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Grassroots Innovation as a Problem-Solving Process (A Case Study: Bambu Selaawi and Sapu Ijuk Purwakarta Craftsmen)

Inovasi Akar Rumput sebagai Proses Pemecahan Masalah (Studi Kasus: Perajin Bambu Selaawi dan Sapu Ijuk Purwakarta)

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ABSTRACT

West Java is well known for its abundant natural resources and handicrafts. Because of the abundant natural resources, many handicrafts are produced by local craftsmen. One of them is bamboo handicrafts in Selaawi, which are known for their bird cages, woven bamboo baskets, and so on. Another craft in West Java that still survives and has become the hallmark of the region is the palm-fiber broom in Purwakarta. During the production process, bamboo craftsmen in Selaawi and palm-fiber broom craftsmen in Purwakarta are known to have unique production tools that are specially made for certain functions. These simple tools are developed based on the special needs of production combined with the limited availability of tools and materials. Even though it is simple in shape, this equipment is an essential production tool that plays an important part in craftsman's production activities. Nowadays, the challenge is the lack of motivation of the younger generation who work as artisans due to economic factors and a lack of knowledge about alternative solutions to achieve affordable and simple production. Through the digitizing artifacts method, the author archived various handicraft products and their production techniques from two case study areas in craft-centers, namely Selaawi and Purwakarta. Data collection and interviews resulted in the findings that the craftsman had gone through an innovation process using a social approach.

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ABSTRAK

Jawa Barat memiliki kekayaan sumber daya alam yang melimpah dan hasil kerajinan yang beragam dari berbagai daerah. Karena sumber daya alam yang melimpah, banyak hasil kerajinan yang dihasilkan oleh para perajin di daerah. Salah satunya adalah kerajinan bambu di Selaawi yang dikenal melalui produk sangkar burung, keranjang anyaman bambu, dan sebagainya. Kerajinan di Jawa Barat yang masih bertahan dan menjadi ciri khas daerah adalah sentra sapu ijuk di Purwakarta. Dalam memproduksi kerajinan, para perajin bambu di Selaawi dan perajin sapu ijuk di Purwakarta diketahui memiliki beberapa alat produksi yang dibuat sendiri khusus untuk fungsi tertentu. Peralatan sederhana tersebut dibuat berdasarkan kebutuhan khusus produksi serta ketersediaan alat dan material yang terbatas. Walaupun sederhana, peralatan tersebut

merupakan senjata utama yang menjadi bagian penting aktivitas produksi para perajin. Tantangan yang saat ini dihadapi adalah keinginan generasi muda menjadi seorang perajin. Hal ini disebabkan oleh faktor ekonomi dan pengetahuan yang minim tentang berbagai alternatif alat produksi sederhana dan terjangkau. Melalui metode digitisasi artefak, penulis melakukan pengarsipan produk kerajinan dan teknik produksi di daerah sentra kerajinan, yaitu Selaawi dan Purwakarta. Pendataan dan wawancara menghasilkan temuan para perajin telah berinovasi melalui pendekatan sosial.

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Introduction

Selaawi village has abundant bamboo as a natural resource. It has almost 600 hectares of bamboo forests spread across seven villages. This potential is growing with the support of human resources (bamboo craftsmen) in Selaawi. Most of the residents of Selaawi Village are bamboo craftsmen. The name 'Selaawi' comes from the Sundanese words *'sela',* which means between, and *'awi',* which means bamboo. Residents in the village make handicrafts from bamboo in their spare time when they are free from farming or gardening activities.

The most well-known bamboo handicrafts in Selaawi are bird cages, household utensils, traditional musical instruments, chairs, and furniture. The potential for bamboo handicrafts in Selaawi is inseparable from the historical aspect of a bamboo product that has long been known as Selaawi's signature, namely the bird cage. Selaawi bird cages have a round shape and are usually decorated with various carvings (Hendy, 2021). With the expertise of the craftsmen in making bird cages, they have been able to produce various other types of bamboo products that have penetrated the international market (Asia, Australia, and Europe).

Various research and development of bamboo products have been carried out in Selaawi Village, such as the exploration of techniques and material combinations by Larasati and Tristiyono (2019) and the role of socio-technical instruments as sets of technical apparatus to reconcile the diverse interests between craftsmen and stakeholders (Luffiansyah, M.P, et.al., 2020). However, there has been no research regarding the creativity of craftsmen in the production process, especially that which emerged from the bottom-up movement.

Besides Selaawi Village, another craftsman center that becomes the location of the case study is Sindangpanon Village, Purwakarta, a producer of palm fiber brooms. The research team interviewed a craftsman named Sunarya and found out that he received the skill to make palm fiber crafts from a friend who came from Cirebon. The fibers used for brooms are harvested from palm trees. The materials needed to make palm fiber brooms are palm fiber, bamboo, rags or spandex, and a plastic handle coating. In a day, Mr. Sunarya and two other craftsmen can produce 100 palm fiber brooms. The presence of a palm fiber broom craft center in this village is a blessing for the local community because almost 20 households, including Mr. Sunarya's relatives and his neighbors, have been engaged in palm fiber handicrafts.

In carrying out the production process, the craftsmen in Selaawi and Sindangpanon are known to make production tools that have certain functions. These simple tools are made based on the needs of the craftsmen and the availability of the tools and materials in the environment. For example, a smoothing machine can be made to adapt to the characteristics of the bamboo material and achieve the desired shape by modifying a water pump that can be found at a local iron shop. Although the tools are simple, they have become important parts of the production activities for bamboo craftsmen.

Indirectly, these production tools have an important role and are unique because they can be adapted to the needs of the craftsmen. Unfortunately, there are not many bamboo craftsmen who use these tools

because of competition with modern tools. In addition, currently, there is no regeneration of bamboo craftsmen or machine builders in the sub-district who know the tricks and strategies for making simple tools that are affordable and finding materials that are easy to find.

Because of this, the research team is trying to archive and document various artifacts, production techniques, and innovations in craft production tools in Purwakarta and Selaawi in the form of digital data so that this data can become a source of information that can be used by other craftsmen and the next generation. It is hoped that this research activity can support the regeneration of bamboo craftsmen in Selaawi and Purwakarta through the transfer of information and knowledge possessed by these craftsmen.

Method

The method used in archiving artifacts is digitization in the form of visual photo data, which is carried out directly at the craftsman's location. The results of the digital data will be stored on the Museum of Objects website platform (museumbenda.id), which is a platform for digital artifact data collection designed by the Ethnography Design Laboratory, Faculty of Fine Arts and Design, Institut Teknologi Bandung. Artifact digitization refers to the process, method, or technique of changing and converting physical or analog objects into digital materials or assets. In addition to archiving, the digitization strategy has proven to be efficient in terms of preserving the originality of a product in digital format (Madanan et al., 2018).

Through this digitization process, it is expected that data can be easily stored and accessed by the public. Another goal is that, apart from archiving, digitizing artifacts is useful for providing information and cultural insights to academics, professional designers, and the public, as also stated by Madanan, Hussain, & Khaliq (2018). The scope of digitalization is expanding and has become a major source of innovation over the last two decades; in some contexts, digital innovation outnumbers physical or analogue innovation (Cantamessa, 2020).

Museum Benda (museumbenda.id) conducts data collection every year at the location where the cultural artifacts are located. This year, the Museum of Objects is collecting data on artifacts from two West Java craft centers, namely bamboo products in Selaawi Village and palm fiber brooms in Sindangpanon Village. The artifact data collected does not only include the handicraft products but also the everyday objects of the craftsmen that can support the process of making these products.

Digital Archiving of Museum Artifacts "Museum Benda"

When doing digital archiving, several things need to be prepared. Among them are:

1. Primary data collection

   Primary data was obtained through the following stages: (a) preparation of places for taking photos of artifacts at the craftsman's location; (b) conducting observations, interviews, and discussions regarding artifacts of handicraft products and production tools used by the craftsmen; (c) selection of artifacts to be documented together with the craftsmen; and (d) taking photos of the artifacts or handicraft products and their various production tools. Primary data were obtained from two locations and three craftsmen: two bamboo craftsmen in Selaawi Village, Garut, and one palm fiber craftsman in Sindangpanon Village, Purwakarta.

   The tools brought for archiving in the field include photographic equipment (Figure 1) (camera, lighting, white backdrop) and box lighting for small products (Figure 2).

Figure 1 Photo equipment
Source: Personal documentation, 2021

Figure 2 Lighting box
Source: https://www.alibaba.com/product-detail/Photo-Light-Box-PULUZ-24-60cm_1600181104217.html, 2023

2. Secondary data collection

   Secondary data is narrative data or descriptions of artifacts collected by the archiving team as a form of data validation, summarizing, and argumentation of data from the craftsmen. Secondary data, namely complementary data sought or collected after the implementation of data collection in the field, for example, literature (from books, articles, or internet sites). This data supports primary data, or data from interviews that have been conducted directly in the field.

3. Data processing

   Organize, prepare, and re-check primary and secondary data for inclusion on digital platforms. One of the examples is museumbenda.id.

Innovation and Social Approach

Innovation is the process, result, or outcome of the development of knowledge, expertise, and experience as a means of solving problems or improving products and/or systems that provide added value (Bhatti, 2012). Taylor (2017), in his research, attempts to compile the creative process through several different forms of innovation and says that there is a strong relationship between creativity and the innovation process.

Innovation: Creative Process for Problem-Solving

Murray, Julie, & Mulgan (2010) said that innovation is not related to luck or sudden events and is not exclusively achievable by brilliant individuals. Not only scientists, researchers, and academics, but also people in general can create, manage, support, and nurture innovation.

Innovation is not only seen in the context of results but also in the context of processes. The outcome context focuses on innovation in terms of product novelty and production methods, while the process context studies the social and organizational dynamics that generate innovation, for example, individual creativity, organizational structure, environmental context, and social and economic factors (Bhatti,

2012). In the process context, innovation is influenced by many factors, depending on the individual and the environment. In addition, many studies state that everyone can be creative, so depending on the context, creative activity and innovation can occur in many ways (Taylor, 2017). In this study, innovation occurs through a problem-solving process carried out by the craftsmen, not only in one process but in several stages.

The creative process of producing innovation can be observed through four things: namely Person, Process, Product and Press. A person; is someone who understands the traits, characteristics, or attributes of their creative personality. Process: describing the stages of thinking that creative people use to invent something new and useful; product: the qualities of a product that make it creative; and creative press: is the environment in which the person works may be conducive to or inhibitive of creativity (Zhang, Zhou, Pedersen, & Luo, 2016). In this research, the analysis of grassroots innovation produced by craftsmen will look at various aspects related to the craftsmen's perspective (person aspect), especially regarding motivation and supporting factors that encourage the birth of innovation.

Social Innovation

Social innovation has no boundaries. This happens in various sectors, including public, non-profit organizations, private, and so on. Creative efforts occur across sectors in various fields, such as fair trade, distance learning, hospitals, urban farming, waste reduction, and restorative justice.

Social innovation has become the center of attention in recent years because the current structures and policies do not fully solve the most urgent and global problems, for example, climate change, worldwide chronic disease epidemics, widening social inequality, and so on (Murray, Julie, & Mulgan, 2010).

Some social innovation practices also occur in many other countries, especially in developing countries. For example, in China, an analysis of the character of grassroots innovation is at least divided into three terms viewed from the subject: motive, method, and type (Hua, Jiang, & Lin, 2011). Most of their innovations are inherited from Chinese culture itself. From a motivational perspective, grassroots innovation is not led by the government but is a spontaneous movement by craftsmen and farmers with skills. Usually, these systems are messy and self-sustaining, as opposed to those made by governments, which are stable and constructive.

In the context of the work of making handicrafts carried out by craftsmen at *Bambu Selaawi* and *Sapu Ijuk Purwakarta*, the practice of social innovation is very visible. The craftsmen are not fixated on production systems or creative processes that are up-to-date but rather focus on the suitability of the process or method to the habits or abilities of the craftsmen. Creativity plays an important role in this matter as a form of effort to create new works or solutions to existing problems.

Grassroot Innovation

Grassroots innovation can also be interpreted as innovative activities to improve products, techniques, and crafts randomly and extensively (Hua, Jiang, & Lin, 2011). Grassroots innovation includes not only individual innovation but also collective innovation by both private research institutions and private companies.

The results of grassroots innovation are, for example, the application of technology that does not require sophisticated tools, is easy to imitate, and is sustainable. The development of this product can improve the production conditions and welfare of the workers at a low cost, especially for residents in poor areas, thereby helping to increase productivity, reduce work intensity, save production costs, and improve product quality. Unlike mainstream innovation, grassroots innovation involves activists who are committed to experimenting with social innovation and using environmentally friendly technologies (Nurjaman, 2022).

Grassroots innovation emerges from the intersections of the three-innovation dimension phenomena (Pansera, & Sarkar, 2016), including (1) sustainability-driven innovation; (2) processes of frugal innovation; and (3) socially driven innovation (Figure 3). Frugal innovation is the search for simple but effective solutions to produce affordable products and services using pre-existing technology, according to the capacity of innovators. Socially driven innovation involves innovators who consistently respond to problems and empower minority groups around them. Then, the third dimension is that the goal of the innovator is to deliver solutions that are beneficial to the environment through minimal energy consumption (sustainability-driven innovation). Grassroot innovation not only provides benefits for minimal energy consumption, but also in the context of society. Regarding the drivers, grassroot innovation takes place as a bottom-up response to a local need. It aims to promote systemic changes that lead to a transition to more sustainable societies (Pellicer-Sifres, 2017).

The grass-root innovation concept is also greatly influenced by economic conditions, inadequate support systems and the pressing needs of its users. According to Gupta (2020), there are six dimensions that are the main aspects in the formulation of grass-root innovation: affordability, indigenous knowledge, informal innovation, local fit, and adaptability.

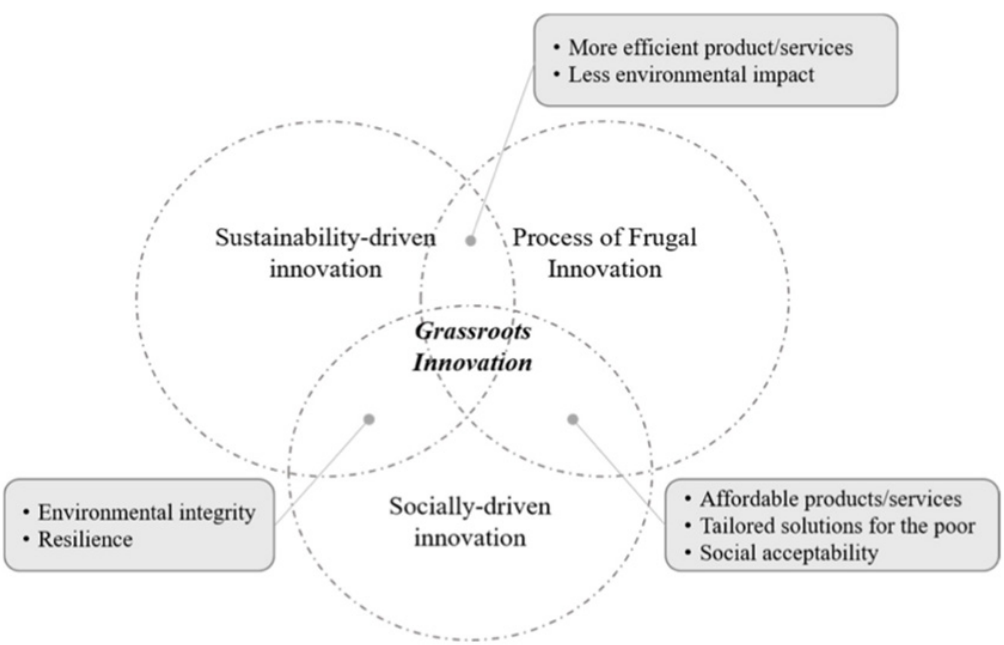


Figure 3 Intersection of the Three Dimensions in Grassroots Innovation
Source: (Pansera & Sarkar, 2016)

Results

Archiving produces three categories of data, namely: (1) craft product artifacts; (2) documentation of craftsmen's production tools; and (3) interview data regarding the production process and product development at each location.

Archiving Craftsmen Artefact

Each artifact data collection has visual artifact documentation (Figure 4) with several views, namely axonometric view, front view, rear view, right and left side view, top and bottom view, material detail, and artifact operation (Figure 4). In addition to visual artifacts, there are also descriptions of the artifacts, namely the description of artifacts medium, function, brand, producer, designer, production technique, production location, material, dimensions, shooting location, shooting time, collection owner, credit, and tags (Table I).

Through archiving at two craft center locations, 72 artifact data points which have not been filtered and categorized, were obtained.

Figure 4 An example of the result of taking photos of bamboo handicraft artefacts made by Mr. Iwan in Selaawi
Source: Personal documentation, 2022

Table I Example of Artifact Data Collection Results

	Primary Data	Information
A	Product name	Bamboo Rantang
B	Description	This bamboo rantang has a product framework that uses cage grating and bamboo bend techniques. The cage grating technique is used to form the walls of the product body itself, while the bamboo bend technique is used to form parts using harder bamboo to become product parts that have certain angles or indentations (considering that the products are tubular and without corners). The local community tends to rarely use this bamboo rantang because it is considered 'too pretty' and is more suitable for display or as a form of souvenir.
C	Location	Nagrok Village, Selaawi, Garut Regency, Jawa Barat
D	Dimension	200 x 200 x 330 mm
E	Material	Young bamboo
F	Production technique	Cage grating and weaving
G	Function	Food containers

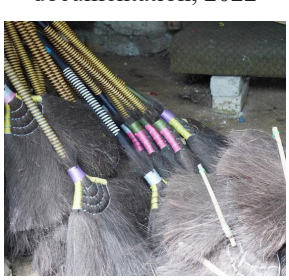
Source: Personal documentation, 2023

Through the archiving above, it was found that the craftsmen made several simple production tools specifically for processing the production of palm fiber brooms and bamboo products.

Production Tools as a Result of Grassroots Innovation

In this sub-chapter, we will discuss various tools made by craftsmen to make handicraft products using various tools and materials available around them. The table describes the shape, material, and function of the equipment, pictures of the tools, and aspects of the innovation or novelty of the tool.

Table II Modification of Production Tools from Craftsmen

No	Product Name	Description	Images	Innovation Aspect
1.	Steam tool for attaching plastic broom handles	In Sindangpanon Village, Mr. Sunarya makes palm fiber brooms using the resources around his house. When picking up the palm fiber, Mr. Sunarya went with his nephew to the garden behind the house. The processing of palm fiber into brooms is done right next to the kitchen of the house. In the production area, Mr. Sunarya uses the stove in the kitchen to make broom handles so they can be coated with plastic (Figure 7). The tools used are very simple, only using biscuit tins and bamboo. Mr. Sunarya uses bamboo as a steam line (Figure 6), and then both sides of the biscuit tin are punched with holes the size of the diameter of the bamboo. The way this tool works is by putting water in a tin, boiling it over a fire, and then putting the plastic-coated handle into the bamboo to be vaporized (Figure 5). As a result, the plastic will stick to the bamboo without leaving black marks. Previously, the direct heating process was carried out over the fire so that it left blackmarks.	 **Figure 5** Steam tools and how to use them Source: Personal documentation, 2022 **Figure 6** Steam line Source: Personal documentation, 2022 **Figure 7** Broom handle with plastic coating Source: Personal documentation, 2022	This tool allowed craftsmen to fix the plastic layer to the broom handle more easily. Using heat from the steam, the plastic layer would shrink and fit the stick neatly. Innovation aspects of this tool include the use of new materials (a biscuit tin and bamboo handle) and new functions (to fit the plastic layer in the broom handle).
2.	Spandex fabric rolling machine	In addition to broom handles wrapped in plastic, Mr. Sunarya also makes broom handles wrapped in spandex fabric (Figure 9). Because the process is still done manually and takes time, Mr. Sunarya tried to design a machine so that spandex cloth can wrap broom handles in a short time. This machine is made of a sewing machine motor and a sewing machine tread, which functions as a tool to roll spandex fabric on palm fiber handles (Figure 8). Currently, the rolling machine has not been successfully operated, so the process of winding the cloth is still done manually.	 **Figure 8** Modification of the rolling machine Source: Personal documentation, 2022  **Figure 9** Broom handle covered with spandex fabric. Source: Personal documentation, 2022	This tool allowed craftsmen to wrap the broom handle with spandex cloth faster. The innovation aspects of this tool are the use of an existing tool (a sewing machine motor) to serve the new function (to roll spandex fabric).

3.	Bamboo hole drilling machine	This small drilling machine is an innovation made by Mr. Utang from Selaawi Village after trying the manual drilling technique, which, according to him is less efficient. From this experience, an idea arose to modify a used low-RPM pump motor combined with a drill bit (Figure 10). This ex-pump motor was deliberately chosen as the driving force because it has a rotational speed, or RPM, and torque that fit the need to punch holes in bamboo material. Initially, this machine was only used by craftsmen to make bird cages, but now its function has expanded to various production needs according to designs ordered by buyers. The addition of the sandpaper feature to the drill head is also provided as a tool to smooth out small parts. The way to use a drilling machine is to put the media on the base that is on the machine, then the craftsman holds the edges of the bamboo surface to be perforated, and the bamboo is rotated manually.	**Figure 10** Modification of the drilling machine Source: Personal documentation, 2022	This tool allowed craftsmen to punch holes in bamboo material. The sandpaper on the drill head is used to smooth small parts. The innovation aspects of this tool are the use of an existing tool (a used low-RPM pump motor combined with a drill bit and sandpaper at the drill head) to serve a new function (to punch holes in bamboo material and to smooth small parts).
4.	Bamboo Bending Tool	Another innovation made by Mr. Utang is the funnel to facilitate the process of bamboo bend (Figure 11). An innovation of a bending tool made of aluminum, which was made by the craftsmen from used wok, turned upside down, and then perforated in the middle as a circulation of focusing heat through a chimney connected by a rivet method. The way this tool works is by focusing the hot air from the stove for 30 seconds on each part of the bamboo that will be bent into a corner. This bending tool functions as a bending tool by utilizing LPG gas as its combustion energy, so it does not leave black marks on the bent bamboo.	**Figure 11** A tool for bending bamboo Source: Personal documentation, 2022	This tool allowed craftsmen to bend bamboo without leaving burn marks. The innovation aspects of this tools are the use of existing tools (used woks and gas stoves) to serve a new function (bend bamboos with heat without leaving any burn marks).

Based on the findings, there are two dimensions of grassroots innovation that shape the innovation of craftsmen (see figure 3). The first dimension is the process of frugal innovation, supported by the motivation to produce faster, more effective, and more labor-efficient production processes such as the Steam Tool for Attaching Plastic Broom Handles and the Spandex Fabric Rolling Machine. The second

dimension is socially driven innovation, with the support of the idea that craftsmen need tools that have specific needs but are hard to find at affordable prices.

The production tools made by craftsmen are inspired by various everyday items such as aluminum biscuit jars, drill machines, and stoves. Many people have large square biscuit jars because they are one of the gifts usually given during Eid al-Fitr, so these objects are usually easy to find in every home. The activity of creating new functions from everyday objects can also be called everyday design or non-intentional design (Kim & Lee, 2014). Artifacts used in everyday design have already been professionally designed, and then people try to create new uses for designed artifacts within given contexts.

The Motivation of Craftsmen

Based on interviews with Mr. Utang and Mr. Sunarya, several backgrounds encourage them to explore and be creative. This background arises from external influences and internal encouragement. The first reason experienced by both parties was the existence of problems and challenges in production. The problem is, among other things, the difficulty of finding a suitable tool for the character of the material being processed. For example, bamboo requires a special drill with an RPM that can be adjusted according to the needs of the craftsmen.

"Most of the tools for making bamboo are still manual and traditional. But some do buy from shops, but in certain cases, some can't use machines from shops, so they must engineer it" - Mr. Utang, bamboo craftsman.

Based on information from Mr. Utang, it is known that not all tools are available in shops, and the craftsmen need to engineer the tools so that they can be used. In addition to the unavailability of suitable tools and the competition for new bamboo-based products, craftsmen also need to adapt to current design developments. Various requests for new designs, both from consumers and designers, have encouraged Mr. Utang to develop different production tools. External pressure pushed Mr. Utang and another bamboo craftsman, Mr. Iwan, to produce even better bamboo products.

Mr. Iwan also felt an internal influence, as stated in the following interview.

"The skill is inherited from my grandfather to my father. This (pointing to the writing of black bamboo on the product) is also passed down from the family, and yes, maybe only my family makes something like this" - Mr. Iwan, bamboo craftsman.

Based on the interview with Mr. Iwan, the motivation to innovate also arose because of the enthusiasm to maintain traditions passed down from generation to generation in the family. But these two motivations or triggers all come from figures or leaders among craftsmen in each region. This is in line with what has been said by Lin, Chen, & Chen (2018) that a leader has an important role in bringing about innovation in a region. Leader motivation can arise from a sense of responsibility and their role in managing a group or community. Leadership comes naturally, is unpaid, and has work responsibilities with a passion (Setiadi, 2020). Through a process that was not easy and a long journey, the two figures became trusted pioneers and were able to provide direction to other craftsmen.

Environment as a Supporting Factor for the Creation of Grassroots Innovations

Through this research, we can see the creation of craftsmen to overcome their problems using limited resources. In producing bamboo products, the craftsmen use several production tools that are not commonly used. Maybe this tool is not something new and has modern technology, but it provides effective benefits. Based on the interviews, the craftsmen designed the means of production by going through a learning process, namely repeated experiences experienced every day. This experience forms the basis for generating grassroots innovation.

The challenges and obstacles faced by Mr. Utang and Mr. Sunarya in the work process were successfully resolved by utilizing household appliances at home. In addition, different work habits at

home also lead to different needs for the craftsman when working. Usually, craftsmen work in various sitting positions to pursue comfort at home. Some sat on the floor, using short chairs like stools. Therefore, the tools that are made also adjust to a high position when they are in a low sitting position.

Mr. Utang and Mr. Sunarya go through three main processes in producing innovation. The first step is to understand the needs of the work process by comparing the machines available in the store. After using the purchased machine, it turned out that the character of the machine did not match the material to be processed, so the machine needed to be re-engineered. Second, there is a learning process by observing the resources at home or in the environment. Thus, many production tools are made from household appliances. The third process is testing the machine in the production stage. If it doesn't work, the craftsman will remake the production tools.

According to Bhatti (2012), innovation is not seen only in the context of the results but also in the context of the process. The steps undertaken by Mr. Utang and Mr. Sunarya are difficult if there is no individual creativity, community efforts (craftsmen), a supportive family, environmental context (natural resources), or socio-economic factors. Fortunately, they find solutions at an affordable cost, and the machines used are also easy to find at the nearest hardware stores or household stores. So, if needed again, craftsmen can easily find the materials.

The solutions provide values not only for individual interests but also for the common good (craftsman community). Tools are easy to find, easy to build, and easy to understand.

Conclusion

Based on the list of production tools made by craftsmen, it is known that innovation is not always born from the use of advanced technology. In solving production problems, craftsmen try to make tools from household objects at home. From this process, we can conclude that craftsmen are able to see other functions of an object. Creativity is not always born from high technology but depends on perspective when looking at other possibilities. The creative process carried out by craftsmen cannot be followed easily because it arises from very specific needs. However, the concept of ideas that emerge is very unique, breaks the barrier of technical rules (Zhang, 2016), and sometimes breaks the concepts that "should" or usually exist regarding production tools.

The creativity carried out by craftsmen has fulfilled the context of social innovation, but it still needs improvement. The characteristics of the production tools made by craftsmen are similar: they are made from objects that are in the house, there is a modification of the system, the design is still messy, and there is no consideration of safety in the use of production equipment.

Aspects that support the creation of social innovation include the learning process, communication between craftsmen, behavior or work habits, availability of resources (natural, energy, and human) and daily necessities, and compatibility with the capabilities of the community in technology use.

Basically, the purpose of innovation by Mr. Utang and Mr. Sunarya is survival. Thus, the grassroots innovations that have been carried out can provide opportunities for Mr. Utang, Mr. Sunarya, and the craftsmen to survive, especially when facing economic problems.

The digitization process can play an important role in recording the real conditions of social innovation and the preservation of these activities, not only those that are tangible (craft products, tools, materials, and so on), but also those that are intangible. The results of the recording or digitization can be used as a guide, recommendation, or simple knowledge for other craftsmen or the next generation, so that the social innovations that have been implemented do not stop at the relevant period but can also be sustainable.

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