceremonial occasions like parties, marriages, and festivals.
	Design/Product Design and Development	Millage is mainly produced from rice. They boil grains, dry them, add cysts, keep them for a month, and decide whether to distill them or not.
	Design team	The elders use traditional experiences, so no specific design team is available.
	Network	Producers receive orders and sell from their relatives, neighbors, and local marketers based on prior knowledge.
	Multidisciplinary	The producers need to gain more knowledge about the chemical analysis of their products. They do not test how their grain changes over time from beginning to end, and they do not remain cautious about the effects of their products on the users.
	Production	Each producer has a limited production capacity, which is at most 20 liters at a time if they produce distilled products.
Downstream	Marketing/ Trade/ Design promotion	No formal marketing campaign, no registration, and no labeling are exercised.

Source: Observation by author, 2024

Government view on branding and marketing of locally brewed alcohol products

The government of Nepal proclaimed that legal arrangements for branding and marketing liquor should be made only in 2024(Poudel, 2024). With Finance Minister Barshaman Pun highlighting this in the budget, discussions about the commercial production of domestic Alcohol have gained momentum. Ushakala Rai, a former member of the Koshi Pradesh Assembly, has long advocated that "homemade liquor should not be banned but branded.

In one interview, a government official stated three models regarding branding and marketing of locally brewed alcohol products. These are: 1) the Local Government Model, Delegating the responsibility to local levels; 2) the Cooperative Model, Managing through cooperatives; and 3) the Industry Model, Establishing dedicated industries for production and distribution. It requires amendments to the fourth amendment of the Liquor Act of 2031 to release its provisions that restrict the production of Alcohol, distribution, and use. Government support is needed in Section 3 of the Act, which prohibits the production of Alcohol without a license. Here, the license provision must be made, giving the right to produce large quantities for domestic purposes. Similar support is needed through the amendments to Section 4(a), which explicitly prohibits the sale and distribution of domestic liquor. It must be amended, with a specific limit for sale provisioned.

In the fiscal year 2079/80, 25.92 billion rupees were collected from Alcohol and 32.61 billion rupees from Beer. This figure signifies that a considerable amount of alcoholic products are imported from outside. Currently, 40 alcohol industries assemble foreign-brand alcohol products. If the regulation of home-produced Alcohol is made effective by fixing standardization, it will undoubtedly reduce dependency on foreign products and save foreign currency.

CONCLUSION

The study concludes that management innovation has helped producers increase their production and distribution and maintain their customers. In Nepal, from tradition to now, alcohol production is done by different communities and casts. Huge national losses have occurred in the production process due to not introducing design management. Only when small producers get education and skills about the production process can they gain competitive advantages. All the production resources are national resources, so they must be used rationally and skillfully.

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