

## ODL Embedded with Innovative Communication and Digital Media to Empower All Levels of Farm Sectors to be Smart Farmers

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**Abstract:** This research shows how innovative communication and digital media could help empower any level of farm sector in Thailand and be embedded into ODL to serve their most effective demands. Qualitative research was used via case-based studies among eight key farm leaders from four success farms with data mapping and an interview form. Content analysis was also used. Tangible results of how ODL embedded with innovative communication and digital media can empower all levels of farm sectors under “SDGs” is described. The main findings are “ODL embedded with Innovative communication and digital media must be: 1) undertaken for the right reasons; 2) sensitive to real demands and problems; 3) fit with the existing context such as existing infrastructure, i.e., farms and ICT; 4) best engaged among all stakeholders with all kinds of participatory processes; and 5) an appropriate design to fit with all farmers’ contexts, i.e., friendly relationships, pedagogical, administrative, and all kinds of participatory channels and opportunities.

**Keywords:** ODL, innovative communication and digital media, smart farmer, Thailand.

### Introduction

Disruptive technologies, and especially online learning, including ODL (Open Distance Learning), have been developing alongside all other changes and disruptions, including those in technology, in innovation and in the everyday lives of people all over the world. ODL has been used over the decades as a potential strategy for addressing human development issues in changing times. With the current disruption of information and communications technologies, as well as all kinds of innovative communication and media, we can optimise ODL to serve its best function for all education services as well as development in most of the countries around the world.

ODL, using disruptive technology and innovative communication and media, comes at the right time to support life-long education. However, it is important that ODL initiatives be tailored, designed and grounded well with the real needs of those who are marginalised. ODL has proved its sustainable success in addressing people’s needs and development, especially in the quest to reduce poverty and promote sustainable development in each particular group and context. The Food and Agriculture Organization of the United Nations (FAO) has, since 2001, studied the experiences of ODL for agriculture and rural development in low-income countries and has concluded that ODL should be implemented effectively in developing countries as follows:

1. Undertaken for the right reasons;
2. Sensitive to the context in which it is applied;
3. Uses existing infrastructure, with sustainable cost structures;



4. Engages stakeholders in participatory processes; and
5. Uses sound pedagogical and administrative models. (Scott McLean, et al., 2006).

The Research Center of Communication and Development Knowledge Management (CCDKM) based at Sukhothai Thammathirat Open University (STOU) was established in 2006 and is committed to bridging the digital divide and increasing the social and economic impact of information and communication technologies (ICTs) at the grassroots level and in marginalised communities in Thailand and the ASEAN region. CCDKM, STOU is the focal point for research in using ICT to empower all marginalised groups in Thailand and beyond. CCDKM has been the core partner of the Ministry of ICT, Thailand and initiated the establishment of ICT Community Centres all over the country among marginalised communities, using ODL embedded with ICT technologies with innovative communication and media. (CCDKM, 2021)

In response both to disruptive technology and the recent pandemic, it is argued that ODL embedded with the innovative communication and media should be further developed and optimised to best serve all the marginalised groups in Thailand, especially given the country's digitisation journey of "Thailand 4.0", which concentrates on important advancements and digital improvements to enhance the quality of life, productivity and efficiency of the Thai people. Several case studies have been used to show its potential success.

## **Literature Review**

### **ODL in Thailand**

**ODL:** Open and Distance Learning allows for innovative, flexible, and in-time learning opportunities. ODL can reach the remote learner and is free from time and space constraints. ODL can be used to provide learning to the unreached or the marginalised – a trend visible throughout the world (Carr, et al., 2018). Through technology disruption, ODL has a significant role to play in all education fields: formal, informal and non-formal education. More and more people, including the marginalised, can easily access all kinds of new horizons, knowledge and opportunities. Besides ODL can serve the real needs and changed lives of people in response to all kinds of pandemic and disasters.

**Role of ODL in Lifelong Learning and Development:** Through use of technology in ways that disrupt traditional pedagogy, ODL can be optimised to make significant advances in serving lifelong learning for all. McLean, et al. (2006) point out that ODL has great potential for helping a wide range of learners achieve more desirable and rewarding circumstances for themselves and their communities. ODL has proved its numerous possibilities to fulfill the promise of lifelong learning for all in many countries of the world.

**ODL to Serve the National Educational System of Thailand:** Under the current Thai government act for Agile Life-Long Education for All, the National Education Council has adjusted its Educational Qualifications Framework (NQF) to integrate more between education qualifications and occupation standards with all kinds of adaptive pedagogies including ODL. The main objectives are to make sure that learning outcomes of each education qualification meet the requirement of each occupation. The objectives are: 1) to serve as a mechanism for education reform by linking quality demand on manpower required by all sectors with the education qualification system in order to keep pace with the changing world of work and education standards; 2) to strengthen lifelong learning via any agile

pedagogy aimed at human workforce empowerment; and 3) to increase the value of those having functional competencies by recognition of prior learning (RPL) as the basis for sustainable career path development for individuals as well as for the country as a whole.

### **Smart Farmer**

Thailand's agricultural sector generates 8.4% of the country's GDP and employs 40% of the country's labor force. This makes agriculture the backbone of the Thai economy. So, one among the priorities of "Thailand 4.0 Development Plan", launched by the current Prime Minister Prayut Chan-o-cha's government, is to drive Thailand with ICT and innovation while eliminating social inequality as well as pulling the country out of the middle-income trap. "Thailand's Agriculture 4.0" aims at professionalising agriculture and biotechnology to make the most of the country's abundant resources and to add more value to the products through the adaptation and adoption of advanced technologies and innovations for improved quality, uniformity and efficiency.

Nowadays, the majority of Thai farmers earn on average US\$4,125 per household annually. Under the drive of Agriculture 4.0 (Thai PBS, 2020), technology-enabled "smart" farmers should be able to increase their annual income to more than US\$5,625 per household and should make an annual profit of over US\$15,625 per household (the Office of Agricultural Economics, 2019).

Under the Agriculture 4.0 initiative, the State-owned Bank of Agriculture and Agricultural Cooperatives (BAAC) is one among the key organisations in agricultural development in Thailand and has announced plans to allocate US\$3.3 billion to support the Thai agriculture sector. Recognising digitisation as the way forward, BAAC plans to introduce and implement smart farming in 4,500 Thai communities nationwide, starting in 2020 to help farmers make the transition into smart farming by providing them with loans at low-interest rates of only two percent. The farmers are also encouraged to take on supplementary occupations. Under this smart farming scheme, BAAC also offers low-interest loans to help farmers with supplementary occupations including organic fertiliser pellet manufacturing while also promoting the use of technology and innovation in the agricultural industries under the national policy of Agriculture 4.0 (BAAC, 2019). Starting from the fundamental smart farming cycle using basic technology, smart farmers are encouraged become more advanced by incorporating more technologies such as AI-powered drones, robotics and all kinds of automation to help in all farm cycles. Agricultural businesses, regardless of size, are encouraged to embrace and leverage all kinds of technology and innovations towards digitisation in all systems and processes of smart agricultural industries.

So, the role of "smart" farmers is to integrate any appropriate ICT and innovation into each level of agricultural management. Tapping into the Internet of Things (IoT), smart farming can drastically change all facets of the agricultural industry. The core concept of smart farming is relatively practical with its main processes: new knowledge and skills, analysis, implementation, and decision-making:

- 1) **New Knowledge and Skills:** Digital new knowledge and skills such as a remote sensor that connects all the dots in the farm to record all required data such as soil, temperature, pressure, rainfall, humidity, insects, etc.
- 2) **Analysis:** Digital data as well as all the relevant data analysis in the farm's context.

- 3) **Implementation:** Automation data fed into a cloud IoT platform to be programmed with a designed model then apply its functions as planned.
- 4) **Decision-making:** Leverage artificial intelligence (AI) and machine learning (ML) to decide the next actionable steps. Machines involved in the process can help carry out the commands required to rectify a problem or improve any requirement for the farm.

There is no doubt that making the transition from traditional farming to smart farming requires all kinds of development including farmers’ empowerment, ICT, innovation, policy, partners and farm management. In the long run, once farming can be managed by its own data-driven automated processes, farmers can monitor all their farm’s activities more practically and at less cost. Besides, potential threats and risks can be intercepted, and farmers can use data obtained in predictive analytics to gain insights into their own farms’ production processes, marketing forecasts, and risk mitigation needs.

### **ICT Embedded in ODL to Empower Marginalised Farm Sectors in Thailand**

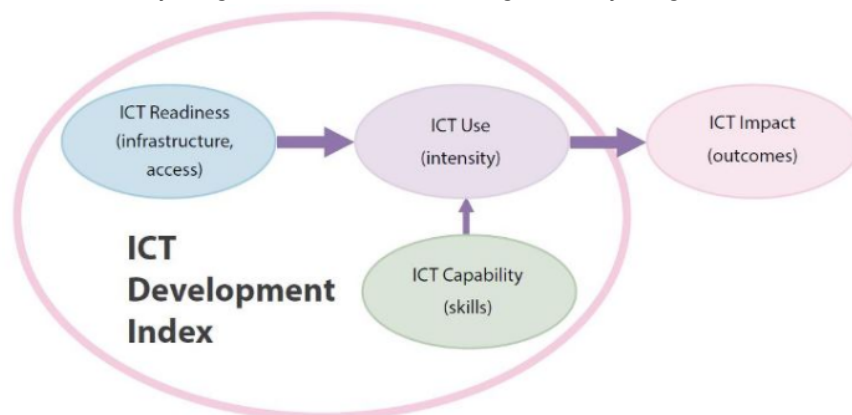
The International Telecommunication Union (ITU) has as its mission to promote ICT to be the development enabler in any development process, and drive a country’s evolution towards becoming an information society. ITU has designed the three-stage model shown in Figure 1:

Stage 1: ICT readiness – reflecting the level of networked infrastructure and access to ICT;

Stage 2: ICT intensity – reflecting the level of use of ICTs in society; and

Stage 3: ICT impact – reflecting the results/outcomes of more efficient and effective ICT use. (ITU, 2021)

*“With ICTs ....everything is POSSIBLE for Thai girls and young women farmers...”*



**Figure 1: ICT Development Index (IDI): Conceptual Framework and methodology**

[https://www.itu.int/en/ITU-D/StatisticThe Ins/Pages/publications/mis2015/methodology.aspx](https://www.itu.int/en/ITU-D/StatisticThe%20Ins/Pages/publications/mis2015/methodology.aspx) (ITU, 2021)

Since 2006, CCDKM STOU has partnered with various core agencies such as FAO (2020), ITU (2021) in the International Girls in ICT Day event, Farm Women Group National Association of Thailand (2021), and with other relevant partners and policy-makers, such as the Ministry of Agriculture, Ministry of Digital Economy and Society (MDES) in Thailand. It has sought to augment the existing “ICT Community Network: Telecentre” with further developments, for example through the Village

Broadband Internet Project (*Net Pracharat*) in most of the villages all over Thailand to empowering digital skills for girls and young women farmers in Thailand. One of the key thematic areas is enhancing digital skills of girls and young women in agriculture to able them to become “smart farmers” through training programmes such as the "Agri-tech Using ICTs" as well as other ICT skills, knowledge, and innovations in agriculture offered holistically. This training covers aspects such as drone technology for smart farms, smart watering systems, smart fertiliser systems, and smart solar systems through to smart farm marketing and other areas. There is an increasing number of partners involved, especially with all the relevant technology sectors as well as the girls and young women themselves.

### **Some Pilot Success Smart Farms in Thailand**

CCDKM has been the core partner of the Ministry of ICT in Thailand and initiated the establishment of ICT Community Centres all over the country. It also offered digital literacy to the most marginalised, including girls and young women who mostly earn their living as small farmers. With tangible support from all partners, CT can make seen and heard all the talents and voices of all the girls and young women involved in farming. ICT has been practically applied in an increasing number of farm activities according to capability and readiness since 2016. The digital topics addressed in training evolve in step with the process of digitisation from establishing smart farms, to smart farm marketing and smart farm entrepreneurs.

ICT for smart farm or Agri-Tech has been expanding all over the country via the network of Community ICT Centres, the Ministry of Digital Economy and Society (MDES) as well as the USO Internet Centre in the NBTC (National Broadcasting Telecommunication Commission) in Thailand and with support by all the relevant expertise partners such as FAO, ITU, The Women Farmer Association of Thailand under the Ministry of Agriculture and Cooperatives, Microsoft Thailand, CISCO, and others.

Since 2006, more than 50,000 youths including girls and young women, have accessed training and support and there have been more than 50 success cases of smart farms all over the country because of the innovative and continuous training, partnering, sharing, and marketing via ICT as a tool for all. Many youths become the real leaders on their own farms and their own communities because many are already “digital natives”. Besides, the innovation, all the local farm wisdom and farm heritage has also been preserved and protected digitally.

### **Research Objectives**

ODL Embedded with Innovative Communication and Media to Empower All Levels of Farm sectors in Thailand to be Smart Farmers had the following research objectives:

1. To study how ODL embedded with innovative communication and digital media can empower all levels of farm sectors in Thailand;
2. To synthesise the key innovative communication and digital media embedded in any successful ODL implementation among all levels of farm sectors in Thailand;
3. To recommend how to scale up more ODL embedded with innovative communication and digital media to empower all levels of farm sectors in Thailand.

## Methods

Qualitative research was undertaken with four successful case studies of the pilot farm model to analyse how ODL embedded with innovative communication and media can empower all farmers to be smart farmers (CCDKM 2016a, b, c, d). Content analysis was undertaken on data from Focus Group Discussions, and in-depth interviews, among 20 key informants (five key informants from each farm) who are the key stakeholders of each successful pilot smart farm.

## Findings and Discussion

Illustrative quotations from the focus groups and interviews are provided in response to all three of the research objectives outlined above.

### Success Case 1: Young Smart Farm and Start Up, The Smart Farm of Karen Tribe, North Thailand



**Figure 2: The Smart Farm of Karen Tribe, North Thailand**

- “ODL made me feel more confident and included among the Thai people, I will back home and train my people, do my own smart farm to be the tangible pilot success in my tribal village” ....
- “ICTs assure me that I can do it even of my remote village. I have a very big smart farm network that can help me all the time....”.
- “I will be back home and train my tribal people to do the smart farm aims to earn more as well as save our green environment because I have already got well trained, I know how to seek all the relevant information that is fit to my farm and my family”.
- “I never ever dream about touching this kind of Agri. Tech...this is really my first time, and it is not that difficult, I will use drone to spray the natural fertilizer in my parent’s farm up the mountain. Yes, some of my family members and my community’s members’ might think that I am crazy, but I know how to use ICT to communicate with some of the donors, the agencies, then my farm could be the DEMO Smart Farm for the others.
- “I will be the volunteer to train the youths in my village’s school to know about the good agriculture, the ecological farming system, the self-sufficiency farming system of King Rama 9<sup>th</sup> because ODL via ICT and some ideas of innovation are not that difficult to me to learn further by myself.... then I can train the others in my village.

## Success Case 2: The Smart Organic Island Farm, Phetchaburi, Central Thailand



Figures 3 - 4: The Smart Organic Island Farm, Phetchaburi, Central Thailand

- “If you are the one who gain good graduation, but you don’t do it, who will do it?...From my own experiences, ODL is very practical tool for me and for my community too.... because I can apply and adjust whatever that fit to all the needs of my people”.
- “ODL embedded with ICT and any appropriate innovation can be easily applied to my farm, I can work among all partners to create our own DEMO Smart Farm: “Smart Organic Island” one of the signature Green Farm Tourism in Thailand”.
- “My farm area is at the upstream of the main river of the town, if my farms use heavy chemical, surely that all the town people downstream will be sick, I have discussed with my family, everyone absolutely decided to do smart farm or the ecological farming system which hurt no one especially ourselves.... we use ODL to raise the awareness of all the community then collaborate their hands and hearts to build this Organic Island as the prototype farm model for the others”
- “Ecological farming system has been designed and tailored made as of its contexts...ecology in my farm is Self-learning & Self-development, life-long learning & life-long development, we can learn by our own at anytime, anyplace, any device...”.
- “Besides from doing smart farm, we have created more value from our farm as follow; we have creating the Smart Farm Tourism, the Natural & Adventure tour in our clean river, the fresh & green farm products not only from our own farm, but also from the other neighbors in our village. More income generating has keep increasing while our happiness, our health, and our nature is still very sustained”.

- “We also keep training our neighbors, our young generation in our village to do smart farm. Our smart organic farm has been opening for all free smart farm training to all ages...from primary school students to the old age” All kinds of learning & empowering process occurring every day in my farm and my neighborhood”.
- “We also partnered with all relevant agencies to train, to pilot, to experiment any kind of innovation: farm innovation, communication & digital media innovation that could be benefited to ourselves and our people. We cannot lead the others without their co-understanding, and co-creation...ODL with innovative communication, digital media, and innovation must be used as a tool among us all”.

### Success Case 3: The “Liberal Farm”: The Smart SME Farm Family, East Thailand



Figure 5: The “Liberal Farm”: The Smart SME Farm Family, East Thailand

- “Once we have learned from ODL among all partners in the community, we got back to talk among our family members then made decision to do smart farm, all happiness return back to our family”.
- “We have named our smart farm as... “Plot-ake Farm” or “Liberal Farm” ...this name synthesized from what we have seen from other success farms that we have learned from the case studies from ODL course. The other success cases in ODL has assured us that our family also can do it if we are committed to. So, we both made decision to leave the industry labored works, and back home to do our own farm”.
- “I never can predict my future and especially my kid future to be the un-skilled labor in the factory. We stay apart among our family’s members especially my aged parent and my husband, my kid. I have got trained from the ICT Community Learning Centre nearby, then I have enlightened that ...my whole family’s member can be all happy, healthy and wealthy with the emerging friendly and affordable ICT. Then I resigned from the factory and help my husband as well as my aged parent to be a smart farm”.
- “We all are happy, especially my kid. He is very fast learner in ICT, he is the leader of ODL in our own family as well the other nearby farm. I do surely predict that he will be one among the smart farmers in Thailand. I am very proud of my own decision to start this smart farm”.
- “We use ICT to facilitate our farming system from the beginning till its market’s outlet. We have our own farm’s members which keep increasing because they all do know that our farm products are clean, safe, and fresh”.



- “I also help my husband in using ICT to communicate with all the farm’s members’ networks, stakeholders to seek some more farm innovation to develop our farming system. Smart farming system is not that hard as it looks. I keep explaining among my networks, and many of them keep following our smart farm system. So, I am sure that if all the farmers can use effective innovative communication and digital media, they all can be the effective smart farmers like us too.

**Success Case 4: SAB—Safety Agri Burirum Farm, The Social Enterprise Smart Farm Hub: Northeast Thailand**



**Figure 6: SAB — Safety Agri Burirum Farm**



**Figure 7: The Social Enterprise Smart Farm Hub—Northeast Thailand**

A medical doctor who has deserted land at the back of her small hospital has also tried the SDG smart farm model since 2016 and commented as follows:

- “I personally have observed that people keep getting more sick because of what they eat.... Even the farmers themselves who produce the food...How can we help this?...ODL course has been introduced to me, then I am quite sure that all the farmers can be empowered to be the smart farmers if they all get well trained from ODL at least”.

- “If my farm success, I aim to use it as the Smart Farm lab & hub for the other needed ones especially the small farmers nearby... because being the Smart Farm Hub is one among the community learning center among all the farmers, if we can use all kinds of innovative communication, digital media and any appropriate innovation, it could be well served to all the farmers”.
- “We have started with a friend (people media) who is the local wisdom in the area whom has the same mindset that...we can be a smart farmer...with health & wealth at the same time or at least...being our self-sufficient. The ecological paddy field has emerging up with our simplified drone technology to design our zoning as of the King’s New Theory of Agriculture: Farm Design”. With the drone application and demonstration in our pilot farm, it is really raised significant awareness among most of the farmers in the area”.
- “With the help of simplified technology, we can gain more and precise farming system. We can calculate our cropping system our watering management as well as our marketing out”
- “Our SAB: Safety Agriculture of Burirum (Burirum is our town) then can have its ecological farming system which aims to be the Smart Green Hub for other green farmers nearby. We have our sufficient crop to feed our own consumption all the year round”.
- “More Agri Tech is still most demanded and welcome because...not only SAB farm which will gain the benefit for all Agri Tech, other nearby small farms will also gain the same benefits.
- “The “Partnership model” as well as the “Social Enterprise model” is our testing strategy among our co-creative partners in the area”. Yes, we do need a very effective and innovative communication as well as all kinds of appropriate digital media as its tool”.

## **Discussion**

The preliminary study of “ODL embedded with innovative communication and digital media to empower all levels of farmers to be smart farmers” has shown tangible evidence of how ODL embedded with innovative communication and media can help empower farm sectors in Thailand. Feedback from participants indicates a positive attitude both towards the goal as well as to the methods employed to help farmers achieve it. Further research will be needed to identify ways in which the model can be improved.

## **Conclusion and Recommendations**

The overall conclusion is that the initiative of “ICT : Information, Communication, and Technology embedded with all kinds of innovative communication and media” has potential to be one among the common tools in ODL provision to empower all levels of farmers but especially the young farmer generation. Through this means they can be supported to be the next young smart farmers who can sustain their own farm heritage and local farm wisdom while enjoying good quality of life as well as protecting their own environment in line with the SDGs. ICT must be embedded in all kinds of innovative communication and media with the ODL pedagogy for all farm sectors to enable personalised life-long learning. Although further research is needed, the initiative has demonstrated some success and aligns well with “Thailand 4.0 : Agricultural 4.0” with its aims to empower all Thais to be smart Thais and smart farmers.

Although, as noted, more research is needed the following preliminary recommendations can be made:

1. ODL embedded with ICT and innovative communication with digital media must be undertaken for the right reasons;
2. ODL embedded with ICT and innovative communication with digital media must be sensitive to the real needs and problems of all the farm sectors in which it is being applied;
3. ODL embedded with ICT and innovative communication with digital media must be fit with the exiting contexts such as the existing infrastructures, i.e., farm structure and ICT and innovative communication structure, which aim for sustainable success together;
4. ODL embedded with ICT and innovative communication with digital media must be most engaged among all stakeholders in all kinds of participatory processes; and

ODL embedded with ICT and innovative communication with digital media must be appropriately designed to fit well with all contexts of the farmers, i.e., friendly pedagogical, administrative, and all kinds of participatory process and opportunities.

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