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Actor's Identification and Models from Appropriate Human Settlement Technology Diffusion

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Abstract

Bamboo and woven fiber laminated (Case Study) Laminates Laminate and bamboo are woven fiber technology innovation developed by the R and D Station for Traditional Housing (RDSTH) Denpasar Ministry of Public Works in addressing the problems of diminishing demand for wood in Indonesia because of the excessive use of wood as a construction material which is deemed capable of bamboo and woven fiber as an alternative construction material. The study wanted to see how the identification of actors in the diffusion model of TTG and what to model's technology for the bamboo and woven fiber technology. The research location is in the Bali Province, West Java Province, and East Nusa Tenggara Province,. Method of data collection is carried out by the Foccused group Discussion. The analytical method is to mix methods (kuantiataif and qualitative). The results are the actors involved are Innovators, Mediator, Manufacturers and Customer. Models are needed for technology diffusion is the Business Model Feasibility Assessment, Socializations Model and Integrated Model (5K)/

Keywords: Actors, Model Diffusion, Appropriate Technology

1. Background

Definition of appropriate technology from some of the literature found, suggests that the appropriate technology is technology that is designed for a particular community in order to adapt to the environmental aspects, ethics, cultural, social, political, and economic communities concerned. From these definitions it can be seen where the purpose is the appropriate technology to provide convenience for the users of technology. Such convenience can be found on the side of resource savings, ease of maintenance, and environmentally friendly.

Use of environmentally friendly technologies and appropriately used to using renewable materials, which according to the needs. The use of the term appropriate technology, presented in Small Is Beautiful: A Study of Economics As If People mattered (1973, ISBN 0-06-131778-0), a 25th anniversary edition was published (ISBN 0-88179-169-5), by Dr. Ernst Friedrich "Fritz" Schumacher. The existence of appropriate technology is seen as an effort to progress or social and economic interests.

In the development of appropriate technology use associated with various fields, one of which is a building or construction materials. Research and Development Station for Traditional Housing, Ministry of Public Works, as research and development institutions have found a variety of technologies. One finding appropriate technologies are called bamboo laminated technology. Principles of appropriate technology is an attempt to perform the processing resulting in increased usability of bamboo material.

Bamboo and woven fiber laminated (Case Study) Laminates Laminate and bamboo are woven fiber technology innovation developed by the R and D Station for Traditional Housing Research Center Denpasar Ministry of Public Works in addressing the problems of diminishing demand for wood in Indonesia because of the excessive use of wood as a construction material which is deemed capable of bamboo and woven fiber as an alternative construction material.

Bamboo classified as non-timber forest products are well known by the public as a material for various parts of the construction of buildings, such as columns, beams, walls, floors, and roof frame, while the woven fiber is plant stem-mother. Woven fiber as a building material is only known to the people in East Nusa Tenggara to the wall. Woven fiber also found a lot of potential in the province. Both of these materials have been researched and developed as an alternative building material technology with laminate wood replacement by R and D Station for Traditional Housing Research Center Denpasar (RDSTHR). In its development, bamboo laminated technology

already developed such by RDSTHR Denpasar and it is applied in the form of 16 units of the model house in Bali, West Nusa Tenggara, and East Nusa Tenggara. Laminated bamboo technology transfer activities have also been carried out in 2010 in Bangli Regency, Bali Province and in Ngada Regency, East Nusa Tenggara Province. While laminated woven fiber technology is still in the development stage and has not been tested in a 1:1 scale. However, woven fiber laminates will dialihteknologikan in NTT in 2012. Acceleration is based on the needs in the field related presidential directive to the Ministry of Housing to build 19,000 units of low-cost housing for refugees from Republic of Timor Leste.

Specifications of laminated bamboo and woven fiber laminates are as follows: Laminated bamboo is a product innovation with the incorporation of bamboo planks using adhesive. This technology is simple raw materials, namely bamboo rod that has a pretty thick wall> 10 mm, such as Petung's bamboo, Bulung's bamboo, and Lear's bamboo. Additional material is a chemical preservative liquid that serves to protect the bamboo to make it more durable against attacks organisms, polyurethane adhesive types, and materials hardener (crosslinker) with code (AJ - 1). The main equipment used is the air tube, compressor, water level gauge, Parang, hand saws, scales, gauges, hydraulic clamp tool, planer machine (planner), and assistive devices. Before in laminated bamboo cleaned, dried, and preserved with pump tap. Lamination process consists of cutting the bamboo into planks, sorting, preparation of bamboo slats, gluing, clamping arrangement in / mold, compression, drying, and flattening the sides. Subsequently several layers arranged and glued together again as the desired shape and thickness. Mechanics of the test results, it appears that the advantages of bamboo laminate tensile strength, compressive strength and flexural strength were higher than class I. stronger wood

Figure 1. Variations in shape and utilization of bamboo laminate
Sources: Central Research Institute for R & D documentation Sosekling Settlement Sector, 2012

Woven fiber laminates are merging midrib (woven fiber) gewang tree with adhesive. The raw material used is the stem-mother tree, which is widely available in East Nusa Tenggara. Gewang tree has long been known as home building materials by the NTT. NTT house building society, especially on the island of Timor, in general, with a square-shaped structure and a framework using local wood. Wall covering materials using stem-mother arranged in rows and then punctured using a bamboo called by the locals as "woven fiber" material with a length of 25-30 cm and width 210 cm. Roofing materials using a leaf-mother or zinc depending on the level of public opinion. The walls are just a traditional woven fiber sheath and stabbed stacked, resulting in the persistence of the cavity in a pile of bark so that insects such as mosquitoes can enter. In addition, traditional woven fiber wall is not impressed midrib are stacked neatly because usually without smoothing and equalization measures. Laminated woven fiber technology is a way to increase the value and selling price of the woven fiber. Laboratory test results refer to SNI 03-2105-2006 on particle board, are as follows:

Mechanics Test Results Table woven fiber laminates

No.	Testing	Test Results	SNI Particle board laminated woven fiber type 8 (03-2105-2006)
1	Density	0,46 gr/cm3	0,4-0,9 gr/cm3
2	Water content	10.63 %	14%
3	Development of Original Thick	Original 34,01 %, dengan pelapis cat Polyuretane 10,35%	12 %
4	Persistence limber	96,45 kg/cm2	82 kg/cm2
5	Dependability pull perpendicular surface	9,6 kg/cm2	3,1 kg/cm2
6	Dependability pull screws	41 kg/cm2	41 kg/cm2

Sources: Test results RDSTHR Denpasar, 2011

Laminated woven fiber test results with the water content of 10.63% shows that for the variable density, laminated woven fiber test is higher than required, to variable bending persistence, determination Pull perpendicular to the surface and remove the screws firmness, woven fiber laminates have a higher value than that required under SIN 03-2105-2006.

Actors Involved in Appropiate Technology Diffusion

Technology diffusion process is the adoption and implementation of activity results in a more extensive innovation by inventor and or party - the other parties with the aim to improve the usability. The purpose of the diffusion process of technology transfer and technology is a process for transferring all information, science and technology products (Sosekling, 2012).

The results Sosekling Sector Housing Research Center (2012), found that in the process of technology diffusion identified four (4) diffusion actor. The actors are: the owner of the technology (innovator), mediator, producers, and consumers. The respective roles of different actors as the context and purpose of the diffusion process. The actor roles are as follows:

No	Actor	Role
1	Owner (Innovator)	Owner APPROPIATE TECHNOLOGY introduced the mediator. After a successful mediator persuasive approach to potential manufacturers, owners of APPROPIATE TECHNOLOGY will train prospective producers and accompanied him during the early stages of production. Owner and master data is concerned APPROPIATE TECHNOLOGY APPROPIATE TECHNOLOGY related laminated bamboo and woven fiber laminates.
2	Mediator	Mediator Mediator is a party who receives an idea from the owner and become a facilitator APPROPIATE TECHNOLOGY application. The mediator can be either government or local government or public institution or private, depending on the context and location of the application of diffusion case APPROPIATE TECHNOLOGY. The mediator may constitute an institution, individual, or a few institutions that share the role. Mediator in the diffusion mechanism plays an important role and all the groups associated with the data, which related to APPROPIATE TECHNOLOGY, policy, implementation potential, and the potential for sustainability. Mediator is a production planner in the diffusion of technology
3	Manufacturers/ Producers	Manufacturers are the ones carrying out the implementation of APPROPIATE TECHNOLOGY and produce technological innovations. Manufacturers have linkages with data sets APPROPIATE TECHNOLOGY especially in terms of ease of application, the data for potential application as executor of the application, and data on potential sustainability.
4	Consumers	Consumers are the users of the products of technological innovation. Consumers simply related to the sustainability potential of data, especially the economic aspect of the selling price of the product and distribution network.

Description of the process / technology diffusion mechanism is as follows:

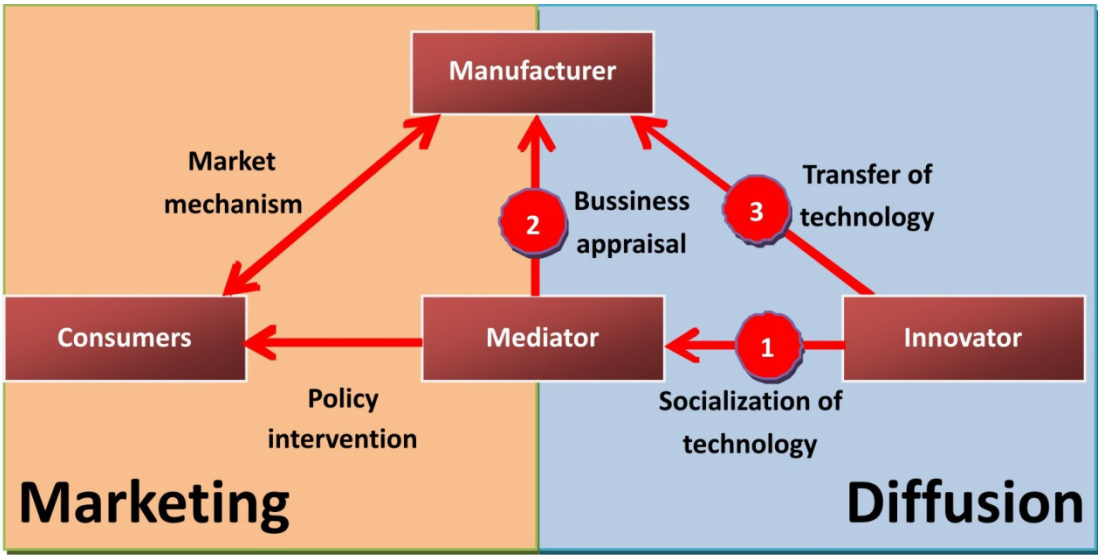

Figure 2. Process / Technology Diffusion Mechanism
Source: Research and Development Center research Sosekling Settlement Sector, 2012

In Figure 1, are described on the position and relationship / relationship between the four stakeholders and activities in each of these relationships. From point 1. Appropiate Technology owner / innovators, in conjunction with the mediator, to disseminate Appropiate Technology to find early adopters of technology. Mediator, which does not have the capacity to do their own production, and then find a location that has the potential for application of Appropiate Technology as seen in point 2 in Figure 1 above. At this point the mediator has a very important position to assess the potential for, among others, to prospective producers. When the candidates were introduced and dipersuasi manufacturers to implement Appropiate Technology, Appropiate Technology owner / innovators then conduct training on prospective producers in order that the process of technology transfer is seen at point 3. Problems faced by producers during the training period will be handled directly by the owners of Appropiate Technology / periodic and continuous innovator. Once the manufacturer is able to produce independently manufacturers will further engage with consumers. Associated with the consumer, there are two ways of marketing products Appropiate Technology, the producers dealing directly with consumers or producers associated with the mediator will connect with consumers. The focus of this paper focused on point 1, 2, and 3 in which the research is focused on the innovators, mediators and producers.

2. Research questions

Based on the background presented, can be formulated the following research questions: How does the interactions that occur between the actors involved in the process of technology diffusion? And What are the models for technology diffusion? (Case study results and woven fiber laminated bamboo products)

3. Appropiate technology

Understanding Appropiate Technology is sufficiently loose translation of "appropriate technology". Appropiate Technology is found in the form of technology that is practiced by Low-Income People. The community, once a small chance of having the opportunity to use advanced technology and efficient, which is the pattern of the advanced technology / industry. Technically Appropiate Technology is a bridge between traditional and advanced technology

Criteria and Conditions APPROPIATE TECHNOLOGY

Assessing ketepat use of a technology, in this case, that gives meaning or understanding relating to rural development issues or low-income communities. According Suwarto Martosudarjo of LIPI meaning / understanding that needs to be underlined is that the technology efficiency criteria: 1) the technology economically (viable), 2) the technology can be justified (technically feasible) and 3) are well-established technology can adapt to the culture and social environment local on something that we discussed (socially acceptable and ecologically sound). Many other formulas on Appropriate Technology. The following formula is adopted Development Technology Center – Bandung Institute of Technology, which includes technical social, and economics requirements.

Technical requirements include:

a. Pay attention to environmental preservation system, using as many of the raw materials and local sources of energy and as little as possible using imported raw materials.
b. Production should be sufficient number and quality of production must be accepted by the existing market, both within and outside the country.
c. Ensure that the results can be transported to the market by means of transportation are still available and can be developed, so as to avoid damage to the quality of the results (products) and ensure continuity of supply peneyediaan (supply) fairly regularly.
d. Noting availability equipment, and operation and maintenance for continuity technical requirements.

Social requirements, include:

a. Utilize existing skills easy removal, and as far as possible to prevent the re-training difficult, costly and time-consuming.
b. Ensure the emergence expansion of employment that can continuously evolve.
c. Pressing the lowest possible labor shifts resulting unemployment or underemployment.
d. Limit the incidence of social and cultural tensions, by arranging that increased production takes place in certain limits,
e. Ensure that increased production is evenly matched by an increase in the revenue

Economic terms, include:

a. Limiting minimal capital requirements,
b. Pressing, so the minimum need for foreign exchange,
c. Directing the use of capital, to conform with local development plans, regional and national
d. Ensure that the results and profits back to the manufacturer and does not create a new chain to the formation.
e. Orient on cooperative grouping.

4. Methodology

A. Research Approach

This study uses a qualitative research approach with a qualitative analysis supported the quantitative data (mix- methods). A qualitative approach was chosen to explore in depth the various opinions and experiences of communities and local government Appropriate Technology laminated bamboo and woven fiber laminates and issues in technology transfer and implementation planning. Analysis was performed on data based on inductive logic. Analysis will move from something that is special or specific, ie which would be obtained in the field towards a finding of a general nature, which will emerge through analysis of the data based on the theory used.

B. Site Selection Criteria

In terms of location, the study was limited to three locations. All three locations were selected on the grounds are several locations in the application of Appropriate Technology bamboo laminate and woven fiber laminates made by BPTPT Denpasar. The third location is the province of Bali, East Nusa

Tenggara and West Java. In each province, the study focused only on the location of the study districts / cities, namely Bangli regency in the province of Bali, Kupang City in East Nusa Tenggara Province, and Subang regency in West Java Province. Although this study focused on three city / county, it was likely in development will analyze some cities / counties in each province.

C. Data Collection's Method

This study uses primary and secondary data. Primary data is data obtained directly from the data sources (informants) which is a compilation of the results of public consultations, focus group discussions, in-depth interviews and observations. While secondary data is data obtained from other sources that has to do with the refinement criteria as supplementary material and supporting refinement criteria.

The main way that will be used for retrieval and data collection in this study was in-depth interviews (depth interviews) to people who are considered able to provide information relating to the issues in this study and focus group discussion (FGD). In addition, data collection was done by field observation and study of the documents of the secondary (literature study).

1. In-depth interviews (depth interviews), the data collection techniques and conducted through face-to-face conversation between data collectors with the information providers. Interviews were conducted either directly or indirectly by using an interview guide that had been developed. Interview guide contains a list of questions that direct the conversation to the required data. Depth interviews were conducted with key informants, ie those that are considered very understanding and understanding problems in the context of this study. The key informant three stakeholders in the diffusion TTG Bamboo Laminates Laminates and woven fiber, namely: BPTPT as the owner of the technology, mediator at each location (can be enabled government agencies, local government agencies, non-governmental, or private), and producer (can form of individuals, community groups, cooperatives, etc.).
2. Focus groups (Focus Group Discussion), which collects the informants and teams of researchers in a discussion to explore the data and qualitative information. In this activity, one of the team members act as moderator and several other team members act as registrar process / discussion, both in writing and sound recording or audiovisual. Participants in the discussion are all key informants in the study. Discussions held at a convenient place and time, thus providing flexibility for key informants to express concerns, ideas, and response to other participants' opinions. Moderator guided the discussion to the topic of discussion and a list of questions. Recorder equipped with a process of discussion stationery, laptops, voice recorders and audiovisual recording device. The reason for choosing focus groups is to:
    - Provide opportunities for participant to interact with each other to reveal hidden information that may not be obtained with in-depth interviews
    - Provide opportunities participants reveal insights the perceptions, conditions and expectations for the Appropriate technology
    - Limited time for interview sessions
    - FGD is more effectively and efficiently than interview sessions
    - Provide opportunities for participants to interact with each other to reveal hidden information

    However, this method also has the risk that participants felt less comfortable and safe to express their opinions for fear of conflicts with other participants at risk. This can occur when participants are not on equal terms, for example, superiors and subordinates. To anticipate these risks, methods must be balanced with the FGD-depth interviews to obtain data that is more contradictory with other stakeholders.
3. Observations (observation) field, which is a technique of collecting data through direct observation of the object of study. According Soeratno & Lincolin Arsyad (1993), observation or observation is a "way of collecting the data by doing a careful and systematic recording". Observation technique is usually performed in conjunction with other techniques to observe physical state, or the location of the study area on the face of it (on the spot) and by recording necessary. Observations made by observing the raw material potential, the potential of human resources as the automaker, the potential sustainability of raw materials, process technology introduction, process and training in

technology transfer.

4. Study of literature, it examines the conceptual and theoretical references for the whole process of activities, ranging from planning, data collection, and data analysis, are expected to be obtained.

D. Data Analysis Methods

Analysis of the data in this study conducted through four phases of activity, namely the identification (in accordance with the conditions and characteristics of the field data); categorization (grouping of field data), interpretation (translating each grouping results into a statement), and conclusion (Neuman, 1997).Explanation of the data analysis procedure is as follows:

- Identification.
- Categorization.
- Interpretation
- Conclusion.

E. Validation Strategy Research Findings

Qualitative research is seen by some as a subjective study because it is influenced by the background and capacity of its researchers. Therefore, there needs to be a strategy to keep the data and results are written as a basis for policy-making remains valid. This research strategy plated validation, given the importance of this research for many stakeholders. The strategies are:

- Triangulation approach

Data validation is done by triangulation technique, in which qualitative research using qualitative data with quantitative data comes as a support and tools to validate research findings and analysis. For example, the method of interview and observation found that the potential of bamboo in a great location. These findings will be compared with the data potential of the relevant agencies.

- Focus Group Discussion (FGD)

Data and results will also be validated by means of cross-checking with the relevant stakeholders. Cross-checking done by the method of Focus Group Discussion (FGD) at each study site. In this cross-checking FGD, each stakeholder can provide feedback and correct the data and analysis generated from these data.

- Involvement of resource persons and experts

Resource persons and experts involved in this study as the primary reviewer of the substance, including the data and analytical results. At every stage of report writing, resource persons and experts will provide feedback and correction in accordance with their respective areas of expertise.

- Review by senior researchers and policy makers in the Center for the discussion of research reports Sosekling.

At every stage of reporting, the results of the study will be presented to senior researchers and policy makers in the Center for Sosekling to get verbal feedback. Further book report will be distributed to officials to obtain written input.

5. Results and Discussion

a. Overview of the potential of bamboo laminate diffusion Appropiate Technology

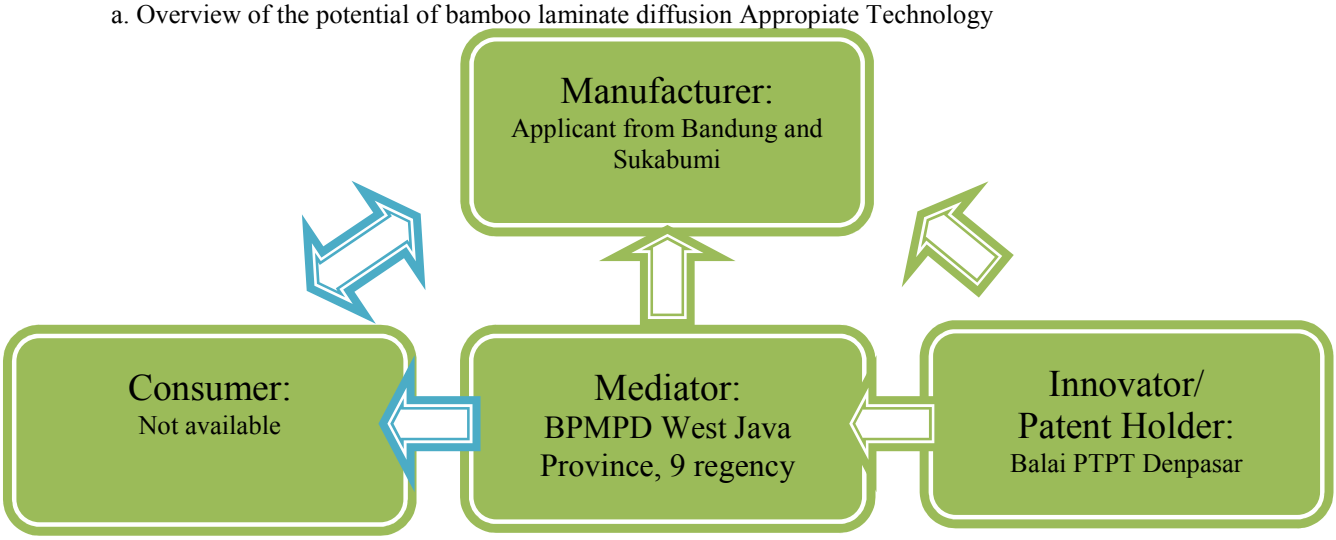

Figure 3. Overview Potential Diffusion APPROPIATE TECHNOLOGY Laminated Bamboo

West Java Province has abundant potential bamboo. In terms of natural resources, according to the Chairman of Jatnika Bamboo Foundation of Indonesia, there are 127 species of bamboo in the world. Indonesia has 105 species. Of 127 species of bamboo in the world, as many as 90 species are native species of West Java. In terms of culture, bamboo has become part of the culture since ancient Sundanese people. This is indicated by the ritual in a bamboo tree felling. Sundanese people still hold the belief not to cut bamboo as bright moon, in the morning, when the shoots appear, and when the bamboo clumps begin flowering. From the aspect of utilization, West Java community has long bamboo utilize both of them for groceries, construction materials, home appliances, souvenirs, and traditional musical instruments. The utilization allegedly started to decline since 1960, when the land began to be converted into bamboo land settlement and modern materials such as plastic began to replace the bamboo in everyday appliances (Kabayan, 2007).

Appropiate Technology BPTPT developed laminated bamboo as a construction material has become a popular substitute for wood in West Java since the event title Appropiate Technology as West Java Province in 2011. At the event, the Governor of West Java expressed interest in bamboo laminate and ask BPTPT as the owner of West Java Appropiate Technology to help develop the potential of bamboo held. Interest in local government and communities in West Java on Appropiate Technology bamboo laminate increasingly visible during the event colloquium Center for Housing in 2011 and socialization Appropiate Technology in Homman Savoy Hotel, London in early 2012. At the last event, there are 9 districts expressed interest and commitment to implement Appropiate Technology laminated bamboo. The nine districts are Sukabumi, Cianjur, Garut, Tasikmalaya, Majalengka, Sumedang, Bandung, West Bandung and Subang. Then BPTPT and Research Center Sosekling Housing Sector 9 held a re-socialization for districts that have committed to implement the Appropiate Technology bamboo laminate in Soreang Sourcing Fairs event at Appropiate Technology. The Socialization of generate the data potential of bamboo 5 districts in West Java, such as Bandung regency, Majalengka, Garut, Cianjur, and Sukabumi Regency. While 4 other districts have not submitted the data potential of bamboo in their respective locations.

The nine districts are coordinated by the mediator and the Government Agency for Community Empowerment Village (GACEV) of West Java Province. GACEV has a village empowerment program better known as the Village of Civilization. Village civilization is a program to prevent the urbanization of rural areas to cities, is expected with this program in the village can create business opportunities for rural communities. Civilization village is a program for disadvantaged villages in West Java. The new program implemented two times: in the year 2010 (100 villages) and 2012 (150 villages). Evaluation conducted in 2011. Civilization villages selected by

the village profile and champion race village. The plan launched in April held in the village of village of Civilization Mariuk Subang. 150 selected villages are growing villages in 17 districts and 1 city (Banjar).

In the village of Civilization program, selected villages received grant funding 1 billion per village, which is given in two stages. The first phase of 600 million awarded after the village submit proposals. On the average allocation of funds to the economy, including the strengthening of BUMDes, approximately 250-450 million per village. The funds are planned to be directed to fund the implementation of laminated bamboo APPROPIATE TECHNOLOGY in West Java.

After socialization by mediators then obtained two candidates bamboo laminate manufacturer, from Bandung and Sukabumi Regency. As of October APPROPIATE TECHNOLOGY owners have not done the training to prospective manufacturers due to lack of coordination between the owners of APPROPIATE TECHNOLOGY and mediators (BPMPD).

o Overview bamboo laminate technology diffusion in Bali:

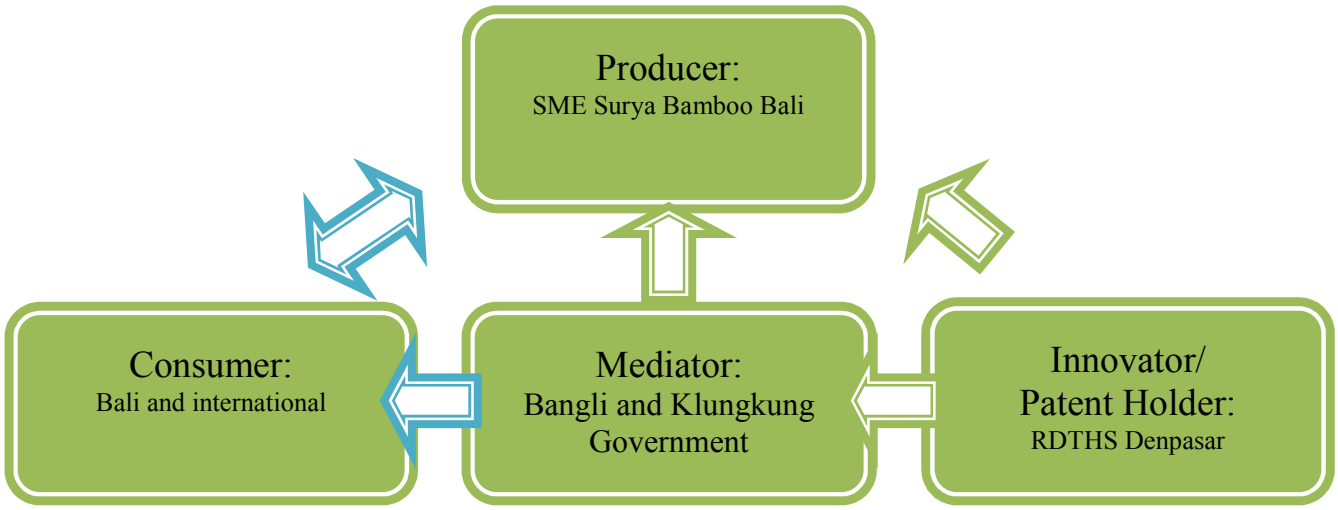

Figure 4. Picture of Bamboo Laminate Technology Diffusion in Bali

Described in the above chart of the position and the relationship between the four stakeholders and activities in each of these relationships. Appropiate Technology owner, in conjunction with the mediator, to disseminate APPROPIATE TECHNOLOGY to find early adopters of technology. Appropiate Technology owners in Bali in Denpasar this is PTPT Hall. Mediator, then find a location that has the potential for application of Appropiate Technology. At this point the mediator has a very important position to assess this potential. In this case the mediator in Bali is Bangli regency government (Department of Industry and Trade and Cooperatives Bangli regency, SMEs, Industry and Trade Bangli regency) and Klungkung regency. Hall PTPT introduce the technology to prospective producers, and after that the local government then conduct a feasibility assessment. Bangli, already one step ahead, which in Bangli Bangli As a form of institutionalized in existing Bamboo Working Group comprising stakeholders such cross Indag Agency, Office of Kop etc. The bamboo working group formed by mid-late 2011 Bangli Regent ago with the aim to accelerate and reinforce the use of bamboo as a cluster of bamboo Bangli recognition nationwide.
Then when candidates were introduced and dipersuasi manufacturers to implement Appropiate Technology, Appropiate Technology owner then conduct training on prospective producers in order to transfer of technology. In this case the Hall PTPT Denpasar has socialized Appropiate Technology to laminate bamboo craftsmen in Bangli (2010) Klungkung and (2012). Bangli regency was established SME Solar Bamboo Bali that concentrate on making parquet and laminated bamboo furniture. Klungkung also been established SMEs with the same characteristics as Bangli. Klungkung SME members come from ex-P4S group that had stood since 1998. Problems faced by producers during the training period will be handled directly by the owners of appropiate technology. After completion of the training period, as the owner of Hall PTPT intensive technologies continue

to guide, when manufacturers need or find the problem. Once the manufacturer is able to produce independently manufacturers will further engage with consumers. Associated with the consumer, there are two ways of marketing products APPROPIATE TECHNOLOGY, the producers dealing directly with consumers or producers associated with the mediator will connect with consumers. When manufacturers deal directly with the consumer, the product sales will be entirely dependent on market mechanisms. This is appropriate when it is optimal and stable production and yield have got a fixed market share, so it is not a lot of price fluctuations have a negative impact on manufacturers. However, if production is not optimal, the second way is more recommended. Mediator hold / buy products from manufacturers, and then put it into the consumer market through policy intervention. Examples of policy interventions are as happened in Bali where the construction of a model home in Bangli and laminated bamboo PTPT Hall, organized by the Center PTPT many take the material - the material of bamboo laminate manufacturer in Kayubihi village, Bangli. Through this second way, the manufacturer has indirectly gain promotion from the examples on display. Once this is done, many orders orders parquet and laminated bamboo furniture comes from Bali and abroad (Argentina, USA etc.).

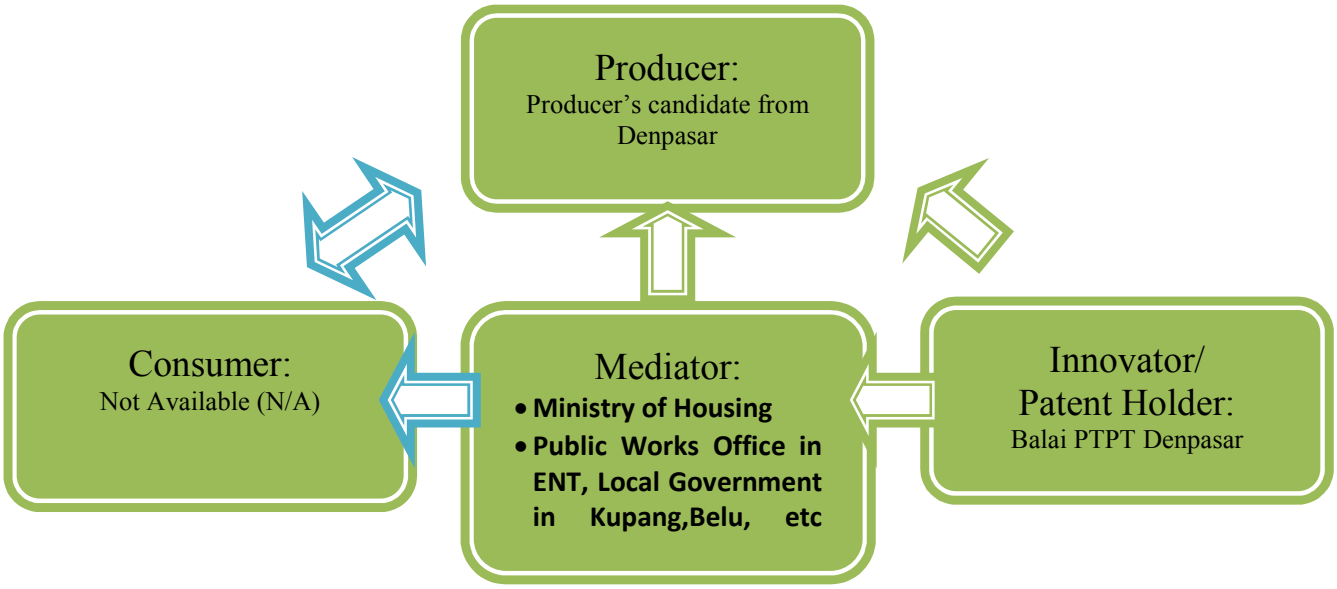

Figure 5. Diffusion picture APPROPIATE TECHNOLOGY woven fiber laminate in NTT

Appropiate Technology planned for diffused in Kupang was woven fiber technology Laminates. Owner Appropiate Technology woven fiber laminate is (RDSTH) Denpasar. Socialization efforts that have been done by the owner of the technology is to organize events and socialization dissemination standards and guidelines manual (SPM) and appropriate technology (Appropiate Technology) settlement areas, organized by the Division of Standards and Dissemination Center for Settlement, on February 21, 2012 in Kupang NTT.

Prospects mediator laminated woven fiber technology in the city of Kupang, NTT generally is Non Vertical Specific work unit (SNVT) The Ministry of Public Works and Housing Ministry in East Nusa Tenggara Province, Department of Public Works NTT Provincial Government, Provincial Councils and ENT Government and Local Government in Kupang, TTU, TTS and Belu, the association also related settlements.

a. Compilation of the results of the analysis

From the analyzes performed above, this study synthesizes things - the important things in the three models and the integrative mechanisms of technology diffusion. Appropiate Technology socialization models:

The model consists of four stages: socialization Model Appropiate Technology: Aware and Concerned, Interest, Participate, Follow-up, which can be abbreviated and hereafter referred to as AIPF. AIPF operationalization of the model can be seen in Table 1.

Stages	Target stages of socialization		
	Government (Data source: Ministry of Housing)	The Local government (Data source: BPMPD)	Private (Data Source: Surya Bali Bamboo)
Aware and Concerned	• Communication-aware matter face to face • Multiplier effect • international reputation • Protect national interests	• Face-to-face communication • PAD • Create jobs • Serving constituency electoral district	• Face-to-face communication • Potential business
Interest	• Public private partnership • Budget saving	• Access stimulant fund budget • Synergies with local and national priority programs • Involving aspects of community empowerment	• Obtain an incentive, in the form of equipment • Significant Business Benefits • The market share of the Participate
Participate	• Programs that support priorities presidential directive	• Using a little budget but maximum results	• Decent financially and bankable Follow-up
Follow Up	• Performance Unit Housing Ministry	• Head of region Commitment	• The regional head of the customer is ready to buy

Table 1. Stages AIPF to Target Dissemination

Business Model Feasibility Assessment, The study of the interaction with producers and mediator technologies, then the model can be summarized in a business appraisal value chain depicted. The value chain model of the synthesis of the data found in the three study sites, suggesting that the components of the model are: the main activity component and component support activities. The main activity is a component of market analysis and supply chain analysis, while supporting the activity component is the technology analysis, labor analysis and analysis of financial resources.

1. Market analysis: Review of the literature shows that the analysis of the market consists of consumer behavior analysis, competition analysis, the size of the potential market, segmentation, targeting, positioning, and market mix. Obtained in this study is a major factor that consumer preferences: power, price, beauty, ease of purchase, ease of maintenance, after-sales.

2. Supply chain analysis: Compilation of the data shows that there are major sequence of activities, from APPROPIATE TECHNOLOGY products ranging from raw materials into raw materials and then transported to the workshop, and manufactured with laminated primary process, and then transported to the market and then marketed, sold and given sales service. The main activity can then be allocated to particular clusters correspond to the potential of each area. The supply chain should certainly provide added value. Supply chain also ensures that the time spent on production and marketing in accordance with market demand. Overall, the supply chain must ensure that producers benefit financially.

3. Analysis of the technology, This study found that there are two things that are important in the business feasibility of the technology aspects of the technology development cycle lamination line with the adoption of technology (Technology Adoption Life Cycle) and the development of means of production.

4. Analysis of labour, Primary data collected indicates that the analysis of labor should be directed to the availability of artisan, raw materials farmers, craftsmen in the manufacturing process, including educational qualifications and working life.

5. Modal analysis, Need for subsidy programs shaped, to help entrepreneurs in the early stages of business APPROPIATE TECHNOLOGY bamboo and woven fiber laminates, because of the high cost of equipment. APPROPIATE TECHNOLOGY is a viable business if the total income of the market minus the cost of the supply chain and support activities is positive or surplus is not only short-term but also long term. Technology transfer models. Result of interaction between BPTPT and Manufacturers indicate the need for a systematic transfer of technology transfer to support the transfer of technology from BPTPT to producers. BPTPT mechanism of technology transfer to producers can be done either directly or indirectly, to producers who do BPTPT (Mr. Nengah) is the form of equipment, training, and mentoring. While the process of technology transfer indirectly not found empirically. Technology transfer both directly and indirectly will homely, enlightment process, empowerment, and networking.

Integrative Technology Diffusion Mechanism, Based on the above three models and the interaction of three actors in the diffusion summarize research into the integrative mechanisms. This mechanism consists of five steps, namely communication, codification, acceptance, combination, and alignment or it could be called a 5K models.

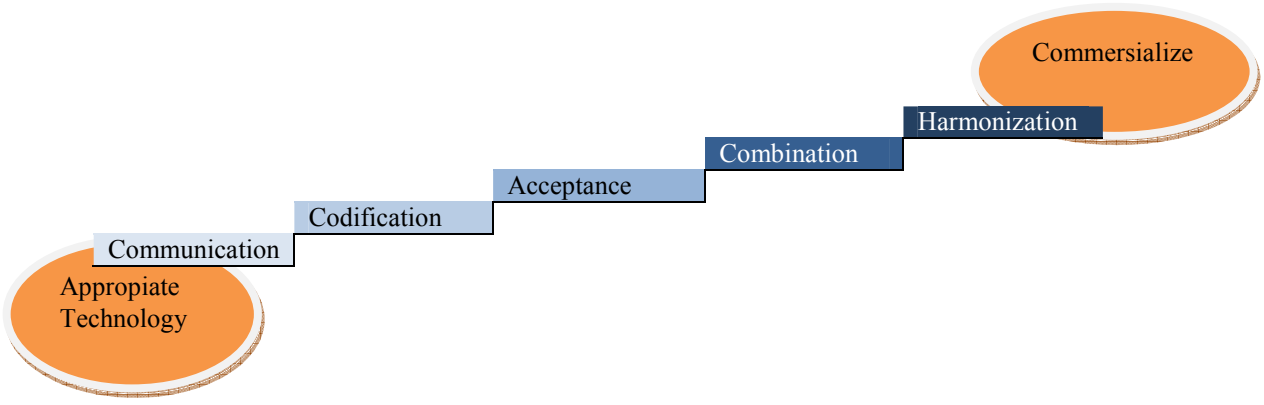

Figure 6. Model 5 K

5K models made after APPROPIATE TECHNOLOGY is deemed ready (technology readiness) for diffused.

Step 1: Communication

Technology diffusion preceded by socialization with emphasis on face-to-face communication. This process is very difficult and time consuming, a tool that is used to communicate SMIT.

Step 2: Codification
While walking BPTPT communication steps to ensure that appropriate technology is codified using Indonesian national standard writing 08-2007. The codification forms are at least include manual for the user (user manual) and manual for the manufacture of products APPROPIATE TECHNOLOGY (manual production). The codification of the results will help further the process of acceptance.
Step 3: Acceptance
There are three main factors that a APPROPIATE TECHNOLOGY acceptable to target groups or beneficiaries. These factors are usability APPROPIATE TECHNOLOGY, ease of use APPROPIATE TECHNOLOGY, and the intended use of APPROPIATE TECHNOLOGY. These three factors should be reflected in the results of codification.

Step 4: Combination
After usability, ease, and the intended use of APPROPIATE TECHNOLOGY acceptable to the target group (and producer or consumer) then the diffusion process at this step helps the target group to combine between APPROPIATE TECHNOLOGY and businesses.
Step 5: Harmonization
Results of step 4 combinations are then used by the target group to harmonize and internalize APPROPIATE TECHNOLOGY diffused into the portfolio for manufacturers and suitability for the needs of consumers. After keselarasan step is complete it will continue to process the terpsah commercialization of this research.

6. conclusion

Technology owners need to pay attention to four aspects, namely an attempt to Sadar-care, interest, Participate and Follow-up (SMIT) to perform diffusion to the mediator and producers. Aspects of the production costs and selling prices is the cornerstone of stakeholders perception. Preferences related to note mediator and attempt to convince consumers are aspects of power and the price for the material structure, beauty and price for supporting materials, the beauty of furniture.

Delivery process technology to manufacturers of mediators consider the value chain and supply chain, which can be implemented using direct direct way: given the tools, training, mentoring and indirect: licensing, joint ventures, independent units, such as BLU.

Process information and technology transfer between the owner of the technology to the mediator, and the mediator to transfer the capital from the manufacturer can be done by considering the social aspects of the availability of an educated and skilled labor, the public perception of the technology, product utilization APPROPIATE TECHNOLOGY, the economic aspects of readiness in terms of marketing products early, and related environmental aspects sufficient availability of raw materials and affordable from the production site. As an effort to transfer the technology to the information from the owner of the mediator, and the producers need to increase the amount of production and adaptation of new technology, the design and aesthetics of existing and consider the selling price more affordable for consumers.

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