Exploring traditional thread-making and simple weaving used in upcycling OPP laminating plastic for ecologically responsible textile craft

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1. Introduction

Plastic has been a problem worldwide to the environment since its production and use exploded and created a pollution after mass waste management failures. In 2016 statistics, Indonesia generated about 65,200,000 tons of waste and about 85,000 tons per year is of plastics. It is in mostly used industrial packaging from wet market to grocery store, toys, drinking cups, food utensils, bottled water, even in books and other bounded volumes.
The scope of this research, therefore, is to identify OPP (Oriented Polypropylene) waste as a technical nutrient, creating eFiodi for other creative, small-scale/home industries spread around the region. The waste treatment being studied is upcycling, introduced by Cradle-to-Cradle (C2C) design principles while considering a sustainable craft/design practice that promotes environmental soundness. The research presented more questions such as, what kind of upcycling process would be safe for the environment, yet practicable and beneficial for the creative and growing local industry. Is upcycling truly a new practice, or could we find it in traditional culture where a system has always been supporting the ecological health. Could we bring this dialogue of older ways of living and modern design discipline within upcycling practice. Then, once a renewable material is produced, how might we convince entrepreneurial parties concerning the production system and develop the product that could educate the market yet having social acceptability and a chance to create a circular economy. While responding to the initial issues of upcycling system, the research partly investigated indigenous knowledge system to find an approach to eco-effective waste management and production.

1.1. The potential value of Oriented Polypropylene (OPP) lamination film waste
Made from Polypropylene resin and other synthetic chemicals, this plastic is difficult to naturally decompose among similar others. However, OPP is the lightest, has excellent resistance to organic solvents, and has good heat and creep resistance. It is a film that folds easily and highlights excellent optical properties (clarity ,economical, cost-effective,having write-on / wipe-off properties,and softer than Polyester (PET) [1]. With its soft texture yet having a glossilic look, OPP film creates visual and tactile aesthetic and could be appealing when use as materials to make certain products. From these properties, the authorsrecognized the potential of the OPP as a renewable craft making material.

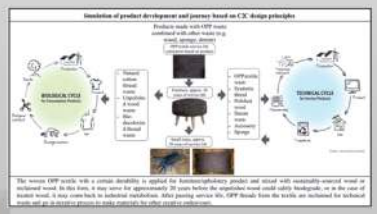
1.2. Adopting Cradle-to-Cradle (C2C) design principles for upcycling
For this, the research adopted an approach to regenerative design that had been developed in the 1990s by Prof. Dr. Michael Braungart, William McDonough and EPEA Hamburg, called Cradle-to-Cradle (C2C) from which upcycling practice was introduced.
C2C design framework is inspired by systems found in nature, aiming to not only reduce negative influences on the natural environment, but to be able to leave a positive ecological footprint resulted in safer processes, products, and businesses for healthier human and natural environments.

1.3. Indigenous knowledge system, traditional technology and upcycling practice
Indigenous knowledge system refers to ways of knowing and living mechanism leading up to local wisdom that originally developed within a community specific to a certain geographical area [3]. This knowledge system entails collective understanding of the delicate interconnectedness of natural elements and the job description of human community within the ecosystem. Cultural ecology encompassing language, ritual and spirituality, social interaction, material culture, bodily techniques and resource use practic e was developed through interacting with the natural environment. As a biological organism capable of thinking, sensing and feeling, thuman develops action and perception of the whole organic being (indissolubly mind and body) situated in a richly structur ed environmenti [4], and is capable over time to transform them into a set of skills of living such asagriculture and craft and tool making.

2. Reasearch Methodology and Material

This research was executed by first implementing the approuch of C2C design principles and identifying the service life of the OPP film waste as technical nutrient for local textile andfurniture industries. OPP film waste collected for this research came from one local printing Industry located in Surakarta City in different roll sizes, therefore assortment wasperformed based on color, texture, width, and thickness to later create several variations of raw materials. Secondly, literature studies and field observation was conducted prior to COVID-19 pandemic to investigate local culture of craft -making in Surakarta city and neighboring regencies from which traditional technology could be studied and re-introduced for upcycle system, to map small-scale home industry who has the potential of implementing C2C design principles as well as the opportunity to introduce upcycled OPP as raw materials for creating high quality textile crafts. Later, several local artisans of thread-making and weaving in Klaten regency are identified within the community who still use traditional technology in their production system and discovered ways to process OPP waste into renewable and re-manufacturable material resources using traditional tools.

2.1. The upcycling processof OPP film waste into threads and woven textile
Today, a number ofindigenous cultural practices in Indonesia are becoming marginalized or appropriated for consumerism that it loses the long established understanding of human nature relationship. As initial research took place, the focus of OPP waste as a dsource of nutrient is implemented on small scale textile and furniture home industry where production can be limited and cuality controlled for managing the practicality of C2C design principles while educating craftmakers regarding the potentials of the system. The focus of this is towards the upcycling system of imperishable materials and ecologically responsible production system inspired by indigenous knowledge system to bring awareness of the relationship between man nature industry.



3. Reasearch Results and Discussion

In Klaten regency, rope/thread-making craft in Jombor area have existed for a long time along with the development of Lurik weaving in Pedan and Cawas areas. Although the craft was originally intended to meet the needs of the Lurik weaving centers, the craft later became an independent business, producing yarn and rope for other purposes. Rope/thread-making that utilizes leftover textiles from other regions is considered as unconscious upcycling practice, a potential of the region that could be enhanced. Here, rope/thread-making technology which involves unraveling thread out of its previous interlace requires manual labour and traditional spinning tool (Eretk), where operation techniques, though relatively easy, require hands on skills, time, diligence are a collective effort as method to achieve the desired cuality. The process utilizes the space arou nc the yard as well as public spaces in the neighbourhood making a worthy spectacle to behold. Production is carried out after dawn until before noon and is dependent on the weather, therefore if it rains, all production is stopped. Meanwhile, Klaten Lurik-weaving (Pedan and Cawas) is a textile craft that has existed for quite a long time and cannot be separated from people's lives which depend on the ecosystem [5]. Theworking network between Pedan-Cawas-Jombor in terms of yarn supply for Lurikcraft has organically formed and create production ecosystem until today. Some Lurik weaving units in the area still use non-mechanical loom because it has been passed down from generation to generation and becoming a tradition. All tools involved are handy, cheap and fixable by simple carpentry. In weaving process, the possibility to use other traditional looms such as hand -loom, warp-weighted loom, backstrap-loom or house-fase loom could encourage new inventions and adaptations by textile making crafts(wo)men within their community and diversify weaving practice as well as textile products while educating the importance of production system designed to be a part of a larger ecosystem.
Generally, all traditional craft works are done at home or within living vicinity, such as communal space within one neighborhood. This traditional thread-making and weaving chosen as means for upcycling is the same, in a way that may benefit environment, industrious entrepreneurs and society at large. Geographically, these two areas are the closest to the printing industry, thus a network of production could be supported by economically feasible distribution. Furthermore, when individual upcycling is done at crafting unit level, it could help maintain the waste management than industrialized upcycling and keeps the decentralized system flexible until C2C awareness manifesting as acultural practice is formed organically. Using the approach of C2C design principles, designers and makers could start seeing their designs are a part of a larger ecological system that pay attention not only to the material needs of humankind but towards understanding the delicate natural systems, its health and interconnectedness, as the life of human kind and other beingsis integral to this. The designing of upcycling process on the OPP film waste using technology the local people are familiar with is one of the wise innovations because; 1) it brings a positive impact on the environment and cultural diversity. 2) it will generate added value for the printing company concerned or anyone who can process it; 3) it produces alternative raw materials that will stimulate the creativity of craftsmen and enhance their craftsmanship

3.1. New meaning for tradition inspired textile making
Designing is meaning-driven and a practice to materialize intention. Product development of OPP film waste yarns and textile should be designed with recycling/upcycling in mind. Future remanufacture and disassembly is based on biological/technical value where each part will be either goes to biodegrade or upcycled to become another product. The possibility of product development with small scale home industry, for example furniture and upholstery, may involve educating the interested parties concerning the renewable material; where it is come from, what it could be, what values it contains and what next, paving a way to community services for creative eco-entrepreneurship. In this way, the authors hope to ignite the spirit of eco production inspired by indigenous knowledge system and C2C principles, from identification of matirrals, to socio environmental needs and trend fore casting, to product storytelling and market penetration. This research also highlights the possibility of reviving extinct textile motif (such as Lurik patterns and Songket motifs) or create an entirely new meaning encoded motif using OPP wefts (*Pedan*).

4. Conclution

This design research produced an upcycling mechanism focused on low cost, environmentally sound process with local familiarity and practicability that can be performed by anyone, individually and/or collaboratively. Traditional technology similar to upcycling have existed for thousands of years as a practice to convert waste or used object into higher valued objects, and the idea of upcycling OPP film waste into valuable and eco friendly materials have led the experiments on the wisdom of traditional textile making, using familiar tools and technology to produce yarns and yielded ecologically responsible and high quality textile craft. Using OPP threads as wefts to be woven and be given new value in local textile making culture is inspired from the centuries old of upcycling practice found in Tenganan Pagringsingan and the threadmaking culture of Jombor respectively.
Thus, adapting tradition inspired upcycling is one way that was also meant to tackle the design of conventional production system and aid local working units to design system and outcomes following C2C framework. The uniqueness of culture and traditional knowledge that is still preserved by thread making craftsmen and Lurik weavers in Klaten regency supported this view and can be enhanced to create a narrative, becoming another added value for the upcycled OPP and production outcomes. In conclusion, introducing this production system as an alternative to upcycling practice and responsible craftsmanship may give a positive impact to the humannature relationship, environment, industry, and cultural diversity.

Reference

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