The Pinisi: A Study on the Development of Boat Technology

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Abstract. Two main problems studied in this research; traditional boat-making and the modern one. This research aimed at studying the changes taking place in the boat-making and the factors causing these changes so that the modern boat-making. Research use of historical method. The data were collected by library research, documentation, interview and observation. The skill in the making of the traditional pinisi is considered as a skill of the boat makers inherited from their ancestors from generation to generation. The traditional boat-making has very simple working relation, namely, between leader, crew members and prospective crew members. The rising demand of boats have resulted in the development of working relations. The change has also occurred in the traditional boat with the introduction of motorization, in which machine are use as the moving power. The traditional tools have also developed with introduction of modern ones as a step toward the process of adaptation and the speed in the production.

Keywords: Pinisi, Development, Boat, Technology, Modern

1. Introduction

There are not many ethnic groups in Indonesia who are very intimate in their lives by boat and sea, like the people of South Sulawesi, commonly known as the Makassar Bugis. The boats that become their means of sea transportation are better known as Bugis boats. Since centuries ago it has sailed across the archipelago, mastering inter-island shipping. Even in the golden age of the kingdom of Gowa in the sixteenth and seventeenth centuries, these boats had reached Sri Lanka, the Philippines, Cambodia as far as the coast of Northern Australia \cite{1} \cite{2} \cite{5}. The boat industry is part of the rural industry. Its role in spurring the development of coastal villages cannot be ignored, especially in employment and regional economic growth. One form of rural industry is the boat making industry \cite{8}. The Bugis make boats for inter-island transportation, as a means of transportation to migrate and for fishing. The boat has also become a symbol of their maritime culture. An amazing piece of evidence is the international event of happiness at the end of the 20th century. These events are: (1) the Nusantara Pinisi boat cruise to Vancouver Canada in 1986 \cite{3}; (2) Cruise of the Hati Maregge boat from Makassar to North Australia in 1988; (3) Amanna Gappa boat cruise to Madagascar in 1991; (4) Sailing the Sagara Damar Boat to Japan in 1992.

It is very interesting that the boat was apparently made by boat experts from South Sulawesi. Their expertise in making boats has been passed down from generation to generation until now \cite{4}. The economic potential of the people which is still very simple, especially the equipment systems and manufacturing techniques, requires a new discovery to support increased production \cite{4} \cite{5} \cite{11}. From this it is expected to be the base of social and economic changes in the people. In South Sulawesi, craft centers for boat-making are in Bulukumba Regency. The inheritance of skills and knowledge makes boats through the apprenticeship system to their offspring, so that these skills remain to this day. The craftsmen, especially the courtier (expert boat makers), must have two expertise in boat making, namely technical expertise and magical expertise. Both are combined into one, so the existence of this technology is difficult to match. During the traditional boat-building
system, the courtier had a multi-role role as a master craftsman who was an expert in making boats and mastered the rituals of boat-making, capital owners and patrons for the mustards he was leading [7]. In boat making shows the occurrence of changes in coastal communities whose occupational structure in the boat industry. Changes in the structure of activities, along with developments in various aspects of the organization of production and mobility of activities in the form of movement of the boat craftsman community [8]. To discuss the problem of boat building activities in South Sulawesi, which has a very broad scope, the authors limit the scope of the problem to the object of study: Changes that occur in the activities of boat building organizations, and the factors that cause technological developments in boat making activities [9] [10].

2. Methods
The design used in this study is a combination of "historical organizational case studies" (case studies according to historical organizations) with life history [11]. The first design is aimed at tracking changes and technological developments in boat building activities, while the second design is intended to reveal the history of ongoing social mobility. With the design of historical organization case studies, research is centered on one unit of activity to reveal how the state of the activity is in its initial conditions, in this case the condition of boat making activities in the traditional system and how the conditions of boat making activities after the presence of modern technology. With the design of life history, research is directed at interviewing someone to get a complete description of that person [12]. Data collection : Use of documents, literature, interview and observation. Analysis during data collection reveals what data still needs to be sought, hypotheses that need to be tested, what questions must be answered and what methods should be used to find new data / information [12] [13]. The method used in this research is also to use data interpretation and analysis with historical methods.

3. Results and Discussion
Making modern boats has undergone many changes and developments. One of the causes of these changes is due to geographical conditions [14]. In the traditional boat-making system, before making boats in Bantilang, the courtier and mustard did a wooden meeting in the forest with a number of ritual procedures that were binding in the process of making the wood. This happened because Bulukumba at that time still had a lot of forests that provided wood as raw material for boat making. Timber as raw material for boats for making more modern boats is obtained from outside South Sulawesi, namely, from Raha, Ambon and Kalimantan [4] [5]. The wood is lifted with motorboats owned by boat entrepreneurs. The wood used, has a lot of ironwood [15]. From these conditions and conditions hold the making of the boat directly making in Bantilang, there is no longer a wooden supper in the forest with a number of ritual procedures. The wood which was taken from outside South Sulawesi immediately arrived at Bantilang and was ready to be used as material for making boats because the wood had been sawed and cut [4] [5] [11][16].

Boat making systems have experienced the development of production organizations and the evolution of boat shapes goes hand in hand with changes and developments in production technology. Some equipment components and simple materials / locally made have been replaced with mechanical equipment and synthesis materials. These changes affect the way work, work ability, and the volume of mustard work. Technological advances have played a role in responding to demands for greater work allocation due to increased work components (room construction and engine installation) and increased boat demand due to market expansion. With more modern material equipment, the boat manufacturing industry can meet these demands. The presence of modern technology provides new knowledge and skills for mustard greens in production by using
machine tools and synthesis materials. In it mustard involved learning process while working. Technology capability is the ability to increase knowledge and digestion of technology to make changes or adjustments in accordance with local conditions and skills of local workers [17]. In Bulukumba District, those who live as boat craftsmen experience changes in the boat manufacturing system both in terms of the equipment used and the boat's motion equipment, from sailboats to boats that use engines (motorization). Market development and shipping motorization, new equipment that uses engines began to be used in the boat industry. These equipment are: (1) the drilling machine used to make holes in the side of the board to be cooked, can replace the hand drill function with a difference in working speed of 10: 1, (2) electric planers, replace the usual planers functions in smoothing boards / blocks, (3) splitting machine (Chainsaw), that is, sawing machine mainly functions to chop sticks, less energy is used and the process works faster, (4) electric sandpaper, used to smooth the surface / sides of boards on the hull of the boat and the room and putty leveling [4] [5] [18]. Beginning with the emergence of modern equipment in 1981, the engine used a dynamo or battery to drive the tools [11] [20]. In 1985, with the entry of the State Electricity Company (PLN) in the craft center, the device was driven by electricity. However, please note that some traditional equipment is still used by the artisans [5]. The use of synthetic materials to replace local materials, also developed after the development of the market. These materials include: 1) iron bolts / nuts, functions as bone pegs, 2) white nails, functions for attaching boards and block joints, 3) synthetic glue, glue that is purchased directly from the store or a mixture of some materials that are personally formulated by artisan, especially for adhesive boards [19].

The work order also changes. In the old-fashioned way, a craftsman usually finished finalizing the boat's components and installing them one by one. For example in the installation of a skeleton: a block is cut ax, hoe and chop and then installed, after that the beam is cut and then installed again. After the equipment is changed, a mustard must first complete a number of skeletons (out) then be installed simultaneously in boat construction. In the old way, builders feel bored / tired when they have to finish a few skeletons and then installed [20]. By adjusting the fineness and installation, mustard feels loose, lighter, and the job is finished faster. Likewise in the installation and splicing of boards, the volume of work when using modern equipment is 5: 1 compared to traditional equipment. Boat making with a modern system of ritual procedures in boat making is rarely encountered, except the boat launch ritual. This change arises because the order shifted from local sambalu to sambalu China / abroad which paid less attention to ritual procedures and beliefs in boat making, but emphasized more on boat loading and speed in finishing boat building [11] [21] [22].

The development of boat making technology, is caused by several factors: (1) Market Development. The buyer expects the boat to sail in all monsoons and greater load capacity. The presence of motorization in response to the demands of the times [10] [11]. Changes from the sails to the engine as a boat driving device affect the shape of the boat. The boat that initially taper the rear face because the boat uses a sailboat and turns round in the back of the boat as the engine; (2) The Government's role in the government industrialization project since 1972; (3) The level of education of the craftsmen, boat operators, and production managers influences the adaptability to the development and the demands of the era they face; (4) Orders from abroad have experienced development since 1985. This also happens because tourism is developing which is a container for the promotion of cultural production in the form of boats made by craftsmen. Boat modification has changed [11][23]. The boat hull is designed for a kitchen, toilet, and bedroom equipped with modern facilities. This modification is new knowledge obtained by the craftsmen as a step forward from the creativity of the craftsmen for the sustainability of the boat industry in South Sulawesi.
4. Conclusion
Pinisi boats built on traditional boat making systems are boats that use sails as the main driving force of the boat. Pinisi boat experiences changes and developments along with the demands of the times and service users. Pinisi sailboats start with the types of salompong, collik, jonggolan, and a combined model of lambo-pinisi. Because the boat still uses sails, the tonnage of the boats is still low and the efficiency of marketing and shipping is still slow because it depends on the monsoon (wind).

Along with the expansion of marketing and the presence of Chinese / foreign customers who expect a boat that has a large carrying capacity and an increase in business units, the economic orientation of the craftsmen is getting sharper. As a result of these factors, craftsmen inevitably have to make a boat in accordance with the demands of service users. A boat that uses an engine is a product that suits the tastes of service users, because the boat has a large amount of tonnage and can sail on all monsoons. To accelerate production, boat making equipment is developing with the use of equipment that uses electric tools. The development of boat making technology, is caused by several factors

5. References
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