

A comparative study on the sustainable aspect of Channa Patna wooden toys over mass-produced polymer toys.

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Abstract—Toys play a very crucial role in every child's development in cognitive, sensory, and motor skill development. Traditionally, wooden toys were used; due to industrialization there was a huge increase in polymer toys, which dominated the market because of their low cost, automated plastic products, which costs child's health, creative autonomy, passive play and ecological sustainability. This research investigates aspects of Wooden Toys of Channa Patna over mass-produced polymer toys. The study is founded on the hypothesis that more beneficial due to its natural, non-toxic composition and modular design that collectively enhance a child's cognitive, sensory, and physiological development while promoting environmental sustainability. The study seeks to perform a comparative analysis of Channa Patna wooden toys and polymer toys, assessing their material traits, toxicological safety, and life-cycle effects. The Methodology used is an extensive literature review to collect secondary data, which is useful for comparative analysis. Secondly, the study aims to examine the thoughts and preferences of parents, caregivers, and preschool instructors regarding toy selection. The study uses primary data through a survey method to examine the viewpoints, preferences, and purchasing behaviours of essential stakeholders, including parents, caregivers, and preschool educators. The investigation into the perspectives of parents and educators reveals a critical "Knowledge-Action Gap," where high consumer awareness and a preference for sustainable toys are consistently undermined by a lack of market availability and information.

Index Terms—Channapatna wooden toys, Polymer, Sustainability, child-development, Open-ended desi

I. INTRODUCTION

The toys are considered as part and parcel of children's development, which helps to shape their lives. The objects that a child comes in contact with for the first time are his toys, and they are close to him when his

brain starts growing, giving him a glimpse of the real world outside. In the early stages of childhood, play is the primary way through which children can develop and grow in terms of brain, senses, and motor skills. While playing with toys, children explore their surroundings, educate themselves, role-play, and develop emotional expression. The objects which children engage with are not only Toys, they are pedagogical tools that help them develop the ability to interact with the world surrounding them. Thus, play acts as a medium of enculturation.

Traditional Toys of India depict India's rich history, cultural heritage, folklore, Legends, Mythology, plants, animals, etc. Toys have been produced in the Indian subcontinent since ancient civilizations like Harappa and Mohenjo-Daro around 5000 years ago. Archaeologists have found clay Figures of birds, animals, toy carts, human faces, mother goddess, dancing girl, votive figurines, whistles, dices and many more during the excavations at Harapan sites.



Figure 1 Source: M.S. Vats, 1940. Excavations at Harappa: Being an account of archaeological excavations at Harappa carried out between the years 1920-21 and 1933-34. Volume I – Text; Volume II – 139 Plates., pg 300-301.)

Even today in India, we can see Indigenous toys made of natural materials like Clay, paper, wood, metal, bamboo, cloth, rags and other materials. The Toys of India are categorised based on their material, design, and regional significance which reflects art and skills of local artisans. They are characterised on cultural significance, craftsmanship, and material. Toys act as cultural texts, they carry stories, values and traditions which are passed down to next generation through toys. Toy can tell the story about their community, belief system, lifestyle, rituals, ecology etc. For example, In West Bengal, clay dolls are presented by the mothers in fertility rituals. In Tamil Nadu, the colorful idols of gods are displayed during Navratri festival. Wooden pull-toys like elephants, horses, or bullock carts teach children about animals and agrarian life. Anthropologist Verrier Elwin says “The toys of a people are a mirror of their world.” In India, Indian toys mirrored a cosmos of animals, gods, farmers, and kings. They taught children who they were, what mattered in their community, and how the world around them was ordered. There is a particular branch in Ayurveda that describes characteristics of an ideal toy and play is referred as Kridanaka. An ideal toy imparts a skill or concept, and has a strong influence on children’s thinking and interaction with peers, it also enhances creative expression. Indian culture teaches importance of playing with toys for children s development and growth.

II.COMMON TYPES OF TRADITIONAL TOYS

Terracotta Dolls: Often crafted in various shapes, these dolls serve as both toys and decorative items. They are commonly found terracotta dolls are the Dolls of Velachery [Tamil Nadu] crafts idols used paper mache and clay. these ‘Golu’ dolls, which are arranged on display to tell a story during festivities, are inspired by figures of mythology, epics and folktales. Thanjavur dolls, or Thalayatti Bommai, are known for their bobble head-like oscillating movement. They are made from various materials such as terracotta, marble, clay, and wax. Most depict dancers of the region, especially Bharatanatyam, and members of Thanjavur's royal family. These are handmade toys, crafted without a workshop, which imbues them with rich cultural symbolism that is also prominent during Navaratri Asharikandi Terracotta Toys from Asharikandi village in Assam are made from clay,

sand, straw, and kabish (red clay prepared). Inspired by traditional beliefs and aesthetics, the toys depict deities, animals, birds, and everyday objects, with 'Hatima putul,' a mother with elephant-like ears holding a child, symbolising culture. The craftsmen use simple tools and ancient techniques to craft such figurines that reflect local religious and social customs.

Puppets: Handcrafted paper puppets depict characters from Indian folklore, offering a means of storytelling and entertainment that has persisted for centuries.

Bhatukali: This traditional Indian game from Maharashtra uses small figurines made from clay and cloth, encouraging imaginative play among children. Such toys were primarily made of metal alloys like brass, wood, burnt clay, or Terracotta but nowadays they are also made of Aluminium and plastic fibre.



Figure 2 Image source- telegraph India. Image depicts Bhatukli game

Wooden Toys



Figure 3 Natungram dolls of West Bengal, Image source Wikipedia



Figure 4 Kondapalli Toys of Andhra Pradesh, Image source Wikipedia

India being a diverse country with traditions, culture and same diversity is reflected in Toy making as well. Wooden toys are an integral part of India's cultural heritage. Today, traditional artisans in various states of India craft wooden toys based on the availability of raw materials. Wooden toys are known for their durability and eco-friendliness.

Kondapalli Toys: Hailing from Kondapalli toys, also known as Kondapalli Bommalu, are a 400-year-old heritage craft from the village of Kondapalli in Andhra Pradesh. These GI-tagged wooden figurines, Miniature Bullock cart are celebrated for their lightweight feel, Natural dyes, vibrant storytelling, and deep roots in Indian rural life and mythology.

Natungram Dolls of West Bengal- Natungram dolls hold particular cultural significance as they are directly associated with the goddess Lakshmi. Other examples of such dolls include the famous Gour-Nitai dolls, Krishna dolls and Royal couple dolls.

Wooden Rattles: Frequently used as a baby's first toy, these rattles stimulate sensory development and are typically made from eco-friendly materials.



Figure 5 Rattles, Image source <https://channapatnatoyshop.co.in/>.

Latto (Spinning Tops): This simple yet captivating toy is a favourite among children, offering hours of fun while enhancing motor skills. The tops were earlier crafted in clay and later replaced with wood. Later around 2000 BC, wooden tops were introduced. Today latto are also produced using polymer material.



Figure 6 Latto [Spinning toys], Image Source natkhatduniyastore

Channa Patna wooden toys



Figure 7 Channa Patna toys of Karnataka, Image source www.ChannaPatnatoyshop.co.in



Figure 8 Channa Patna toys for kids, Image source - Indiamart

Channa Patna handicraft wooden toy industry has a significant historical, cultural and heritage importance. The Channa Patna handcrafted wooden toys are unique for their vibrant colours, lacquered finish, and use of non-toxic, natural dyes (Anupama & Srilakshmi, 2021). These toys are crafted in Channa

Patna town in Ramnagar district of Karnataka ,75kms away from Bengaluru .It is known as Toy town of Karnataka [Gombegalur].Channa Patna toys has a rich history of 200years The ruler of Mysuru Tippu sultan was gifted wooden Lacquer toys from Persia, impressed by the craft Impressed by the craft, he invited Persian artisans to Channa Patna to train the local artisans. This merged Persian techniques with indigenous South Indian motifs. The craft 's shape, structure, style have been influenced over the period of time. As early as 1892, hereditary artists called "Chitragars" were engaged in wood-turnery, which is the basis of lacquerware artistry". Varghese, A 2016. In 1900s, Bavas Miyan went twice to Japan to learn lacquered techniques. Bavas Miyan is known as Father of Channa Patna toys Varghese, A 2016. He incorporated Japanese lacquer techniques and mechanised the process by adopting power lathe. He started Industrial School in Channa Patna where he encouraged people of all castes to join and learn the craft. Channa Patna toys received the Geographical Indication (GI) status in 2005. The first cultural tableau at the 66th Republic Day parade at Rajpath was from the state of the Karnataka and the main theme was Channa Patna toys.



Figure 9 Cultural tableau at the 66th Republic Day parade at Rajpath, Image source <https://kannada.oneindia.com/>

More recently, in 2023, a modernized version of the "Dancing Girl" from Mohenjo-daro was created using Channa Patna craft techniques to serve as a mascot for the International Museum Expo, highlighting the craft's versatility. The craft has been down over the generations, preserving the craft for centuries and providing employment to local artisans.

The Channa Patna toys Gugari are the Rattle – the most quintessential Channa Patna toy which comes in

egg or simple dumbbells. Buguri are the spinning tops made in vibrant colours.

Wooden Balancing Doll, Gadi – Simple bullock or horse cart, Gombe which means dolls such as couple Kodagu attire, dolls of Dasara festival -showcasing the famous Dasara festival, birds, animals, Folk art like Yakshagana, Musical instruments etc.



Figure 10 Image displaying Channa Patna wooden toys and idols Image source online

Most of the figurative toys of Channa Patna represent a particular society and culture. The caste system originated in India in ancient times. Various earlier modern rulers during Medieval India transformed this system. In south India, most of the people followed the caste system very strongly. Though peoples from different cast belong to the same society, culturally, they are very different. Even a job also depends on the caste system. Clothing, Jewellery played an important role to identify the people. Most of the Indian businessman families are healthy and fatty. These characters are well reflected through the form, ornamentation, and dresses. A lower cast couple probably associated with farming physically lean and strong. This socio-cultural issue well reflects through Channa Patna couple dolls. The Ceremonial Elephant of Dasara festival depicts the rich and glorious festival of Mysuru and Karnataka. These kinds of socio-cultural reflections enhance the beauty of the Channa Patna toys. Contemporary toys include non-traditional forms such as puzzles, kitchen utensils, Stacking Rings, Pull-along Toy, with medicinal properties attributed to the wood. Apart from these corporate gift items, jewellery, home décor products can also be seen in the market.



Figure 9 Image depicts Mysuru Dasara, Image source <https://www.indiamart.com/>



Figure 11 Channa Patna Wooden Jewellery, Image Source <https://www.gitagged.com>

Wooden toys, especially those created in the traditional way, like Channa Patna woodcraft, are an example of a "low-tech, high-engagement" philosophy. Wooden toys are open-ended by its nature, unlike plastic toys that often offer controlled or passive entertainment by means of batteries and buttons. This simplicity favors "divergent thinking," compelling the child to engage actively in play. The tactile "warmth" and natural feel of wood also provide essential sensory grounding, studies have shown that touching wood, as opposed to synthetic materials, can actually lower physiological stress levels in humans (Ikei et al., 2017). It is in line with well-known educational frameworks like Montessori and Waldorf that support the "Active Child, Passive Toy" principle.

In the middle of the 20th century, the industrial shift and rapid advancement in chemical engineering made synthetic polymers (plastics) the most popular medium because they are cheap and can be made in large quantities and were suitable to make toys. (Trawick-Smith et al., 2015). Plastic was marketed as a "miracle material" unbreakable, washable, and infinitely

moldable. In the 1950s and 60s, the Injection Molding revolutionized the industry, which led to the high-speed production of complex, hollow, and lightweight toys at a fraction of the cost of handcrafted wood (PAG, 2022). This industrial shift successfully democratized toy ownership at the same time initiated a "Linear Consumption Model." Unlike the traditional quality of Channa Patna woodcraft, which is designed for multi-generational use, polymer toys became synonymous with "Fast Fashion" disposable, trend-driven objects that led to global microplastic pollution (Rangaswamy et al., 2018). The famous Barbie doll's success was driven by the ability of polymers to mimic human features and high-fashion textures. 60 million Barbies are sold annually. Their carbon footprint is equivalent to burning 381 million gallons of gasoline per year. Originally a wooden toy company (1932), LEGO switched to plastic in 1947 after purchasing an injection molding machine. Hot Wheels used a "Rocket Scientist" to design high-speed plastic wheels and torsion-bar suspension. As the #1 selling toy in the world by volume, the extraction of Zinc and the production of plastic tracks create a high-intensity linear lifecycle most tracks and cars end up in landfills within 5–7 years.

Despite the value, indigenous toys are sometimes overlooked in favour of mass-produced versions. These plastic alternatives may look great and have automated features, but more and more research shows that this change has hurt children's health, creative freedom, and the environment. As per the recommendations of NEP 2020, the use of indigenous toys can be encouraged in the teaching-learning process because it can enhance students' physical abilities, such as balance, hand-eye coordination, spatial awareness, coordination of movements, fine and gross motor skills, and general body control. Despite the fact natural materials are being discovered to be good for you, the modern toy market is full of plastic toys that are made in large quantities and often have toxic substances like BPA and Phthalates in them. Also, the reality that these synthetic products don't last long contributes a lot to the negative impact that they do to the environment around the world. Additionally, the environmental footprint of petroleum-based toys is substantially higher than that of handcrafted wooden alternatives (Rangaswamy et al., 2018). There is a significant "Knowledge-Action Gap" among urban caregivers:

although they conceptually favor the safety of wood, their purchasing behaviors are disproportionately directed towards plastic due to design challenges such as branding, portability, and retail accessibility.

(Arasuraja et al., 2018). This study aims to fill this gap by highlighting the overall superiority of Channa Patna woodcraft compared to synthetic alternatives

Process of toy making

Visuals of process	Description
	Raw material- Ivory Wood seasoned for several weeks to avoid cracks in the toys
	Cutting the Wood in desired shape based on the shape of the toy
	Shaping the wood in different shapes on the Lathe. Hand tools are also used.
	the wood surface is smoothed using the sandpaper- removes rough edges
	The wooden shape is placed on the lathe and lacquering process is done. Polishing- this creates smooth and glossy surface. Bee wax and screw pine leaves are used to polish the toys

Problem Statement

Mass-produced polymer toys are currently the most popular toys in the world. They are popular because they are cheap to make and can be made in large quantities. But this industrial dominance has led to a serious crisis that is bad for the environment and for the safety of children. The main problem is that synthetic polymers have a linear lifecycle. They are

often made from petroleum and have endocrine-disrupting chemicals like BPA and phthalates. Channapatna wooden toys are better for the environment and for development because they use carbon-neutral Ivory Wood and non-toxic, organic lacquers. However, they are still not very popular in cities. This exclusion leads to a "Knowledge-Action Gap," where even caregivers who care about the

environment choose plastic options because there aren't any established Trust Proxies, standardized safety certifications, or modern brands in the digital retail space.

Furthermore, there is a distinct design-pedagogical disconnect in how modern toys are developed. Mass-produced polymer toys often have "over-designed" automated features that make kids play passively. On the other hand, traditional Channapatna woodcraft is based on open-ended design principles that encourage active cognitive engagement. But these useful benefits are often hidden by social and technical barriers, like the idea that wood is "heavy," the fact that it can't be broken down into smaller pieces, and the fact that it has a traditional "folk" look that doesn't fit with modern minimalist styles. The Channapatna craft cluster is in danger of going out of business because there is no strategic design-led intervention to bridge the gap between artisanal heritage and modern usability standards. Children are still exposed to the developmental and environmental costs of a plastic-reliant play culture.

Objectives

1. To Study the craft of Channa Patna wooden toys and polymer toys.
2. To comparative analysis between Channa Patna wooden toys and polymer toys.
3. To investigate the perspectives, preferences of parents, caregivers and preschool teachers.

Hypothesis –

Wooden toys are superior to plastic as they are non-toxic and its open-ended design helps in child development.

Scope –

This research is based on the Comparative Study of Channa Patna Wooden toys of Karnataka crafted using ivory wood and natural pigments and mass-produced polymer toys. The scope of the study is limited to the material lifecycles, toxicological safety, and pedagogical performance, Play Philosophy, Life Cycle Assessment and Impact on the Environment, Sustainability of these toys, while identifying the socio-technical barriers such as price, branding, and availability that influence the purchasing decisions of urban stakeholders.

Limitations –

- Limitations as to sample type – Parents of infants and kids aged below 10 years.
- Limitations as to sample size -30
- Limitations as to the geographical area - Karnataka and Maharashtra
- Limitations as to the data collected March 2026 to April 2026

II. COMPARATIVE STUDY

Material study -

Traditionally, Channa Patna wooden toys are crafted using biodegradable and eco-friendly material *Wrightia tinctoria*, which is also known as ivory wood. Its light weight and easy to shape the toys due its softness. The finishing process of coloring is done using the natural lacquer (locally called haragu) and vegetable dyes are used, which makes the toys safe for kids and environment friendly (Rangaswamy et al., 2018). The production process is decentralized and is labour extensive, these skills have been passed down through generations. On the other hand, the polymer toys are manufactured from Petroleum based raw materials like polyvinyl chloride (PVC), polypropylene, and acrylonitrile butadiene styrene (ABS). These toys need more energy consuming methods to manufacture toys using injection molding and extrusion, making it a low-cost production and dependent on nonrenewable resources (Kumar et al., 2018). Polymer toys promise scalability and uniformity.

Life Cycle Assessment and Impact on the Environment -

The environment impact of Channa Patna wooden toys is lower when compared with mass produced polymer toys. Channa Patna wooden toys use less energy to make toys and also generates lower greenhouse gases. Thus, making its long-term impact on the environment. Rangaswamy et al. (2018). The polymer toys lead to environment degradation. The extraction and processing of petroleum-based raw materials produce significant carbon emissions, and the non-biodegradable characteristics of plastics contribute to enduring waste accumulation (Kumar et al., 2018). the energy consumed during the entire

lifecycle of a Channa Patna toy is nearly six times lower than that of a PVC alternative.

Toxicological Safety and Physiological Impact

Around 100 chemicals have been found in mass-produced plastic toys, including BPA, Phthalates, and flame retardants, which results in potential health risks to children during the "mouth ability" phase. Erasmus et al. (2021). These endocrine disruptors are largely absent in traditional crafts like Channa Patna lacquerware, which utilize Ivory Wood (*Wrightia tinctoria*) and organic, vegetable-based dyes (Bansal, 2021).

Physiological Impact

Beyond chemical safety, the tactile nature of wood offers unique physiological benefits. Ikei et al. (2017) conducted research on the "Physiological Effects of Touching Wood," proving that tactile contact with natural wood significantly lowers heart rate variability and induces a state of parasympathetic relaxation. In contrast, artificial materials like plastic or metal were found to induce a minor stress response or remained neutral. This implies that wooden toys provide a "Sensory Grounding" effect that is essential in an increasingly overstimulating, digital childhood. The tactile nature of wood has physiological benefits. It reduces heart rate variability and facilitates relaxation of parasympathetic. The polymer-based products cause a small stress response. This means that wooden toys have a "Sensory Grounding" effect that is very important in a childhood that is getting more and more overstimulating and digital.

Play Philosophy

From a pedagogical design point of view, the study shows a "Performance Paradox." Many modern polymer toys are "over-designed," with battery-operated lights and sounds that make them "Passive Play" toys. Open-ended toys (which are usually wooden) produced more high-quality intellectual play and longer engagement periods, and promoted stronger creative problem-solving. It gives the child a blank slate to work with, which helps them develop higher-order cognitive skills and divergent thinking. Conversely, toys that "do everything" — with lights and pre-recorded sounds and batteries — restricted a child's imagination by prescribing one particular scripted interaction. This agrees with the "Active

Child, Passive Toy" philosophy, where the simpler and elemental the design is, that means you have to mentally put in work to "complete" a play experience. Open-ended toys (like wooden toys) enhance cognitive development. Interactive toys aid structured learning but may limit creativity.

Sustainability –

The Channa Patna wooden toys follow circular lifecycle which makes it Sustainable Channa Patna utilizes a "Zero-Waste" system. The use of *Wrightia tinctoria* (Ivory Wood) is carbon-neutral, and when coupled with natural shellac and vegetable dyes, it ensures that the product is entirely biodegradable. The mass-produced polymer toys have linear lifecycle—dominated by brands like LEGO and Mattel—relies on high-energy injection molding and petroleum-derived resins like ABS and PVC, high-quality polymers remain "environmentally permanent," contributing to a global microplastic crisis that persists for centuries after the toy's play-life has ended.

Price –

The price of Channapatna toys is mostly based on the fact that "lac-turnery" is a slow, manual process and that raw materials like *Wrightia tinctoria* (Ivory Wood) are getting more expensive. These materials must reach a certain maturity before they can be harvested. Research shows that a basic plastic rattle can be made in large quantities for less than ₹100 using high-speed injection molding. However, a similar Channapatna rattle usually costs between ₹400 and ₹600. The hidden costs of natural dyes and hand-polishing with crushed lac make woodcraft much more expensive than petroleum-based PVC toys, which makes the gap even bigger. From the point of view of a researcher, this makes it hard for parents to buy wooden toys because they often see them as "luxury gifts" or "souvenirs" instead of cheap, everyday toys, even though they last longer.

Market availability –

The physical and digital footprints of these two groups are very different, which makes it hard for people to access them. Plastic toys are sold in a lot of places, from high-end shopping malls and airport kiosks to local "kirana" stores and quick-commerce apps like Blinkit or Zepto. Channapatna toys, on the other hand, have broken supply chains. They are often only

available in government stores, niche organic boutiques, or specialized online marketplaces. Even though the GI (Geographical Indication) Tag helps keep the craft's authenticity safe, it doesn't fix the "Visibility Gap." So, even parents who want to buy toys made from eco-friendly materials often settle for plastic toys because they are easy to find and buy in cities.

Branding -The branding gap is the biggest "Knowledge-Action" barrier for the Channapatna cluster. Big companies that make plastic toys all over the world, like LEGO and Fisher-Price, use advanced "Trust Proxies" to build trust with kids. These include standardized logos, safety certifications (like ISI or CE marks), and professional marketing that makes kids feel good about the toys. Channapatna branding, on the other hand, is still mostly unorganized and "cluster-focused" instead of "brand-focused." It relies on the craft's general identity instead of individual brand trust. These old-fashioned toys have a hard time showing urban parents how useful they are for teaching without good packaging, modern storytelling, and clear safety-standard labels. Because of this lack of a clear brand strategy, wooden toys are often seen as "static decor" instead of the "scientific, developmental tools" that plastic brands are able to claim to be.

Research gap-

A review of existing literature shows that there is the cultural history and basic material sustainability of various Indian wooden crafts and Polymer based toys. There is a lack of comparative study concerning the functional and market-driven variables like weight-to-volume ratios, Maintenance, energy consumption and competitive branding and marketing strategies of traditional hardwoods versus the lightweight versatility of synthetic polymers.

III.METHODOLOGY

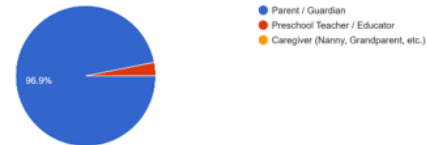
Based on Hypothesis and Objectives of this Study, the researcher employed Comparative study on Channa Patna toys over mass produced polymers through secondary data and employed a convenient sampling method to collect primary data through a questionnaire-based survey to study the perspectives, preferences of parents, caregivers and preschool

teachers. The population is parents staying in urban areas and sample is the parents located in urban areas of Karnataka and Maharashtra. The questionnaire for survey was divided in 4 parts - The first part: - demographic information -Name, Age group etc. The second part includes the questions related to the buying pattern and preferences of parents, the third part includes the questions regarding the challenges, Branding, marketing of Channa Patna wooden toys.

IV.RESULTS AND DISCUSSION

1.Data Analysis and interpretation –

1.What is your primary role?
32 responses

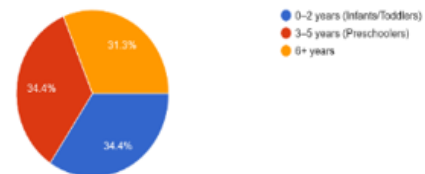


Option	Frequency	Percentage
0–2 years ((Preschoolers)	11	34.4%
Infants/Toddlers)3–5 years	11	34.4%
6+ years	10	31.3%

Analysis – 34.4%of respondents say their children are btw 0–2 years ((Preschoolers),34.4%of respondents say their children are btw Infants/Toddlers)3–5 years are above 6+ years of age

Interpretation – Majority of respondents are Parent / Guardian / Educator of 0–2 years (Preschoolers), while others are parents of 6+ years children.

2.What age group of children do you primarily interact with?
32 responses



Option	Frequency	Percentage
Parent / Guardian / Educator	31	96.9%
Preschool Teacher / Educator	1	31.1%
Caregiver (Nanny, Grandparent, et	0	0

Analysis – 96.9%of respondents are Parent / Guardian / Educator and 31.1%. of respondents are Preschool Teacher / Educator.

Interpretation – Majority of respondents are Parent / Guardian / Educator, while others are Preschool Teacher / Educator.

3. How often do you purchase or select new toys?
32 responses



Option	Frequency	Percentage
Monthly	17	9.4%
Quarterly (Every 3 months)	9	28.1%
Only on special occasions Birthdays/Festivals)	3	53.1%
Anytime, there is no defined frequency (Not Specified If he likes any then we will purchase it	1	3.1%
	1	3.1%

Analysis –9.4%of respondents say they buy toys Monthly,28.1% of respondents say they buy toys Quarterly (Every 3 months) and 53.1%of respondents say they buy toys Only on special occasions Birthdays/Festivals. 3.1% of respondents say they buy toys at TimeLine, anytime there is no defined frequency (Not Specified If he likes any then we will purchase it.

Interpretation – Majority of respondents are bought Only on special occasions Birthdays/Festivals, while others parents buy toys at Any time there is no defined frequency (Not Specified If he likes any then we will purchase it.

4. Where do you primarily discover or shop for new toys?
32 responses



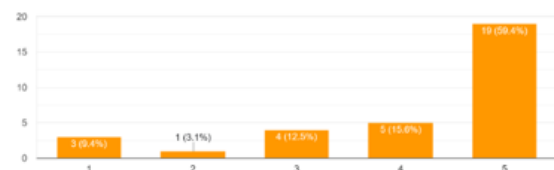
Option	Frequency	Percentage
Online Marketplaces (Amazon, FirstCry, etc.) s/Influencers (Other parents/teachers	13	40.6%
Social Media Ad \Influencers	1	3.1%
Physical Toy Stores/Malls	18	56.35%
Word of Mouth	0	0

Analysis –40.6% of respondents discover toys at Online Marketplaces (Amazon, FirstCry, etc.) ,3.1% of respondents discover toys at Social Media Ad

\Influencers ,56.35% of respondents discover toys at Physical Toy Stores/Malls.

Interpretation - Over half of respondents prefer shopping in person at malls or toy stores. A significant portion of the audience uses marketplaces like Amazon or First Cry.

5. On a scale of 1–5, how much do you agree with the following statement: "I prefer toys that are made of natural materials like wood over plastic." 1 = Strongly Disagree, 5 = Strongly Agree
32 responses



Option	Frequency	Percentage
1	3	9.4%
2	1	3.1%
3	4	12.5%
4	5	15.6%
5	19	59.4%

Analysis – 59.4% of respondents strongly agree with using natural materials like wood over plastic.9.4% respondents strongly disagree with using natural materials like wood over plastic.

Interpretation – Most of respondents strongly agreeing that they prefer wood over plastic. Combined with the neutral-to-positive ratings (3 and 4), a total of 87.5% of participants lean toward natural materials.

6. Which material do you believe is safer for a child who puts toys in their mouth?
32 responses

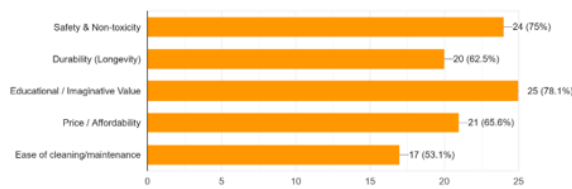


Option	Frequency	Percentage
wood	24	75%
Plastic	0	0%
I am not sure	8	25%

Analysis - 75% of respondents believe that wood is safer for a child to put toys in their mouth.25%of respondents are not sure. 0% of respondents doesn't believe that wood is safer for a child to put toys in their mouth.

Interpretation -Majority of parents strongly believe wood is safer for a child to put toys in their mouth. Remaining parents Doesn't believe that wood is safer for the child to put in their mouth.

7. Please rank these factors in order of importance when buying a toy . Select as many as possible
32 responses

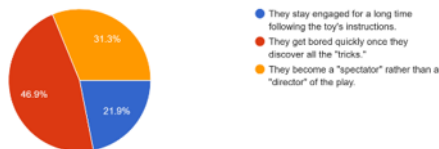


Option	Frequency	Percentage
Safety & non-toxicity	24	75%
Durability (Longevity)	20	62.5%
Educational / Imaginative Value	25	78.1%
Price / Affordability	21	65.6%
Ease of cleaning/maintenance	17	53.1%

Analysis - 78.1% of respondents ranked as factor in buying a toy ,75% of respondents ranked Educational / Imaginative Value as factor in buying a toy, 62.5% prefer durability ,65.6% of respondents ranked Price / Affordability ,53.1% of respondents ranked Ease of cleaning/maintenance as factor in buying a toy.

Interpretation-Majority of parents consider Educational / Imaginative Value as factor in buying a toy and half group of people consider the factor Ease of cleaning/maintenance

8. When a toy has batteries, lights, and pre-recorded sounds (Passive Play), how does the child typically interact with it?
32 responses



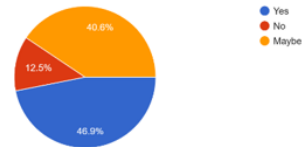
Option	Frequency	Percentage
They stay engaged for a long time following the toy's instructions.	7	21.9%
They get bored quickly once they discover all the "tricks."	16	46.9%
They become a "spectator" rather than a "director" of the play	10	31.3%

Analysis - 21.9% of respondents say that in Passive toy their kids stay engaged for a long time following the toy's instructions.46.9% of parents say that They get bored quickly once they discover all the tricks. and 31.3% say that They become a "spectator" rather than a "director" of the play.

Interpretation- Majority of parents say that their kids get bored quickly once they discover all the "tricks. A

group of parents say a shift from active imagination to passive consumption. The toy dictates the play, leaving the child to watch rather than create. Only a small minority of children remain engaged by following the toy's pre-programmed instructions over a long period

10. Would you be willing to pay a 15-20% premium for a toy if it was certified 100% non-toxic and carbon-neutral?
32 responses

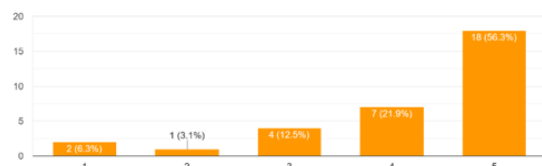


Option	Frequency	Percentage
Yes	22	46.9%
No	11	12.5%
Maybe	0	40.6%

Analysis - 46.9% of respondents say that they are willing to pay 15-20% premium for a toy if it was 100% non-toxic. 12.5% of respondents say that they are not willing to pay 15-20% premium for a toy if it was 100% non-toxic. 40.6% of respondents say that maybe willing to pay 15-20% premium for a toy if it was 100% non-toxic.

Interpretation- Nearly half of parents is ready to pay more, few group of parents say they are maybe willing to buy. Only a small fraction is strictly unwilling to pay more.

11. How would you rate the "Visual Appeal" of Channa Patna toys for a modern nursery or playroom?
32 responses

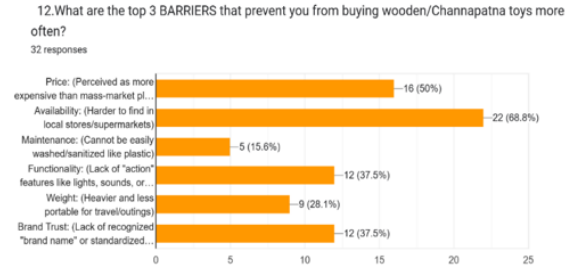


Option	Frequency	Percentage
1	2	6.3%
2	1	3.1%
3	4	12.5%
4	7	21.9%
5	18	56.3%

Analysis 6.3% of respondents rate 1 for the Visual appeal of Channa Patna wooden toys for nursery or playroom. 3.1% of respondents rate 2 for the Visual appeal of Channa Patna wooden toys for nursery or playroom. 12.5% of respondents rate 3 for the Visual appeal of Channa Patna wooden toys for nursery or playroom. 21.9% of respondents rate 4 for the Visual appeal of Channa Patna wooden toys for nursery or

playroom. 56.3% of respondents rate 5 for the Visual appeal of Channa Patna wooden toys for nursery or playroom.

Interpretation – Majority of parents give 5 rating for the Visual appeal of Channa Patna wooden toys for nursery or playroom.

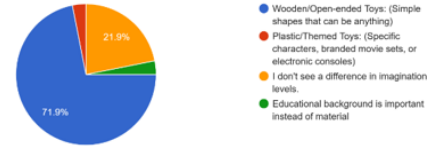


Option	Frequency	Percentage
Price: (Perceived as more expensive than mass-market plastic)	16	50%
Availability: (Harder to find in local stores/supermarkets)	22	68%
Maintenance: (Cannot be easily washed/sanitized like plastic)	5	15.6%
Functionality: (Lack of "action" features like lights, sounds, or motors)	12	37.5%
Weight: (Heavier and less portable for travel/outings)	9	28.1%
Brand Trust: (Lack of recognized "brand name" or standardized packaging)	12	37.5%

Analysis- 50% of the respondents say that Price is the barrier that prevents them from buying wooden toys. 68% of the respondents say that Availability is the barrier that prevents them from buying wooden toys. 15.6% of the respondents say that maintenance is the barrier that prevents them from buying wooden toys. 37.5% of the respondents say that functionality is the barrier that prevents them from buying wooden toys. 28.1% of the respondents say that weight is the barrier that prevents them from buying wooden toys. 37.5% of the respondents say that Brand trust is the barrier that prevents them from buying wooden toys.

Interpretation- Majority of the parents find it difficult to find Wooden toys in the local markets or malls. A minor group of parents find it difficult to maintain the toys.

13. In your opinion, which material better encourages "Imaginative Play" (where the child creates their own stories/scenarios)?
32 responses

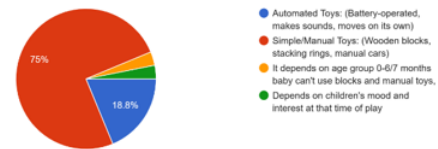


Option	Frequency	Percentage
Wooden/Open-ended Toys: (Simple shapes that can be anything)	24	71%
Plastic/Themed Toys: (Specific characters, branded movie sets, or electronic consoles)	1	3%
I don't see a difference in imagination levels.	7	21%
Other	1	3%

Analysis- 71% of respondents say that Wooden/Open-ended Toys: (Simple shapes that can be anything) encourages Imaginative play. 3% of respondents say that Plastic/Themed Toys encourages Imaginative play. 21% of respondents say that they don't see a difference in imagination levels.

Interpretation- Majority of parents say that Wooden/Open-ended Toys: (Simple shapes that can be anything) encourages Imaginative play. A small group of parents say that they don't see a difference in imagination levels. Minor group of parents say that Plastic/Themed Toys encourages Imaginative play.

14. Which type of toy do you observe keeps the child engaged for a LONGER period of continuous play?
32 responses



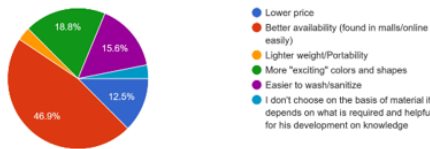
Option	Frequency	Percentage
Automated Toys: (Battery-operated, makes sounds, moves on its own),	6	18.8%
Simple/Manual Toys: (Wooden blocks, stacking rings, manual cars)	25	75%
It depends on age group 0-6/7 months baby can't use blocks and manual toys	1	3%
Depends on children's mood and interest at that time of play	1	3%

Analysis- 18.8% of respondents says that Automated Toys keeps child engaged for longer time of

continuous play .75% of respondents says that Simple/Manual Toys keeps child engaged for longer time of continuous play .3%of respondents says that It depends on age group 0-6/7 months baby can't use blocks and manual toys which keeps the child engaged for longer time of continuous play .3%of respondents says that depends on children's mood and interest at that time of play which keeps the child engaged for longer time of continuous play .

Interpretation- Majority of parents say Simple/Manual Toys keeps child engaged for longer time of continuous play. A minor group of people say that Automated Toys keeps child engaged for longer time of continuous play.

15.What is the MAIN reason you might choose a plastic toy over a Channapatna/wooden toy?
32 responses

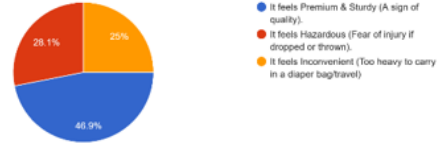


Lower price	4	12.5%
Better availability (found in malls/online easily)	16	46.7%
Lighter weight/Portability	1	3%
More "exciting" colours and shapes	6	18.8%
Easier to wash/sanitize	5	15.6%
Others -I don't choose on the basis of material it depends on what is required and helpful for his development on knowledge	1	3%

Analysis 12.5% respondents say that Lower price is the main reason to choose a plastic toy over a Channa Patna wooden toy .46.7% respondents say that Better availability is the main reason to choose a plastic toy over a Channa Patna wooden toy .3% respondents say that Lighter weight/Portability is the main reason to choose a plastic toy over a Channa Patna wooden toy .18.8% respondents say that "exciting" colors and shapes is the main reason to choose a plastic toy over a Channa Patna wooden toy .15.6% respondents say that Easier to wash/sanitize is the main reason to choose a plastic toy over a Channa Patna wooden toy .3% respondents say that it depends on what is required and helpful for his development on knowledge is the main reason to choose a plastic toy over a Channa Patna wooden toy.

Interpretation- Half of Majority parents say that better availability is the main reason to choose a plastic toy over a Channa Patna wooden toy.

16. How does the "Weight" of a Channapatna toy affect your purchase decision?
32 responses

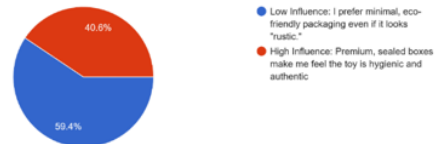


Option	Frequency	Percentage
It feels Premium & Sturdy (A sign of quality).	15	46.9%
It feels Hazardous (Fear of injury if dropped or thrown).	10	28.1%
It feels Inconvenient (Too heavy to carry in a diaper bag/travel)	8	25%

Analysis- 46.9% of Respondents say that weight Feels Premium & Sturdy (A sign of quality). that affect purchase of wooden toy.28.1% of Respondents say that weight Feels It feels Hazardous (Fear of injury if dropped or thrown). that affect purchase of wooden toy.25% of respondents say that weight Feels Inconvenient (Too heavy to carry in a diaper bag/travel) that affect purchase of wooden toy.

Interpretation - Half of Majority of parents say that weight Feels Premium & Sturdy (A sign of quality). that affect purchase of wooden toy. Minor group of parents say that Feels It feels Hazardous (Fear of injury if dropped or thrown) and Feels Inconvenient (Too heavy to carry in a diaper bag/travel) that affect purchase of wooden toy.

17.How much does "Packaging Design" influence your perception of a toy's value?
32 responses

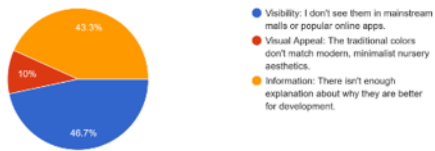


Option	Frequency	Percentage
Low Influence: I prefer minimal, eco-friendly packaging even if it looks "rustic."	20	59.4%
High Influence: Premium, sealed boxes make me feel the toy is hygienic and authentic	13	40.6%

Analysis- 59.4% of respondents say that Packaging design has Low Influence on perception of toy value.40.6% of respondents say that Packaging design has High Influence on perception of toy value.

Interpretation- majority of parents say that Packaging design has Low Influence on perception of toy value.

18. What is the biggest "Marketing Gap" for Channapatna toys
30 responses



Option	Frequency	Percentage
Visibility: I don't see them in mainstream malls or popular online apps.	15	46.7%
Visual Appeal: The traditional colors don't match modern, minimalist nursery aesthetics	3	10%
Information: There isn't enough explanation about why they are better for development	13	43.3%

Analysis -46.7% of respondents say Visibility: I don't see them in mainstream malls or popular online apps is the biggest marketing gap. 10% of respondents say Visual Appeal: The traditional colors don't match modern, minimalist nursery aesthetics is the biggest marketing gap. 43.3% of respondents say that Information- there isn't enough explanation about why they are better for development is the biggest marketing gap.

Interpretation- Half of the majority of parents say that lack of Visibility and Information is the biggest marketing gap.

19. On which platform do you most frequently discover new toy brands or play-based activities for children?
32 responses

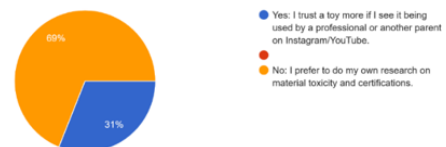


Option	Frequency	Percentage
Instagram (Reels/Influencer posts)	4	12.5%
YouTube (Educational videos/Toy reviews)	3	9.1%
Pinterest (DIY/Nursery decor)	1	3%
I do not follow toy brands on social media	25	78.1%

Analysis- 12.5% of respondents say that on the Instagram (Reels/Influencer posts) platform parents discover new toy brands or play based activities. 9.1% of respondents say through YouTube (Educational videos/Toy reviews) parents discover new toy brands or play based activities. 3% of respondents say through Pinterest (DIY/Nursery decor) parents discover new toy brands or play based activities. 78.1% of respondents say that they don't follow any toy brands on social media.

Interpretation- Majority of parents don't follow any toy brands on social media.

20. Do "Influencer Recommendations" (Parenting bloggers/Teachers) significantly impact your trust in a toy's safety?
29 responses



Option	Frequency	Percentage
Yes	9	31%
No	21	69%

Analysis -31% of the parents say that influencer recommendations impact trust in a toy's safety. 69% of the parents say that influencer recommendations doesn't impact trust in a toy's safety.

Interpretation- Majority of parents trust in toys safety is not impacted by the influencer recommendations.

2. Finding-

Aspect	Channa Patna wooden toys	polymer based toys
Material	Medicinal Wood: Uses Wrightia tinctoria (Ivory Wood) and natural resins (Rangaswamy et al., 2018)	Often PVC, ABS, or Polypropylene derived from petroleum.
Toxicological Safety	Non-Toxic: Coloured with vegetable dyes (Turmeric, Indigo, Kumkum). Safe for "Mouth ability."	Chemical Risks: Potential Presence of BPA, Phthalates, and heavy metal stabilizers.
Durability	Channa Patna toys offer superior heirloom longevity because their solid wood construction resists shattering and chemical breakdown over time.	These toys can become brittle or lose their structural strength over time due to UV exposure and chemical degradation.
Environment impact	Channa Patna wooden toys use less energy to make toys and also generates lower greenhouse gases. Thus,	Emmit greenhouse gases, high environment impact

	making its long-term impact on the environment. Rangaswamy et al. (2018).	
Educational value or creativity	Simple, "Passive" shapes that require a child's imagination to function.	"Active" toys with batteries/sounds that dictate the play script
Price	Channa Patna woodcraft remains at a premium price point due to the high cost of Ivory Wood and intensive manual labour.	mass-produced plastic toys utilize economies of scale to offer low, competitive prices
Market availability	Channa Patna toys are largely restricted to niche boutiques or specialized online platforms. This "Accessibility Gap" often forces even eco conscious parents to settle for plastic alternatives due to the immediate convenience of their availability	Plastic toys dominate the market through ubiquitous distribution across local shops and quick commerce apps. They have strong market presence.
End of life cycle	Designed to last generations; gains character with age.	designed for short-term "trends"; prone to breakage/landfill.
Socio technical Barriers	Supports GI tagged artisan clusters and rural livelihoods.	Profits global corporations; relies on automated factory labour.
Process	labour extensive.	Mass production.

- A clear majority of respondents stated that influencer recommendations do not significantly impact their trust.
- A large group of respondents do not follow toy brands on social media at all. This suggests that for this group, direct brand-to-consumer social media marketing is largely ineffective.
- respondents indicate that elaborate packaging has a low influence on their perception of value. They prefer minimal, eco-friendly, and even "rustic" packaging.
- Nearly half of the respondents simply do not see these toys in mainstream retail environments like malls or popular e-commerce apps.
- parents disregard influencer "hype," preferring to do their own research on toxicity and certifications.
- Parents choose plastic toys primarily because they are easier to find in malls and online which shows a marketing gap.
- Simple/manual toys (like wooden blocks and stackers) keep children engaged longer than automated, battery-operated ones.
- Parents shopping pattern of the toys is occasional.
- Parents prefer shopping in person at malls or toy stores. A significant portion of the parents uses marketplaces like Amazon or First Cry.
- Parents prefer buying wooden toys are aware that wood is safer for a child to put toys in their mouth.
- Parents consider Educational / Imaginative Value as a factor in buying a toy and half group of people consider the factor Ease of cleaning/maintenance.

- parents say that their kids get bored quickly once they discover all the tricks.

3. Suggestions

- Since most of parents prefer physical shopping, they can look for "Experience Centres" or artisanal fairs you feel and touch the toys to know about the safety and sustainability of the toy.
- Parents can visit online websites, Online stores for wooden sustainable and safe toys.
- traditional Channa Patna toys are coloured using Natural Lac (derived from insects) and vegetable dyes (like turmeric for yellow). This makes them the safest choice for toddlers who put toys in their mouths.
- When choosing between a ₹500 plastic toy and an ₹800 Channa Patna wooden toy, consider the Life Cycle. Wooden toys are often "heirloom quality," meaning they won't crack or break after a few months, providing better long-term value.
- When shopping in physical stores check for the seamless, rounded edges characteristic of hand-turned wood and natural lacquer painted toys.
- Parents should partner with certified paediatricians or safety inspectors rather than general lifestyle bloggers.
- Focus on developing parenting forums, local community groups, or WhatsApp/Telegram groups where parents share organic recommendations.
- Choose smaller, hollowed-out, or lighter wooden rattles to avoid injury from dropping.

4.Recommendation-

- Channa Patna toys artisans have a strong presence on Amazon, First Cry, and Etsy. Use high-quality photography that highlights the glossy, natural lacquer finish.
- collaborate with premium lifestyle stores or museum gift shops in major cities to showcase these toys as "heritage pieces" rather than just playthings.
- Collaborate with influencers who are parents, preschool teachers to promote traditional toys.
- Artisans should strongly Market the fact that your toys are completely biodegradable and carbon-neutral, using sustainably sourced ivory wood (Aale mara)
- Focus on Direct-to-Consumer (D2C) Storytelling with the help of social media.
- Promote the GI (Geographical Indication) Tag status of Channa Patna in packaging, social media marketing etc. This acts as a seal of authenticity that plastic competitors cannot claim.
- Marketing materials should prioritize safety labels (e.g., BPA-free, ASTM standards, CE marking) over aesthetic "lifestyle" shots.
- Incentivize current customers to recommend to their friends. Word of mouth plays important role to increase sales.
- Optimize for Search (SEO/SEM as parents aren't following brands on social media, they are likely discovering toys through intent-based searches on Search engines.

V. CONCLUSION

This research validates the hypothesis that Channa Patna wooden toys are superior to polymer alternatives due to their non-toxic material composition and open-ended design, which significantly enhances cognitive development and child safety. The investigation into the perspectives of parents and educators reveals a critical "Knowledge-Action Gap," where high consumer awareness and a preference for sustainable toys are consistently undermined by a lack of market availability and information. To overcome these barriers, the study concludes that traditional craft clusters must address specific functional variables such as weight-to-volume ratios and maintenance

convenience—while adopting competitive digital marketing strategies to transform these artisanal products from niche cultural souvenirs into accessible, trusted developmental tools for the modern global market.

Area of further study-

Future research can focus on how the weight of wooden toys and the effort required for maintenance affect consumer choices. There is an opportunity to measure the exact energy savings of handmade production compared to large-scale plastic factories. Providing this data will help prove to eco-conscious shoppers that traditional crafts are a significantly better choice for the environment. Further study can explore how to make Strong marketing and easier to find online. Comparative study on other traditional wooden toys of India.

ACKNOWLEDGEMENT

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SURVEY QUESTIONNAIRE

1. What is your primary role?

- Parent / Guardian
- Preschool Teacher / Educator
- Caregiver (Nanny, Grandparent, etc.)
- Add option or add "Other"

2. What age group of children do you primarily interact with?

- 0-2 years (Infants/Toddlers)
- 3-5 years (Preschoolers)
- 6+ years

3. How often do you purchase or select new toys?
Monthly

- Quarterly (Every 3 months)
- Only on special occasions (Birthdays/Festivals)
- Other

4. Where do you primarily discover or shop for new toys?

- Online Marketplaces (Amazon, First Cry, etc.)
- Social Media Ads/Influencers
- Physical Toy Stores/Malls
- Word of Mouth (Other parents/teachers)

5. On a scale of 1-5, how much do you agree with the following statement: "I prefer toys that are made of natural materials like wood over plastic." 1. Strongly Disagree, 5 Strongly Agree

6. Which material do you believe is safer for a child who puts toys in their mouth?

- Wood (Natural lacquer/Vegetable dyes)
- Plastic/Polymers (PVC/ABS)
- I am not sure.

7. Please rank these factors in order of importance when buying a toy. Select as many as possible

- Safety & Non toxicity
- Durability (Longevity)
- Educational/Imaginative Value
- Price/Affordability
- Ease of cleaning/maintenance

8. When a toy has batteries, lights, and pre-recorded sounds (Passive Play), how does the child typically interact with it?

- They stay engaged for a long time following the toy's instructions.
- They get bored quickly once they discover all the tricks."
- They become a "spectator" rather than a "director" of the play.

9. Are you aware of the developmental benefits of "Open-Ended" toys (toys without batteries/buttons that require imagination)?

- Yes
- No

10. Would you be willing to pay a 15-20% premium for a toy if it was certified 100% non-toxic and carbon-neutral?

- Yes
- No
- Maybe

11. How would you rate the "Visual Appeal" of Channa Patna toys for a modern nursery or playroom?

- 1-to 5 ▼

12. What are the top 3 BARRIERS that prevent you from buying wooden/Channa Patna more often?

- Price: (Perceived as more expensive than mass-market plastic)
- Availability: (Harder to find in local stores/supermarkets)
- Maintenance: (Cannot be easily washed/sanitized like plastic)
- Functionality: (Lack of "action" features like lights, sounds, or motors)
- Weight: (Heavier and less portable for travel/outings)
- Brand Trust: (Lack of recognized "brand name" or standardized packaging)

13. In your opinion, which material better encourages "Imaginative Play" (where the child creates their own stories/scenarios)?

- Wooden/Open-ended Toys: (Simple shapes that can be anything)
- Plastic/Themed Toys: (Specific characters, branded movie sets, or electronic consoles)
- I don't see a difference in imagination levels
- Other

14. Which type of toy do you observe keeps the child engaged for a LONGER period of continuous play?

- Automated Toys: (Battery-operated, makes sounds, moves on its own)
- Simple/Manual Toys: (Wooden blocks, stacking rings, manual cars)
- Other

15. What is the MAIN reason you might choose a plastic toy over a Channa Patna wooden toy?

- Lower price
- Better availability (found in malls/online easily)
- Lighter weight/Portability
- More "exciting" colors and shapes
- Easier to wash/sanitize
- Other

16. How does the "Weight" of a Channa Patna toy affect your purchase decision?

- It feels Premium & Sturdy (A sign of quality).
- It feels Hazardous (Fear of injury if dropped or thrown).
- It feels Inconvenient (Too heavy to carry in a diaper bag/travel)

17. How much does "Packaging Design" influence your perception of a toy's value?

- Low Influence: I prefer minimal, ecofriendly packaging even if it looks rustic
- High Influence: Premium, sealed boxes make me feel the toy is hygienic and authentic

18. What is the biggest Marketing Gap for Channa Patna toys

- Visibility: I don't see them in mainstream malls or popular online apps
- Visual Appeal: The traditional colors don't match modern, minimalist nursery aesthetics.
- Information. There isn't enough explanation about why they are better for development.

19. On which platform do you most frequently discover new toy brands or play-based activities for children?

- Instagram (Reels/influencer posts)
- YouTube (Educational videos/Toy reviews)
- Pinterest (DIY/Nursery decor)
- I do not follow toy brands on social media

20. Do "Influencer Recommendations (Parenting bloggers/Teachers) significantly impact your trust in a toy's safety?

- Yes: I trust a toy more if I see it being used by a professional or another parent on Instagram/YouTube.
- No: I prefer to do my own research on material toxicity and certifications.