



# Design Thinking and Innovation in the Informal Industries in Kenya

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## Authors' contributions

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## ABSTRACT

In the recent past there have been calls to have Kenyan products labeled 'Made in Kenya'. By doing so, the proponents believe that products 'Made in Kenya' will flock the local stores and even find their way to the foreign markets, thereby making Kenya proud of itself as well as earning the much-needed foreign exchange. While 'Made in Kenya' labeled products would be a great step forward to Kenya's economic wellbeing, showcase talents and skills of the youth and a boost to its image in the global market, the low technology predominantly used in Kenya and lack of design thinking, still remain the greatest impediment to innovation. Using low technology in manufacturing usually results in high production costs and lack of capacity to launch mass production in response to acute increase in market demands. For example, the informal manufacturing sector in Kenya commonly referred to as Jua Kali, is a collection of semi-organized, unregulated, smaller ventures that employ a large number of people and rely on low-level technologies. A significant amount of industrial output is devoted to meeting basic requirements, such as the provision of low-cost consumer goods and services. Wood and furniture, metal products, glass and pottery, clothes, and leather are all produced in this industry. The lack of design thinking and low-level technology used in the production process obviously results in more man-hour on each unit produced, yet this is rarely

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considered on the final price of the product. The prices to a large scale, are usually concerned with the cost of materials without considering other hidden costs. The drive is to make the products affordable to low-income consumers, in order to satisfy the traders' basic needs. In a wider perspective, this study focused on the application of design thinking and its impact on innovations in the informal industries in Kenya. Specifically, the study sought to establish; the application of design thinking as a system of feasibility to increase innovation in the informal industries in Kenya, the application of design thinking as a system of desirability to increase innovation in the informal industries in Kenya and its impact on the innovation in the informal industries in Kenya, as well as the application of design thinking as a system of viability to increase innovation in the informal industries in Kenya. This study reviewed secondary sources and investigations others have previously conducted in relation to the title of the study. Conventional content analysis was used to analyze data. The process of analysis began with the development of the research questions, then the identification of the dataset, and thorough evaluation of the dataset. Our findings deepen the current understanding about policy innovation and technological intervention in the informal industries in Kenya. The findings could also benefit the Government of Kenya, Kenya Association of Manufacturers and Juakali Associations, in terms of policy formulation and enhancement of sector performance.

*Keywords: Technology; design thinking; innovation; informal sector.*

## 1. INTRODUCTION

The informal sector in Kenya, known in Kiswahili as Jua Kali sector, is a crucial sector in Kenya's economy. As result of the failure by the Government to provide employment to the ever-growing youthful population, the sector has been left to take up this role. The informal sector in Kenya employed roughly 15.26 million individuals in 2021. This corresponded to over 80 percent of the total number of people employed in the country [1]. The situation is even more compounded by the inability of the organized private sector to absorb the growing numbers of jobseekers. In an attempt to find solutions to the problem of unemployment, Kenya's politicians have recently been on a drive to have the informal sector brand their products 'made in Kenya' [2]. In so doing, the politicians believe that products 'Made in Kenya' will flock the local stores and even find their way to the foreign markets, thereby make Kenya proud of itself, create employment as well as earn Kenya the much-needed foreign exchange.

While 'Made in Kenya' labeled products would be a great step forward to Kenya's economic wellbeing, showcase talents and skills of the youth and a boost to its image in the global market, the low technology predominantly used in Kenya and lack of design thinking, still remain the greatest impediment to innovation. For example, Kenya is the largest producer of furniture in East Africa. Ironically, even as the compound growth rate of furniture continues to increase at 10 per cent from 2013, the imports

constitute 13 per cent of the total markets. They are gradually saturating the local market despite the country's resources and long-standing history in the craft. Evidently the country has the material and the skill, yet imports continue to dominate large portions of her markets. One of the significant factors attributed to this discrepancy is poor production facilities as a result of low investment in new technologies [3]. She views design thinking as giving rise to a social technology which has the potential to do for innovation exactly what TQM did for manufacturing: unleash people's full creative energies, win their commitment, and radically improve processes.

The lack of design thinking and low-level technology used in the production process obviously results in more man-hour on each unit produced, yet this is rarely considered on the final price of the product. The prices to a large scale, are usually concerned with the cost of materials without considering other hidden costs. The drive is to make the products affordable to low-income consumers, in order to satisfy the traders' basic needs.

## 2. LITERATURE REVIEW

Rikke, F. D and Teo, Y. S. [4] define Design Thinking as an "iterative process in which one seeks to understand his users, challenge assumptions, redefine problems and create innovative solutions which he can prototype and test". The overall goal is to identify alternative strategies and solutions that are not instantly

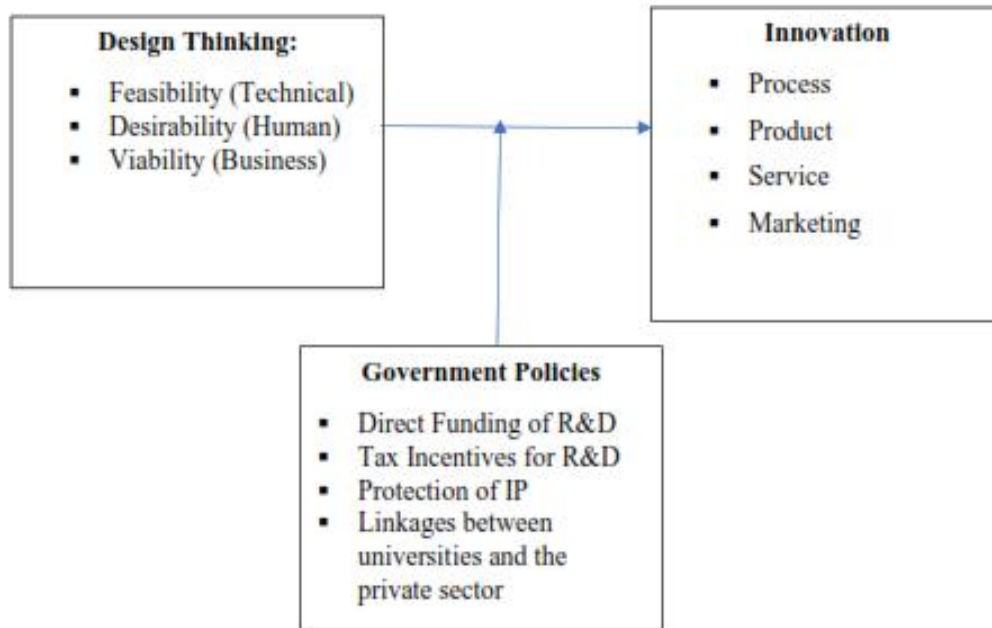
apparent with your initial level of understanding. It is an iterative and non-linear process that contains five phases; Empathize, Define, Ideate, Prototype and Test. According to Chasanidou, Gasparini and Lee [5], Design Thinking (DT) is regarded as a “system of three overlapping spaces, in which *viability* refers to the business perspective of DT, *desirability* reflects the user’s perspective, and *feasibility* encompasses the technology perspective”. Innovation increases when all the three perspectives are addressed. Naiman [6] asserts that DT can be described as a discipline that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity.

Alcor [7] defines innovation as “a process by which a domain, a product, or a service is renewed and brought up to date by applying new processes, introducing new techniques, or establishing successful ideas to create new value”. Generally, definitions of innovation in developing countries posit it as a way to improve people’s lives by transforming knowledge into new or improved ways of doing things in a place where, or by people for whom, they have not been used before [8]. Despite Kenya’s comprehensive policy and institutional framework, the use of innovations and technology is seldom applied in firms. This situation is worse in the informal sector compared to the formal. The effectiveness of the current policy innovation and technological intervention is inadequate in many ways, particularly with regard to the informal sector. For instance, the informal sector is lacking in: exclusive innovation and technology policies to guide the sector; clearly identified non-governmental interventions to nurture innovations or source technology; and recognition of the existing different types of innovations. Given this background, it is important to look into the acquisition of technology, types of innovations and factors affecting innovation in the informal sector [9].

Gautam [10] studied “The role of design in shaping of grassroots innovations in India” and found that DT plays a role in shaping of grassroots innovations developed in the social economy and their diffusion into the market economy. Maina, Rukwaro, and Onyango [11] carried out a study

on “Infusing Design Thinking in the Juakali Production Process”. The trio found that Kenyan products are only competitive in local and regional markets after import duties (25%) and shipping costs are considered. The local industry is also facing limited skills and the use of outdated technology. They recommend that the informal sector considers adopting DT, standardization, quality control, ergonomics and aesthetics in production. Design can support a local network by establishing a co-creation process as the basis for innovations and entrepreneurship in a frugal context, which is the role and value of design thinking for supporting entrepreneurs. The experiences and learnings from frugal innovations are of equal importance as the process and mindset of Design Thinking. A new type of Knowledge Cluster therefore includes not only design knowledge and skills, but also frugal innovation and frugal criteria [12].

A study which is a portion of a larger project based on a new theoretical framework for prototyping called Prototype for X or PFX was carried out. PFX draws from Human-Centered Design (HCD), Design Thinking (DT), and Design for X (DFX) frameworks and methods to enhance the design process and enable designers to prototype more effectively. Among the anticipated impacts of PFX are increases in user satisfaction, technical quality, and manufacturability of end designs. The research marked the first step in testing the impact of PFX on final design outcomes. Results from a between-subjects analysis indicated that PFX methods helped increase the desirability, feasibility, and viability of end designs. These results imply that teams introduced to PFX methods produced prototypes that outperformed designs from the control teams across user satisfaction, perceived value, and manufacturability metrics. These results improved the understanding of the prototyping process and highlight the potential impact that structured prototyping methods could have on end designs [13]. According to Hasso, Meinal and Leifer in their book “Design Thinking: Understand – Improve – Apply”, the heart of the DT process lies at the intersection of technical feasibility, economic viability and desirability by the user. Accordingly, the inquiries of DT research extend to all aspects related to these three dimensions.



**Fig. 1. Conceptual framework**

*Source: Researcher 2022*

### 3. METHODOLOGY

This study reviewed secondary sources and investigations others have previously conducted in relation to the title of the study. Conventional content analysis was used to analyze data. The process of analysis began with the development of the research questions, then the identification of the dataset, and thorough evaluation of the dataset.

#### 3.1 Developing the Research Questions

The key to secondary data analysis is to apply theoretical knowledge and conceptual skills to utilize existing data to address the research questions. Hence, the first step in the process is to develop the research questions [14]. The purpose of this study was to investigate the application of design thinking and its impact on innovations in the informal industries in Kenya. The research questions that guided this work are: Does the application of design thinking as a system of feasibility increase innovation in the informal industries in Kenya? Does the application of design thinking as a system of desirability increase innovation in the informal industries in Kenya? Does the application of design thinking as a system of viability to increase innovation in the informal industries in Kenya? What is the moderating role of

Government policies in the relationship between Design Thinking and Innovation in the informal industries in Kenya.

#### 3.2 Identifying the Dataset

In this research an in-depth literature review of the areas of interest was conducted examining the previous and current work of experts in the field of Design Thinking and Innovation in the informal industries. Through the literature review other researchers on this topic were identified, as were agencies and research centers that have conducted related studies. Recent research and findings were identified and reviewed, as were dissertations in the areas of design thinking, technology, and innovation. Finally, publications touching on Kenya National Federations of Jua Kali also provided necessary valuable information. The researcher had the benefit of an informal network with the youth at the Coast region of Kenya, having been the coordinator for Kenya Youth Employment and Opportunity Project (KYEOP) in Mombasa County.

#### 3.3 Data Analysis and Results

Conventional content analysis was used at this stage. Also called inductive category development, this approach was used because of the limited existing theories or research on the

relationship between design thinking and innovation in the informal industries. Accordingly, data was used as a source to arrive at categories rather than using any of the pre-existing categories. In this approach, the researcher relied entirely on the data to arrive at new insights. The analysis process started by determining coding categories which is basically about following rules detailing out how the content should be categorized. The second stage was coding the content by assigning a label to the text to be analyzed. During the coding process, a number was assigned to each category. The third stage was to check validity and reliability. This involved the testing of the codes that have been designed. The codes needed to be validated for their reliability. The codes had to be tested to check if they indeed measured what they purported to measure and to check if the results were consistent. The establishment of reliability is very critical in the content analysis as any results without proper validation and reliability is considered useless.

#### 4. RESULTS AND DISCUSSIONS

##### 4.1 Application of Design Thinking as a System of Desirability to Increase Innovation

**Table 1. Frequency distribution of DT as a system of desirability to increase innovation**

Desirability	f	%
Affordable	94	44.13
Easy to use	40	18.77
Unique	33	15.49
Efficient	25	11.74
Exciting	21	9.85
<b>Total</b>	<b>213</b>	<b>100</b>

The findings in Table 1 indicate that DT influences innovation by focusing on desirability of product by the user. The most favored desirability indicators are affordability at 44.13%, easy to use at 18.77% and uniqueness at 15.49%. These findings are supported by Goellner et al. [15] who emphasized that contemporary design thinking considers that desirable products need to appeal to their users on emotional, social and intuitive levels, but small and medium-sized enterprises (SMEs) in the informal industries often lack the knowledge and resources to develop desirability-focused design conceptualization programs. Function and usability are still central issues for industrial design, but unless products appeal instantly and

reward longer relationships, chances for success are slim. According to Liedtka [16], it's widely accepted that solutions are much better when they incorporate *user-driven criteria*. Market research can help companies understand those criteria, but the hurdle here is that it's hard for customers to know they want something that doesn't yet exist, DT is the ultimate solution. According to Pinder [17], service designers, human centered designers (HCD), user experience designers (UX) and marketing teams (and others) could finally lead the innovation process by uncovering unmet needs, framing challenges, ideating broadly and developing prototypes to test with stakeholders, long before anyone got near a spread sheet or fancy new technology. The innovation process could be sufficiently de-risked, by ensuring the right problems were being solved with evidence data to support decision making.

##### 4.2 Application of Design Thinking as a System of Viability to Increase Innovation

The results in Table 2 show the highest rated indicators for viability include; demand at 22.15%, profit margin at 21.83%, target market members at 21.83% and market size at 18.99%. According to UXpin [18], viability in DT tells whether or not the product makes business sense. Even if there is the most desirable product in the world, if it's too expensive or isn't profitable, then it's not a good business model. A truly viable product idea makes business sense in the short-term and into the future. The quicker and longer it can deliver a positive return on investment, the higher the viability of your design idea. Firms in the informal industry could understand that there was no point in developing 'product plans' ahead of time for extreme uncertainty products. They need to understand that there is no need to create a complex, unrealistic product (Excel theatre), if there were no customers who wanted the product in the first place [17].

**Table 2. Frequency distribution of DT as a system of viability to increase innovation**

Viability	f	%
Demand	70	22.15
Profit Margin	69	21.83
Target Market members	69	21.83
Market Size	60	18.99
Competitors	48	15.19
<b>Total</b>	<b>316</b>	<b>100</b>

**Table 3. Frequency distribution of DT as a system of feasibility to increase innovation**

Feasibility	f	%
Technology	68	22.67
Financial	65	21.67
People (Skilled workers)	60	20.00
Organizational Structure	58	19.33
Partnerships	49	16.33
<b>Total</b>	<b>300</b>	<b>100</b>

As shown in Table 3, technology leads at 22.67% in the category of indicators for feasibility followed by financial at 21.67% and people at 20%. According to white [19], DT embraces the fast-paced change of technology with a positive outlook that considers every possibility, no matter how “out there” or creative it is. That attitude will be increasingly important as firms in the informal industries find new and exciting ways to make use of emerging technology. Feasibility is about ensuring that your business has the capabilities (or can acquire the capabilities) required to develop and sustain your future innovation: how will I make it work? Feasibility is about resources (people, financial, technology), organizational structures, internal buy-in, partnerships, ecosystems. It requires commitment and vision [20]. Engineering or R&D focused teams could quickly grasp that it was essential to first understand the needs and problems of customers and users, before developing costly technologies that nobody wanted [17].

#### 4.3 Moderating Role of Government Policies on the Relationship between Design Thinking and Innovation

It's evident that Government policies have influence over the relationship between DT and innovation in Kenya's informal industry. This is shown by the rating of the indicators as follows; direct funding for R&D at 30.19%, Tax incentives for R&D at 26.30% and protection of IP at 22.22%. According to Ndemo [21], there is no other way of growing local firms in the informal industries without the government investing in new technologies and creating a conducive business environment. Kenya had unveiled the National Intellectual Property Policy and Strategy that will aid the informal sector players to benefit from their innovative ideas [22]. The Government of Kenya must refocus on the informal sector so as to create jobs at a faster rate and get thousands of idle youths of the streets and into sustainable careers [23-25].

**Table 4. Moderating role of government policies on the relationship between design thinking and innovation**

Government policy	f	%
Direct Funding for R&D	80	30.19
Tax Incentive for R&D	71	26.30
Protection of IP	60	22.22
Linkages between Private Sector & Universities	54	20.00
Training	45	16.67
Loan	40	14.81
<b>Total</b>	<b>270</b>	<b>100</b>

## 5. CONCLUSION AND RECOMMENDATION

The study concluded that DT influences innovation in Kenya's informal industry, by focusing on desirability, viability and feasibility. In terms of desirability, the study concluded that function and usability are still central issues for industrial design, but unless products are affordable, unique and efficient, chances for success are slim. In terms of viability in relation to DT, the study concludes that viability can only take place if the product makes business sense through higher demand, better profit margin, favourable target members and large market size. As for feasibility the study concluded that firms in the informal industries must have the capabilities (or can acquire the capabilities) required to develop and sustain future innovation. These capabilities include; people, financial, technology, organizational structures, internal buy-in, partnerships and ecosystems. Finally, the study concluded that Government policies have influence over the relationship between DT and innovation in Kenya's informal industry. Government policies aligned to direct funding for R&D, tax incentives for R&D, protection of IP, linkages between universities and the private sector and subsidized vocational skill training, play greater role in influencing innovation in the informal industries in Kenya.

The study recommends:

- Creation of awareness about Design Thinking in the informal industries in Kenya. Firms in the industries should be made to understand that it is the practice of design thinking by a team that leads to the opportunity for innovation and each discipline's unique contribution, including

design, that fleshes it out and realizes the potential.

- Linkages between universities and the private sector should be encouraged in order to enhance knowledge transfer for DT and ultimately for innovation
- Government should expand subsidized vocational and artisan training to include those already in the informal industries but have little or no formal education
- Government needs to look at complementing already successful innovators in the informal industries and provide incentives to upgrade existing technologies to boost the sector's productivity and sharpen the competitive edge as a country
- Government needs to tighten the protection of IP of the innovators in the informal industries
- Training program focusing on DT should be introduced in all learning institutions. This is because DT is not a preserve of innovations in manufacturing industries.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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