The Role of Diffusion of Innovation in Agricultural to Compete in Asean Community

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Abstract. Diffusion of innovation is one of the most needed in agribusiness farming. Many farmers failed to increase their income. Besides, they lost their income and even their land because they couldn’t be able to solve their problems which the national development of agriculture business seemed impossible to overcome the problems and the obstacles to resolving thoroughly as the requirement needed more serious attention. The innovation was a key factor for agribusiness growth, development and the welfare of chili pepper farmer. Diffusion of chili pepper farming had given differences in innovativeness to determine the characteristic of the adopter categories. But the communication and adoption process could explain the need of diffusion of innovation. The important in diffusion was the time dimension in chronology and not as history. Innovation was treated as both products of contradiction and caused of new contradiction and the process of adoption as both being structured was changed after all. When a new idea adopted, the innovations required in the period of time to become available. A new technology as a smart technology adopted and transformed in a learning process. By having to identify and examining the WHY and HOWs of the interface the farmer and innovation systems would, therefore, create a very good intervention ground to make a rational use of resources and knowledge for the development of agribusiness farming systems.

1. Introduction

Agribusiness has a chance to be one of the most important parts of the economic growth in Indonesia. Data from World Bank indicated that 40% of Indonesian people live in rural area and work as a farmer. (Quincieu, 2015)[47]. Many factors are sharing to rising in unfairness and low labor absorption. The significant growth has been pushed by increases in low productivity. On the other side, the farmers are unable to increase their income. In Medan Bisnis Newspaper 02 Jun 2017, Lubukpamak, North Sumatra, the price of red chili pepper has been plummeted and has made the farmer worse off. The price went to the lowest Rp 5000 per kilogram. As a result, the chili pepper plant in the area is no longer maintained and left alone. The chief of Farmer Group in Tani Desa Sidodadi, Ramunia said that the fallen of the red chili pepper came at the Ramadan month which it is usually the price would go up and the farmer might have good profit. The farmer couldn’t be able to cover operational costs of purchasing pesticides even though the area is large. Besides, the farmers should pay the maintenance and delivery systems and others. (Samosir, 2017)[53]. Farming is one of the important roles in Indonesia national development and the effort to realize the national development of agriculture business in the future seems impossible to overcome the problems and the
obstacles has not been able to resolve thoroughly as the requirement to more seriously attention. It’s difficult to increase agribusiness together with the increase of farmer income and its welfare. To get integrated farming systems is only a dream for the farmer. To establish the institution in farming is very urgent in order for the farmer are able to act in agribusiness. The issue in developing agricultural institution is more important in with the farmers are able to carry out activities which it is not only concerned on agricultural business, but also related to the aspect off the farm itself. (Tjiptoherijanto, 1996)[56]. This problem continues from time to time and the farmer needs more information to have problem solving. When we look at the case, innovation is a key factor for agribusiness growth, development and the welfare of chili pepper farmer. To measure the innovation is useful because it may provide orientation for the nature and degree of development of society towards a better future. (Ariza, César. et al., 2013)[3] Innovation in agribusiness implies to a recent task, which has just told from Medan Business Newspaper. As far as we concerned the diffusion of innovation has not yet been applied and the selling and buying systems need to be changed and renewed. (Figure 1).

![Figure 1. Unapplied of Diffusion of Innovation.](image)

Actually, the farmer wants to have the innovation and to change themselves to better life. The act of innovating is still heavily laden with positive value. Innovativeness, like efficiency, is a characteristic of the farmer want organisms to possess. (Arumapperuma, 2008)[4]. Based on this problem, the writer would like to find out about the contribution of diffusion of innovations in chili pepper farming and the innovations decision process in farming the chili pepper.

2. **Theory and the Applicable of Diffusion of Innovations in Chili Pepper Farming**

Diffusion really includes three fairly distinct processes: Presentation of the new culture element or elements to the society, acceptance by the society, and the integration of the accepted element or elements into the preexisting culture (Linton, 1936)[39]. Diffusion theory does not lead to the conclusion that one must wait for the diffusion of a new product or practice to reach the poorest people. In fact, one can accelerate the rate of adoption in any segment of the population through more intensive and more appropriate communication and outreach. (Green & Parcel, 1991)[27].

Diffusion occurs through a combination of (a) the need for individuals to reduce personal uncertainty when presented with new information, and (b) the need for individuals to respond to their perceptions of what specific credible others are thinking and doing, and (c) to general felt social pressure to do as others have done. (Figure 2. Diffusion Combination)
Uncertainty in response to an innovation typically leads to a search for information and, if the potential adopter believes the innovation to be interesting and with the potential for benefits, a search for evaluative judgments of trusted and respected others (informal opinion leaders). This advice-seeking behavior is a heuristic that allows the decision maker to avoid comprehensive information-seeking, reflecting Herbert Simon’s seminal insight about the importance of everyday constraints in “bounding” the rationality of our decision making. (Gigerenzer & Selten, 2001)[23].

Most of the criticism of diffusion theory stems directly from its failure to locate itself in a theory of social change. In fact in the last decade the meaning of the work ‘innovation’ has been stretched from the original context of a technical innovation (usually in a rural context) to include any change whatsoever, the result being that many diffusion theorists purport to study ‘change’ (i.e. innovation) without locating their study within a theory of social change. There is usually very little analysis of why the innovation is spreading (other than through the communication-adoption process), upon its impact, and to see it in terms of more general social, economic and political processes. Of course the reason why this anomaly has occurred in much of the writings of rural sociologists in the mid-sixties and geographers since then is that the diffusion process itself is supposed to provide such a theory. (Roger & Shoemaker, 1971)[48]; Outline two equilibrium states typified by a traditional social system and at the other end of the continuum a modern social system. ‘In summary, a social system with modern norms is more change-oriented, technologically developed, scientific, rational, cosmopolite and empathic. A traditional system embodies the opposite characteristics’ (p. 33).

Innovation diffusion is the process by which the state of society moves to from one equilibrium to another. It is certainly very easy in a short review article of this sort to resort to crude reductionism of such an extensive work as that of Rogers and his followers, but it is my view that innovation diffusion is seen by him in his books (1962;1972) as the central process of social change which impinges upon a given ‘traditional’ society, and which is to some extent channeled (or ‘screened out’, p.341) by existing social structures (characterized as ‘power Cites’) and is a chief agent in changing that society to a ‘modern’ one (Rudolph & Rudolph, 1967)[51] for a review of this whole debate. Many studies of the diffusion process have recognized the fact that there are early adopters and laggards and that there are so-called explanatory ‘correlates of innovativeness’, but the communication and adoption process itself cannot explain why there is such a difference in a population, and can only conclude that there is a ‘lag effect’ in which some individuals (the more educated, cosmopolite, socially participating, who enjoy higher social status, who have larger farms, who participate more in the market, etc.) enjoy the benefits before others. Note that the time dimension is important in diffusion studies-as it should be-but that it exists merely as chronology not as history. An historical approach could add that the benefits accrue to some before others, and therefore never to others. Theories about the differentiation on the peasantry following the diffusion of new inputs have been well developed in India in that remarkable journal Economic and Politic Weekly, particularly by (Byres, 1972)[10], (Cleaver, 1972)[13]. (Patnaik, 1972)[43]. (Appu, 1974)[2], (Griffen, 1974)[29] said that in a number of valuable
shorter comments in later editions. In general, there are so many empirical studies of innovation diffusion (usually treated as isolated changes) that Rogers was stimulated to comment:

“The rate at which empirical results have been adequately digested and integrated into theoretical formalities has not kept pace. If we continue to generate studies at even the present rate, without a major ‘leap forward’ in terms of integrative theory, we shall drown in our own data. (Readers are referred to L.J. Rao’s appendix to Rogers and Shoemaker’s book for a cross-referenced bibliography of empirical studies).”

Yet few diffusionist have stopped to ask themselves why there is such a high degree of concomitance of these variables ‘the correlates of innovativeness’ (referring to information-gathering as well as adoption), let alone considered the impact of ‘innovation-stacking’ upon these fortunate early adopters in terms of theories of differentiation or the penetration of capitalism into pre-capitalist economic formations. The reason is that a focus of the item-communication-adoption paradigm cannot hope to explain the social structure which developed and introduced the item, which determined the structure of channels of communication, the attributes of the individuals who hear of it and adopt, and the implication of the pattern through space and time of this adoption. By adopting a dialectical analysis it is possible to integrate innovation diffusion into a theory of social change. A very brief but clear footnote in (Howard & King, 1975)[33] explains the dialectical method:

“...The main idea [of dialectical analysis] is that social phenomena are seen as existing in relation to each other, and continually developing in and through such relations so as to form, at various phases, contradictory forces that generate qualitatively new formations. Thus social reality is seen always as in a state of becoming something else. The term dialectical, therefore, expresses a general structure of historical processes of development.”

Innovations by this method are treated as both products of contradiction and causes of new contradictions, and the process of adoption as both being structured by a social formation as well as changing it. In short, innovation adoption becomes a part of history.

A number of writers have always seen innovation diffusion as part of the wider process of the spread and penetration of capitalism particularly in (Frank A. G., 1967)[19], (Frank A. G., 1969)[20] and in the field of geography, (Blaut, 1975)[5], (Blaut, 1977)[6], and (Harvey, 1989)[31], and of course others have been able to include the study of diffusion of innovation in previous modes of production, particularly the feudal mode (White, 1962)[63], (Dobb, 1972)[16], (Hilton, 1976)[32].

Diffusion of chili pepper farming has given differences in innovativeness to determine the characteristic of the adopter categories. Much less chili pepper farming has been devoted to analyzing innovation differences in investigating how the perceived farming affect the rate of adoption, although the imbalance between farmers versus innovation differences in diffusion study may be disappearing right now. Diffusion of innovations refers to the spread of abstract ideas and concepts, technical information, and actual practices within a social system, where the spread denotes flow or movement from a source to an adopter, typically via communication and influence (Rogers, 2003)[49]. In Indonesia, the effort of national development of agribusiness in the future will have a diffusion of innovations of communication and application of farming systems. The application of diffusion of innovations has not been reached yet so that to resolve this problem, Indonesian government and small business gives solution by having cooperative approach to a group. (Adiwilaga, 1992)[1]. The role of diffusions of innovation in farming in Indonesia is still back to basic farming, and the farming counseling is the guidance, facilitator and mediator to the farmers. Diffusion theory is very important theory that describes the process of change, for example, diffusion of innovations in a group of chili pepper farmer. The theory attempt to predict the communication and the behavior of individuals and social group in the process of adoption of innovation, considering their personal characteristics, social
relations, time factor and the characteristic of the innovation. (Padel, 2001)[42]. The way of communication is shown on figure 2. 3.

![Communication Channels of Diffusion of Innovation](image)

**Figure 3.** Communication Channels of Diffusion of Innovation (Roger, 2003)[49]

Innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption. According to Rogers (2003)[49], diffusion of innovation is a kind of social change. It is a social process that involves interpersonal communication. Communication is a process in which participants create and share information with one another in order to reach mutual understanding. Diffusion is a special form of communication related to new ideas.

3. Methodology

**The Innovations Decision Process in Farming the Chili Pepper**

Proponents of science commercialization argue that social welfare is enhanced through the efficient transfer of research from the public to the private sector (Etzkowitz, 2001)[17] and (Wolf & Zilberman, 2001)[64]; (Link & Siegel, 2007)[38]. However, since the agriculture and food system has long relied on public goods research conducted in public research institutions to drive innovation, many have raised concerns about the capacity to sustain socially beneficial university-based agricultural science and innovations when the there is such heavy emphasis on patenting and commercialization (Glenna, Welsh, Ervin, Lacy, & Biscotti, 2011)[25]; (Glenna, Shortall, & Brandl, 2015)[24]; (Fuglie & Toole, 2014)[22]; (Piesse & Thirle, 2010)[46]; (Cooper, 2009)[15]; (Weil, 1987)[62]; (Buttel & Belsky, 1987)[9]; (Samuelson, 1987)[54]. University scientists question the efficacy of utility patents but feel compelled to pursue them to attract industry funding (Kleinman, 1998)[35]. Some evidence indicates that patents create obstacles to material and information sharing and limit some kinds of research (Glenna, Shortall, & Brandl, Neoliberalism, University, Public Goods, Agricultural Innovation,, 2015)[24]; (Lei, Juneja, & Wright, 2009)[37]. Others note that the rise of patents in agriculture is a kind of primitive accumulation that is also reducing biodiversity (Pechlaner, 2012)[44]; (Kloppenburg, 2010)[36]. Some are claim that an open source approach would be a more effective way to promote innovations (Kloppenburg, 2010)[36]; (Jefferson, 2006)[34]. Another important issue is that patented knowledge goods tend to promote economic concentration because they tend to quickly achieve economies of scale, since fixed costs of research are high while marginal costs for producing additional units are low (Varian, 2009)[58]. Concentration means less competition, which tends to lead to unfair pricing and a decline in investment in research (Fuglie & Toole, 2014)[22]. Despite claims by mainstream economists that it is theoretically exceptional for privatized knowledge goods to promote concentration, it is not exceptional in reality (Brandl, 2012)[8], and this tendency is not ignored in economic textbooks on competition (Comanor,
However, neoliberal economists argue that monopoly and oligopoly are only problematic when a new firm’s entrance to the market is blocked. They claim that this is rare but do not provide evidence. Nevertheless, this argument led the US Justice Department to begin relaxing US antitrust policies in the 1970s and 1980s (Rubinfeld, 2001)[50].

As we noted earlier, orthodox theory rests on an assumption that markets are the most effective and efficient mechanisms for enhancing social welfare. In this case, social welfare refers to the capacity of the economy to generate goods and services in quantities relative to people’s preference for those goods and services. Built into this assumption is a utilitarian premise that preferences expressed by autonomous individuals in a competitive marketplace are the best way to gauge people’s perspectives on how to properly distribute various inputs and outputs to generate those goods and services (Wolff & Resnick, 2012)[65]. Based on this theory, then, one could evaluate the success of markets by their ability to satisfy people’s preferences. And orthodox theory has tended to emphasize the material preferences. When economists charge that privatization of agricultural science and technology is failing to increase crop yields (Victoriya & Gray, 2014)[60]; (Fuglie & Rada, 2013)[21], said that they are building their criticism on the assumption that social welfare is enhanced by increasing the material supply of food stuffs so that consumers will be able to spend less to satisfy their preferences.

There are many flaws in this economic line of reasoning. First, the utility model assumes that preferences are fixed within individuals. This ignores how social change and social interaction might alter people’s preferences over time and space (Wolff and Resnick 2012)[65]. Second, it tends to reduce measures of welfare to objective measures of productivity and economic growth, rather than subjective measures of people’s sense of well-being and quality of life (Flavin, Pacek, & Radcliff, 2011)[18]; (Philips, 2006)[45] critiques are important because they reflect a lack of consideration for democratic deliberation in economic theorizing. We will return to that in the conclusion.

However, for now, the important point is that both orthodox and neoliberal economic theorists assume that social welfare is enhanced by competitive markets that fuel the production of more material goods than a state-managed market. If we demonstrate that the neoliberal policy changes reduce market competition and provide a drag on material production, then we will be justified in rejecting the orthodox and neoliberal theories and calling for an alternative approach to determining the proper allocation of scientific research funding and outputs.

The research has used case study methodology to obtain the advantages of the actor’s perspective on societal contexts and dynamics. The qualitative interview and the close dialogue are at the centre of this methodology, thereby allowing for empirical inquiry of unclear 'boundaries between the phenomenon studied and the context’ (Yin, 1994)[66]. The goal of this methodology is to expand the theory, rather than proving it. This methodology is adopted as the qualities of clusters and its innovative milieus, like trustworthiness and learning dynamics, cannot be just measured using only the objective parameters. The conception of space as an objective attribute of things that can be measured and thereby pinned down is questioned (Harvey, 1989)[31]. Space should rather be understood as a ‘socially constructed, multi-dimensional structure, in part based upon actors’ livelihood strategies’ (Verschoor, 1992)[59]. The case study methodology offers the advantages of the actor’s perspective on business contexts and its dynamics. The researcher using this methodology has entered the ‘life-worlds of the researched’ and thereby has tried to observe and comprehend the entrepreneurial process and its associated hindrances (Long, 1992)[40]. The study has looked into some of these aspects through the lenses of the micro-entrepreneurs. Dealing with two cases has helped in doing a comparative analysis and reciprocal illumination. The methodology of advantages of entrepreneurial process is shown on figure 4.
Figure 4. Methodology of advantages of entrepreneurial process.

Decision to enter the ‘life-worlds’ must turn themselves to their own standard and has no longer lives the relevancies’ of which the adoption of innovations in themselves. The driver of diffusion is the adoption and the utilization of the innovation by individuals which the decision to accept an innovation by the receiver will spread through a population, and depends on the perceived characteristics of innovation. (Ariza, César et al., 2013)[3]. Rogers broadly defined such characteristics as the relative advantage of the innovation, compatibility with the needs and desires of the adopter, the relative complexity of the innovation, and the relative trial ability and observable of the innovation compare to its alternatives. (Rogers, 2003)[49]. The diffusion of an innovation through a given social system can be thought of as the idea’s spread in a limited population; the number of adopters initially grows exponentially as the new technology takes root within the social structure. (Walsh, 1992)[61]. By focusing on persuading individuals to change, the change as being primarily about the evolution or reinvention of products and behavior, they become better fits for the needs of individuals and groups because diffusion of innovations takes a radically different approach to most other theories change and diffusion of innovation is not about people who change, but the innovation themselves in people. (Ryan & Gross, 1950)[52].

4. Result of the Adoption Diffusion of Innovation as New Idea

When a new idea adopted, even it has obvious advantages, is difficult. The innovations required a lengthy period of time to become available when they are adopted. As a matter of fact that adopting the transformation and information especially for the farmers often shows a worrying atmosphere. Even though, increasing the outcome from agricultural business has not been accompanied by increased income and farmers' welfare significantly in the farm, farmers have not been able to achieve the rational value to integrate farming system scale. The issue in developing agricultural institution is more important in with the farmers are able to carry out activities which it is not only concerned on agricultural business, but also related to the aspect off the farm itself. (Tjiptoherijanto, 1996)[56].

In the Indonesian context, three specific problems are related to an economic development strategy based on small-scale rural entrepreneurs. These are: (a) the relatively low number of real entrepreneurs and business start-ups; (b) the dominance of ‘copyists’, rather than innovative businesses; and (c) the limited ability to compete, on price or quality, in open globalised markets.

The concept of ‘innovative milieu’ could be considered as a dynamic counterpart to similar concepts developed within the framework of endogenous economic growth theory, like ‘industrial district’, ’local context’ and ’flexible specialization’. The new element in the concept of innovative milieu is the attention being paid to the innovation process and creativity, rather than to factors that affect production efficiency (Camagni, 1995)[12]. This innovation process is based on entrepreneurs and is revealed through their capacities in creating new technology, shifting resources from declining to rising economic spheres and through adjusting to external turbulence (Camagni, 1991)[11]. This innovative milieu concept has also been used in various industrial development strategies for economically lagging regions among the nations of the European Union (GREMI, 1991)[28].
Researchers like Camagni argue that this innovative milieu approach for growth through industrialization would include the following:

1. An ‘industrial atmosphere’ that is creating dynamic efficiency, for instance through reducing the cost disadvantages of small-scale, locally based companies. Spontaneous and socialized learning and training processes are examples of this dynamic efficiency.
2. Proximity economies’ that reduce transaction costs through easy information circulation and face-to-face contacts.
3. Synergy elements’ which happen not only through close interaction of agents, producers, public-private partnership, but also through business-related interaction with universities and research institutions (Camagni, 1995)[11].

On this theoretical basis, the researcher goes ahead to define the concept of ‘innovative milieu’. In his words:

“…The set of relationships that occur within a given geographical area that brings unity to a production system, economic actors, and an industrial culture, that generate a localized dynamic process of collective learning and that act as an uncertainty-reducing mechanism in the innovation process.” (Camagni, 1995)[11]

A new generation of farmers use a technology as they move on to the life. The smart software and machines is emerging to once again redefine the relationship to work. The technology as smart software machines have the ability to communicate with each other, adapt to and learn from changing condition in real time, and do all of this autonomously without human supervision (Gorbis, 2016)[26]. The connections between institutions, innovation and industries have been discussed by (Hargadon & Douglas, 2001)[30] in the formation of new industries such as those developed though farmer’s work. Diffusion of such smart machines may bring any number of dystopian scenarios to mind: robots taking over the world, software “eating” our jobs, and machines running amok and reproducing themselves (Gorbis, 2016)[26].

With the innovations can increase farmer incomes by improving the efficiency of farm operation, reducing costs, and de-risking farming considerably in the following ways:

1. Improved productivity and diversification of farming activities.
2. Optimizing the cost of applying inputs such as seeds, fertilizers, agrochemicals, mechanization.
3. Improving supply chain efficiency and reducing the cost of borrowings.
4. De-risking Indonesian agriculture by developing innovative crop insurance solutions and reducing supply-demand mismatch which causes price volatility. (Sunding & Zilberman, 2000)[55].

By having de-risking, the future of farming can be predicted towards technology and smart farming. However, it is still skeptical about the development and what consequences will be for different group of farmers. They are expecting a loss of knowledge with increasing automation and see the risk that farmers’ experience is neglected. (p. 45). Furthermore (Sunding & Zilberman, 2000)[55] said:

“Good farmers need good tools, rough tools, and robust things. They don't need whatever sensors.”

Equally a practice expert emphasized farmers’ experience as crucial for taking the right production decision: “I think for a computer automated systems it is very hard to detect the right thing to do, because it’s a lot of feeling and experience.”

The next step will be the establishment of data environments around the technology of individual farms and the connection via networks to streamline the data transfer and optimize the utilization of the output of all data automatically collected by smart soft- and hardware. Therefore, the industry proclaims that it is necessary for the Indonesian Farmers community to manage this evolution.
5. Discussion of a New Idea of Diffusion of Innovation in Indonesian Farmers.

There is no providing adequate base for statistically predicting susceptibility to a technological innovation. But in any exploratory study of social behavior involving complex motivations, frames of mid and some dependence upon external conditions, one can scarcely expect to derive simple touchstones of prediction.

There are five innovations for Indonesian farmers that the potential to collectively and comprehensively achieve: (Lubis, 2010)[41]

1. Farming-as-a-service to make cost variable and make farming affordable to the majority of small and marginal farmers.
2. Big data intervention through real-time capturing and synthesis of data to aid farmers in better decision making.
3. Market linkages for the sale of farm produce to facilitate disintermediation and aggregation of farm produce so farmers reap a higher share of the end-consumer price.
4. Fintech platforms to aid institution financing to reduce the cost of borrowing for farmers.
5. Diversification to increase the sources of income for farmers.

The process of innovation with the diffusion of innovation with technology as "the extent and the speed at which the economy proceeds has adopted a superior technique which it is concerned on how the economy adjusts or 'diffuses' to the new technology. This adjustment or diffusion can be instantaneous or gradual and interpretation of the process of innovation has emerged. The actual absorption of a given technology, more importance is placed on the actual process through which a new technology is developed step by step. In this context, there is no longer adjusts passively to the technology but becomes the instrument for determining the extent, the nature and the articulation through time of the using innovation technology. (Blöndal, Hawkesworth, & Hyun, 2009)[7]. This implies that there are lots of opportunities in the farming systems with diffusion of innovations that help to accommodate the idea of farmer innovation approach. By having identifying and examining the WHY and HOWs of the interface the farmer and innovation systems would therefore create a very good intervention ground to make a rational use of resources and knowledge for development. (Lubis, 2010)[41]. There are a number of comprehensive and well though policies that have been issued by the authorities to support farmers led innovation process in the country in general. Upon making critical examination of some of the key policy documents and practices, there is a possibility of finding out and explain those policy elements, that pertains to farmer innovation and indigenous knowledge, which are not yet realized for many reasons. (Blöndal, Hawkesworth, & Hyun, 2009)[7]. The other ways through farmers innovation process could be enhance with creating opportunity for farmers to share their innovation, as these provide ideas for other farmer to try out. (Samuelson, 1987)[54]. Also, offering the alternatives to compare with current practices or local innovations and improving farmers’ experimental design through stimulating agribusiness to examine their informal experimentation methods and helping them explore more systematic forms of experimentation. (Adiwilaga, 1992)[1]. The agribusiness agents can fill local farmers’ knowledge with has a gap through increasing farmers’ awareness of resource management principles and providing information on phenomena that agribusiness farmers cannot observe on their own so that they can develop local ways of applying the principles in farming practice (p.34). The government can facilitate mutual learning through creating opportunities for group agribusiness farmers to analyze critically both local and external ideas for improving agribusiness, to assess the results of agribusiness farmers through learning groups or exchange visits, and the result of this journal article is more suggestive rather than definitive.

6. Conclusion

Each innovation addresses and demonstrates an eagerness to set aside convention and adopt new practices by developing agribusiness farmers with the use of smart technology which the kind of
process in farming systems. (Lubis, 2010)[41]. The new technology which gives diffusion of innovation rise the stochastic processes which randomly change depend on the time being and understand of dynamics of uncertain events and how they affect the markets. (Adiwilaga, 1992)[1]. This link generally equilibrium modeling with the financial tools that they are an important challenge to the agribusiness farmers’ development. The diffusion of innovation has emphasized technical innovation but it may be just as important to understand institutional innovations which give the reasons for the emergence for the future market, agribusiness farmer’s cooperatives, and product quality warranties. The innovative activities are critically dependent on human capacity to make decisions and learn (Trouillier, 2016)[57]. Technological innovation and institutional change have a profound effect on the evolution of the agribusiness sector. A new technology and their adoption are affected to the result of agribusiness farming including prices and activities of the farming systems. The challenges of designing technology and diffusion of innovation will require improving the understanding the complex process of Indonesian economic, learning and adoption in a myriad of institutional and technological setting. After all, the economics have made many notable advances through their research on innovation and adoption, but there remains much to be discovered (Blöndal, Hawkesworth, & Hyun, 2009)[7].

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