WhatsApp as a Knowledge Transfer Tool for Dairy Discussion Groups

This thesis is being submitted to UCD for the degree of Master of Agricultural Science in Agricultural Extension and Innovation

By

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Declaration

I have carried out this piece of research as part of my Masters in Agricultural Extension and Innovation (UCD/Teagasc). This thesis is all my own work and has not been previously submitted in any other University.

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Thesis Abstract

The purpose of this research was to examine the strengths, weaknesses, opportunities and threats of WhatsApp as a knowledge transfer tool in a dairy discussion group. WhatsApp is a free instant messaging service that discussion group members and group facilitators can use to communicate with each other online in a dairy discussion group. The discussion group members who participated in this research were very positive about having a WhatsApp group as part of their discussion group. 51% of farmers indicated that they have learned technical information as a result of interaction in a WhatsApp group. 67% of farmers in WhatsApp groups use WhatsApp to contact their advisor during busy periods on the farm. Farmers and group facilitators recognise that this tool works best when it's structured and when everyone is sure of their role in the group. Farmers and extension agents need to be clear in their clarity of role in WhatsApp groups to maximise the uptake and efficiency of knowledge transfer. There is a better chance of uptake and usage if the farmers take ownership of the WhatsApp group. Farmers have an issue with the number of messages entering groups, and recommended for extension agents to post in a key message at the beginning of each week with targets for the week. Farmers also felt that WhatsApp messages can keep them motivated between discussion group meetings. It was clear in this research that both extension agents and farmers had a lot to learn about WhatsApp as a tool. Farmers and extension agents need to be trained on how to use WhatsApp as a communication and knowledge transfer tool. Discussion group members and extension agents need to have an initial meeting when setting up a WhatsApp group so that everyone understands the tool, to set ground rules, and to clarify the purpose of the online discussion group.

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Chapter 1- Introduction

The purpose of this research is to examine the strengths, weaknesses, opportunities and threats of WhatsApp as a knowledge transfer tool in a dairy discussion group. A proportion of dairy discussion groups are using WhatsApp to facilitate an online discussion during the time period between group meetings. This research was conducted to gain an insight into the effectiveness of these online discussion groups. Both farmers and discussion group facilitators were targeted in this study, to gain a deeper insight into their knowledge and experiences of using WhatsApp as an online discussion group in a dairy discussion group setting. There has been no previous research carried out to assess whether WhatsApp could be used as a tool to facilitate the flow of knowledge between researchers, advisors and discussion group members. This research aims to capture the flow of knowledge between discussion group facilitators and discussion group members in dairy discussion groups.

1.1 Background to the Study

Large workload and labour efficiency are among the significant challenges faced by dairy farmers in Ireland in an era of increasing herd sizes (Kelly, 2017). Since the abolition of milk production quotas in 2015 dairy farmers have been experiencing large growth both on farm and at industry level. The average herd size has grown to approximately 80 cows and the national dairy herd now consists of about 1.4 million cows (an additional 300,000 cows in the last 4 years) (IFA, 2018) There has been an increase in volatility in milk price in the sector with dairy farm incomes decreasing by 16% on average in 2016 (Dillon, 2017). Therefore farmers must develop their systems to increase efficiency and establish a sustainable, resilient system to cope with external risk factors such as a poor milk price year or extreme weather events (Shalloo, Dillon, Rath, & Wallace, 2004). Farmers must work efficiently to manage the large and growing workload on their farms as efficiency becomes priority and as herd sizes increase. However farmers are finding it increasingly difficult to find time to meet agricultural extension agents for consultations; thus new approaches must be adopted to maximise communication between extension agents and farmers. Research has shown that there is a positive significant influence between communication skills of extension agents and on the level of adoption of new innovations on farm level (Ofuoku, 2012). Therefore it is important for agricultural extension agents to remain in contact with farmers; even in busy periods of the year such as the calving season. Farmers are becoming increasingly dependent on agricultural extension agents advice as efforts are made to increase efficiencies at farm level to run a sustainable and resilient business in volatile markets. Grassland management is fundamental in achieving a sustainable business, with trends continually showing a strong correlation between grass utilised and the profitability of the business (Shalloo, Creighton, & O'Donovan, 2011).

Discussion groups are groups of farmers that meet regularly to discuss technical issues, share information and to problem solve (Teagasc, 2017). They are a widespread method of farmers sharing ideas and knowledge, and developing ideas to increase farmers' understanding of their enterprise. Farmers use discussion groups as a method of knowledge generation to make better decisions on their own farms and to increase the efficiency of the business. It has been previously established that long-standing members of Teagasc discussion groups are out-performing new members and non-members in the percentage of farmers achieving Teagasc roadmap targets such as milk yield per cow, milk solids per cow and protein content (Bogue, 2013). Discussion groups, in a participatory manner, provide the

advisor with an opportunity to deliver clear messages to a group of farmers. Members who enter discussion groups do not enter as blank slates; they enter the group with a wealth of knowledge and experience (Bonner, 2012). Hence, knowledge transfer does not only take place from an advisor to farmer, but also from farmer to farmer and even from farmer to advisor. Online discussion groups are becoming increasingly popular as social media usage levels continue to increase (Galvin, 2014).

WhatsApp usage is growing among discussion groups in Ireland. Many group facilitators and farmers are creating WhatsApp groups to facilitate online discussion between group members. These are across all enterprises; however this thesis focuses specifically on discussion groups in the dairy enterprise. WhatsApp is a free instant messaging service that allows extension agents and farmers send messages, pictures, videos, media articles and audio recordings to one another between discussion group meetings. A proportion of discussion groups have established WhatsApp groups currently in the storming, performing and norming stages of the online discussion group's lifecycle. Many other discussion groups are at the forming stage of an online discussion group's lifecycle, while many other discussion groups currently have no online discussion group. WhatsApp groups between farmers are becoming more and more popular, and it is important we are strategic and tactful with the purposes of these groups looking into the future.

1.2 Research Problem

Irish dairy farmers are becoming increasingly reliant on a quality agricultural extension service to be made aware and to develop an understanding of the latest research, innovations, advice and technologies that are being developed by support networks such as Teagasc. The level of knowledge required by farmers is continuing to grow in an effort to increase outputs and reduce costs per hectare in the post-quota era. The challenge for the advisor is to be able to communicate crucial messages to the farmer at critical times of the year. In a spring calving system, farmers have a very large amount of work to carry out in the spring; such as calving cows and preparing for the breeding season. It is challenging for an advisor to communicate with a farmer during this busy period, so an advisor must be innovative in communicating with a discussion group. An advisor can play an important role in a farmer's decision making process, by keeping the farmer focused and motivated through regular communication. The challenge for an agricultural advisor is to minimize delay as ideas flow, and finally to establish implementation by discussion group members to achieve desired outcomes (Roux, Rogers, Biggs, Ashton, & Sergeant, 2006).

There has been no previous research carried out to assess whether WhatsApp could be used as a communication tool to facilitate the flow of knowledge between researchers, advisors and discussion group members. The lack of previous research in this area justifies the importance of collecting data from online discussion group members and analysing the impact that these online discussion groups are having on their members. In this research I have used discussion group members without a WhatsApp group as a control.

1.3 Research Questions

1. Can WhatsApp be used as a tool to facilitate an online discussion and to improve knowledge transfer among an advisor and a discussion group?
2. What is the level and type of WhatsApp usage in a discussion group?
3. What are the advantages and disadvantages of having an online discussion group for discussion group members and their facilitators?
4. How are farmers reacting to different messages (SMS, pictures and videos) entering the chat and how is it impacting decision making at farm level?
5. What are the characteristics of farmers that are currently using WhatsApp?
6. What are the barriers to uptake for farmers not using WhatsApp?
7. What recommendations have farmers and advisors to maximise the efficiency of this communication tool?

1.4 Research Objectives

- To establish the opportunities for both advisors and farmers to use WhatsApp as a communication tool to interact and to facilitate knowledge transfer in a discussion group
- To identify the challenges and difficulties that discussion group members and advisors experience when using WhatsApp
- To determine the characteristics of discussion group members that are currently using WhatsApp
- To study the reasons why some farmers/advisors are not using WhatsApp
- To develop a list of recommendations on how to use the tool to its maximum potential in a discussion group setting

1.5 Limitations

Discussion groups had to be focused on the dairy enterprise in order to make a discussion group eligible for data collection. Data was collected during May and June 2018. So far, 2018 has been a very difficult year for farmers after a period of low growth and fodder shortage in the spring. Some farmers have been experiencing severe drought in the month of June, grass growth severely declined and many farmers have had to feed large levels of supplementation to fill the feed deficit on farms. Some farmers could not attend discussion group meetings because of the challenges they faced. I attended the discussion group meetings in person to disperse questionnaires, and hence could only survey the attendees at these particular meetings.

One of the substantial limitations to this research is the small sample size that this research was carried out on. Questionnaires were carried out on six discussion groups (fifty farmers in total) and two focus groups were also carried out (a further seven advisors and eleven farmers). Time proved to be a huge challenge in the data collection for this research. Questionnaires were dispersed and focus groups were held during the months May and June. This took organisation to collect such a volume of data in a short time period. I attended all discussion group meetings to disperse questionnaires and I facilitated the two focus groups too. This took up a lot of my time not only attending the meetings, but in the

organisation of these meetings too. Many farmers and group facilitators go on holidays during the months of May and June, however data collection could not be extended to allow for data analysis to take place and to allow time for the write up of results and conclusions.

Due to my location while conducting this research, all of the data collected was based on information gathered from farmers in Munster. All of the farmers used in this study were dairy discussion group members too.

1.6 Utility of Study

This research is important for agricultural extension agents both in Ireland and worldwide. As social media usage increases worldwide, it is important to research the impact it can have on knowledge transfer between agricultural extension agents and farmers. The research gathered from this study will make extension agents aware of the strengths, weaknesses, opportunities and threats of an online discussion group among discussion group members. This research will be used by Teagasc, as many Teagasc discussion group facilitators are using WhatsApp groups to facilitate an online discussion and to communicate with discussion group members. This research will be beneficial to these extension agents as we gain a deeper understanding of farmer's needs and wants in an online discussion group. This research also identifies good practice in setting up and facilitation of WhatsApp groups, so extension agents can maximise the efficiency of the tool and knowledge transfer within the groups. There has been very little previous research on WhatsApp as a knowledge transfer tool in dairy discussion groups, so the research carried out in this study should increase awareness and knowledge in this area.

Chapter 2- Methodology

2.1 Methodology Introduction/Approach

A multi-method sampling approach was adopted to carry out this research. Both quantitative and qualitative methods of analysis were adopted to form a mixed methods research approach. Quantitative research was necessary to gather hard, comparable data to provide a foundation for further qualitative analyses to take place. Once the quantitative data (questionnaires) were gathered, preliminary results were drafted and discussed at focus groups, the qualitative aspect of this research. The intention of carrying out the focus groups was to gain a deeper insight and understanding of both farmers and extension agents experiences and opinions when it comes to online discussion groups on WhatsApp.

The questionnaires were printed and dispersed in hard copy, so the only cost associated with the questionnaires were the printing costs. I decided to hand out the questionnaires in hard copy at discussion group meetings, so I had to travel to the discussion group meetings. I found the questionnaires were practical. I could create questions to suit the target audience and to gather results in the areas that I needed them. The questionnaires were a fast method of collecting results. By attending a discussion group meeting and dispersing the questionnaires to a number of farmers at once, I could gather a large amount of data in a short space of time. The only disadvantage of the questionnaires was that I found that a small number of farmers failed to answer all the questions. If a farmer failed to answer all the questions, the questions that were answered were analysed in the results and the questions that were left blank were not used in the research.

I chose to run focus groups to discover how farmers and group facilitators feel about WhatsApp discussion groups and why they hold their opinions i.e. I was looking for a deeper insight into their experiences and opinions on WhatsApp as a knowledge transfer tool. Focus groups were also useful to observe complex behaviour and to find out more about the results from the questionnaires. I also needed the focus groups to establish recommendations for usage in WhatsApp groups going forward and to gather suggestions for potential solutions to problems that had been identified. The focus groups added a deeper human dimesnsion to the data that had been gathered from the surveys, as focus group members reflected on past experiences and voiced their own opinions.

2.2 Methodology- Quantitative

A questionnaire is a research tool typically containing a series of open and closed questions for the purpose of gathering information from respondents (McLeod, 2018). The purpose of the questionnaire for this research was to gather a sample of specific, comparable data from Irish dairy farmers involved in dairy discussion groups. Questionnaires were dispersed to 6 different discussion groups as part of a case study (4 discussion groups currently using WhatsApp, 2 discussion groups not using WhatsApp). There were separate questions constructed for the WhatsApp discussion groups and non-WhatsApp discussion groups to gather the relevant information from each discussion group. The questionnaires were distributed in hard copies to the farmers at dairy discussion group meetings during May and June 2018. A brief background of the research being conducted was outlined to the farmers

prior to the questionnaire being handed out, so that they had a clear understanding of the purpose of the task. Data gathered from the questionnaires remained anonymous.

Table 1: List of Groups, Number of Surveys and WhatsApp Status:

Discussion Group Name	***Number of Surveys***	***WhatsApp for the Group***
Group 1	*N=8*	*Yes*
Group 2	*N=13*	*Yes*
Group 3	*N=8*	*Yes*
Group 4	*N=8*	*Yes*
Group 5	*N=6*	*No*
Group 6	*N=7*	*No*

Surveys contained 13 questions, split into 2 sections (background and WhatsApp). The survey was drafted and distributed to three farmers to make sure that all questions were clear, before being used in the research. Feedback was gathered on the wording of the questions and the finalised questionnaires were then distributed as part of the research. An example of a change based on the feedback from the farmers was made on a question regarding the education levels of the discussion group members (Q.11 WhatsApp groups, Q.10 non-WhatsApp groups). The farmers were not sure if a non-agricultural education was relevant in this question initially, as the question only asked for the level of "education" (non-specific). This feedback was considered and the question was restructured to ask for the level of "agricultural education" from the farmers. The farmers were given choices to select in order to answer the question to avoid any confusion (level 8, level 7, level 6, level 5, none of the above, or other).

I made contact with local Teagasc dairy advisors to establish how many groups they had, how many were using WhatsApp and when they were holding group meetings. This ultimately dictated the discussion groups for my research. My initial plan was to only use one group facilitator's discussion groups, however due to time constraints and logistics it was impossible to achieve this. I therefore used two advisors discussion groups and attended their group meetings to disperse the questionnaires. Both advisors were happy for me to conduct the research on their discussion groups. The two Teagasc discussion group facilitators had groups using WhatsApp, and not using WhatsApp. I attended their group meetings during May and June to disperse the questionnaires. Questionnaires were dispersed to six discussion groups as a result (four using WhatsApp, two not using WhatsApp).

Table 2: Discussion Group Questionnaires:

WhatsApp Discussion Groups	Non-WhatsApp Discussion Groups
Questionnaire 1: Questionnaire for Discussion Groups using WhatsApp	Questionnaire 2: Questionnaire for Discussion Groups without an Online Discussion Group
13 Questions	13 Questions

During this research, I have been working in Moorepark Animal & Grassland Research Centre, Fermoy, Co. Cork. Dairy discussion groups targeted for data collection were based in a number of counties, however were all in the Munster region. Discussion groups were selected from two advisors and there was no bias in terms of performance, age, land type etc. Discussion groups were simply selected based on the timing of the meetings (a time that suited me to disperse the questionnaires).

Table 3: Types of Answers from the Surveys:

Types of Answers:
1. Yes/No
2. Multiple Choice
3. Comment

2.3 Methodology- Qualitative

A focus group is a specially selected group of people who are intended to represent the wider population, i.e. dairy discussion group members and their facilitators in this research study. Focus groups have discussions in which their opinions are recorded (Collins, 2018). My focus groups were conducted to gain a deeper understanding of the farmer's and facilitator's views and opinions on WhatsApp as a knowledge transfer tool in a discussion group setting. The focus groups provided group members with the opportunity to share ideas and for discussion to take place to build meaningful results. As part of my research I carried out two focus groups. Group 1 was a group of farmers in dairy discussion groups and group 2 was a group of extension agents facilitating dairy discussion groups. I showed the 2 focus groups preliminary results from the surveys to stimulate discussion. These meetings were useful to gather qualitative data and worked well to observe complex behaviour from group members. Focus group members were notified that the focus group were recorded, however group members remained confidential.

It was difficult to attract farmers and group facilitators to the focus group meetings. These meetings were scheduled for the end of June, however the serious issue of drought on farms was seriously inhibiting interaction from farmers and advisors. I therefore decided to hold the focus group for farmers with a drought meeting afterwards to attract their attention. This worked well. Local advisors dispersed a text message to local discussion group members (from both WhatsApp and non-WhatsApp discussion groups) to attend the meeting. The

group facilitators and I also rang farmers that we thought would be interested in coming to encourage them to attend.

The group facilitators' focus group was much more straightforward to organise. The group facilitators all understood that I had to carry out this focus group as part of my research and were understanding and supportive of the meeting. I sent an email to a group of discussion group facilitators that I had built a relationship with inviting them to the focus group meeting. Those that could attend attended, however some group facilitators were on holidays or had other activities on at the same time. All the group facilitators that attended the focus group meeting were from Teagasc.

Table 4: Number of Focus Groups, Types of Participants and the Number of Participants:

Focus Group 1	**Focus Group 2**
Farmers in Dairy Discussion Groups	Agricultural Extension Agents Facilitating Discussion Groups
N=11	N=7

Chapter 3- Literature Review

3.1 Discussion Groups

Discussion groups are groups of farmers that meet regularly to discuss technical issues, share information and to problem solve (Teagasc, 2017). A discussion group offers an environment for members to share ideas, and to keep up-to-date with the latest research and technology. A dairy discussion group is usually facilitated by an agricultural extension agent. A dairy discussion group also enables farmers discuss farming issues and to problem solve. In this study, dairy discussion group members (farmers and facilitators) were targeted to provide an insight into WhatsApp as a knowledge transfer tool in a dairy discussion group. Bogue stated that "farmers use discussion groups as a method of knowledge generation to make better decisions on their own farms and to increase the efficiency of the business" (Bogue, 2013). Section 1.1 above stated that Bogue also recognised that established members of Teagasc discussion groups are out-performing new members and non-members in terms of the number of farmers achieving Teagasc targets such as milk yield per cow, milk solids per cow and protein content.

Teagasc dairy discussion groups started in the 1990s, as joint programmes with the local co-ops. The initial purpose of these discussion groups was to facilitate knowledge transfer between extension agents and farmers. Discussion groups facilitate peer to peer learning among group members. Typically, Teagasc discussion groups contain 15-20 members. By being a member of a discussion group, farmers meet with peers to discuss relevant topics where insights can be gained and where problem solving can hopefully take place. Knowledge sharing and generation takes place as a result.

Previous research has shown us that farmers join discussion groups for a variety of different reasons including to learn, to gain information, to receive a subsidy, to accompany a friend or to improve their farming skills (Heanue, 2012). Thus there are contrasting motivations for farmers joining discussion groups, and also contrasting levels of education among farmers joining discussion groups. Farmers enter discussion groups with a wealth of experience and knowledge, not as a blank slate. Facilitators are therefore constantly learning about issues on the farms of the discussion group members (Heanue, 2012).

A proportion of discussion group members also join a discussion group to stay in contact with other farmers. Farming can be a lonely occupation. Some farmers join a discussion group as a social outlet and to have a bit of fun. Discussion group members have previously indicated that discussion group meetings have supported them socially (Heanue, 2012).

Teagasc completed research on the Dairy Efficiency Programme, a programme aimed at seeting up discussion groups to increase diary efficiency at farm level. Overall, the research found that dairy discussion groups are an effective mechanism in the delivery of advice/messages for an extension agency like Teagasc. The Dairy Efficiency Programme also found that dairy discussion groups have had a positive impact on farm management and efficiency (Bogue, 2013). There were three main pillars to a successful discussion group during the research conducted by Pat Bogue. The three main qualities to a successful dairy discussion group were regular group meetings, a committed group facilitator and an identified group chairman (Bogue, 2013).

For a group facilitator to establish an effective learning environment, different learning styles must be catered for during group meetings (Sherson, Gray, Reid, & Gardner, 2002). It is fundamental that a group facilitator creates a socially safe environment where group members feel free to speak out and share ideas. It is the job of the group facilitator to encourage participation from all group members and to limit the input from dominant speakers within the group (Sherson, Gray, Reid, & Gardner, 2002).

3.2 Knowledge Transfer

The adoption of new research recommendations and improved practices is fundamental to efficient low cost production (Kelly, 2017). Dairy discussion groups are formed to attempt to aid farmers in improving management practices and to ultimately develop a low-cost, efficient system. The Teagasc advisory programme provides farmers across Ireland with an opportunity to see best practice and to acquire new skills through events, media transmissions and through discussions with agricultural extension agents (Kelly, 2017). The Teagasc model ensures integration between research, advisory and education programmes in Ireland.

This thesis focuses on discussion groups as a method of knowledge transfer between Teagasc extension agents and local farmers. Teagasc provide practical training, financial training, technical training and environmental training for farmers and farm family members (Kelly, 2017). Teagasc advisors aim to provide specific advice to farmers and to assist farmers in understanding the strengths and weaknesses of their enterprise(s) helping to make good decisions into the future (Kelly, 2017).

For the Irish farmers to progress and optimise their efficiency, The Department of Agriculture, Food and the Marine state that extension agents should encourage farmers to:

1. Adopt new technologies to increase efficiency.
2. Attend discussion groups, farm walks and events to gather knowledge.
3. Participate in agricultural education programmes and training schemes where appropriate to increase education levels. (The Department of Agriculture Fisheries and Food and Marine, 2018).

Knowledge transfer is fundamental in supporting farmers to increase efficiency, adopt new technology and develop a low-cost, sustainable system. Discussion groups facilitate peer to peer learning among group members, leading to knowledge sharing and knowledge transfer between group members. Section 1.1 stated that knowledge transfer does not only take place from an advisor to farmer in discussion groups, but also from farmer to farmer and even from farmer to advisor.

It is important in the role of an agricultural extension agent to ensure that farmer's progress in terms of the efficiency required for the industry. Morrison outlined the 5 communication methods that are used by extension agents to transfer knowledge to farmers:

1. One to one meetings between extension agents and farmers.
2. Discussion group meetings.
3. Events/ open days.
4. Publications- newsletters, newspapers, online articles etc.
5. Informal conversations with farmers (Morrison, 2012).

Knowledge transfer in discussion groups requires a knowledge sender and knowledge receiver. Knowledge can be dispersed from a farmer or extension agent within the group and can also be received by a farmer or extension agent within the group.

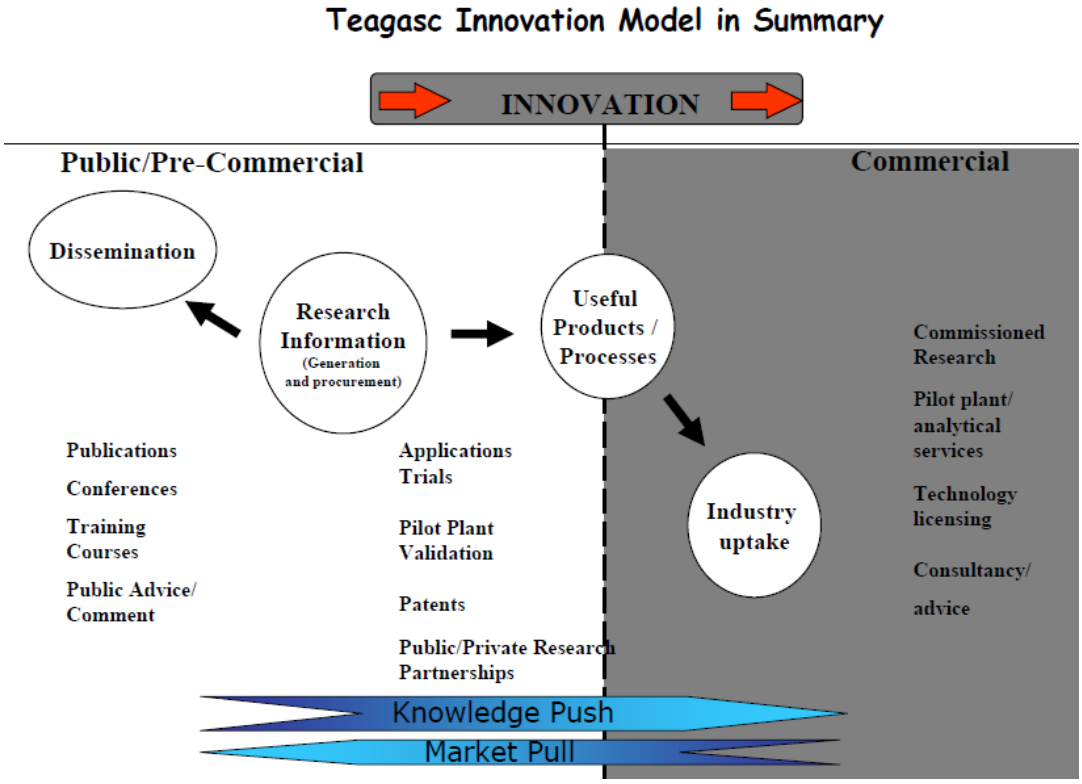
3.3 Innovations

In a period in agriculture when prices are volatile and when the future is uncertain (e.g. the impacts of Brexit), it is important that creative thinking, entrepreneurship and innovative thinking is promoted to increase efficiency. Spielman claimed that farmers and agribusiness must become more innovative if they are to compete and survive in the current environment (Spielman, 2008). For instance in 2018; farmers in Ireland have experienced a fodder crises in the spring, followed by a drought in the summer. It is crucial that creative thinking and innovation is supported to establish solutions to these types of external shocks to farmer's production systems. Spielman also recognised that many innovations in the agri-sector are copied from innovations in other sectors e.g. drones, global positioning system (GPS) etc. (Spielman, 2008). The big challenge for players in industry and extension is to be able to take advantage of new developments made available from other sectors.

Teagasc have recognised that innovations are fundamental in the future of agricultural research, extension and education systems. Innovation is required across all sectors including Irish dairying (Boyle, 2010). The Teagasc mission statement "to support science-based innovation in the agri-food sector and wider bio-economy so as to underpin profitability, competitiveness and sustainability" also has innovation as a focal point (Boyle, 2010).

The Teagasc innovation model is based on the concept of knowledge push and market pull. There are two main sections: public/pre-commercial and commercial. The initial stage of the Teagasc innovation model is research and information. Research includes applications, trials, piloting, validation, patents, public/private research and partnerships. Dissemination must take place following the research phase. Dissemination of publications, conferences, training courses and public advice are all fundamental to knowledge transfer taking place. From the research, we also can develop useful products/processes leading to continuous improvement of products/services. This ultimately leads to industry uptake in the market place. The following diagram is the Teagasc Innovation Model (Boyle, 2010).

Figure 1: The Teagasc Innovation Model



Bogue stated that established discussion group members were more likely to adopt new innovative technologies according to 2008 National Farm Survey (Bogue, 2013). Discussion groups tend to stimulate innovation and creative thinking among farmers. The incorporation of WhatsApp groups into established discussion groups in recent times also validates Bogue's argument that established discussion group members are more likely to adopt new technology.

3.4 Social Media and WhatsApp

WhatsApp is a free instant messaging service that farmers and advisors can use to communicate with each other. WhatsApp started as an alternative to Short Message Service (SMS) and now supports sending and receiving a variety of media- texts, photos, videos, documents, and location, as well as voice calls (WhatsApp, 2018). Messages can be sent directly from an advisor to a farmer, vice-versa, or into a group chat (discussion group). Messages are received through the WhatsApp application on a smart-phone. WhatsApp potentially provides advisors and farmers with an opportunity to share ideas, previous experiences and information with each other. More than 1 billion people in over 180 countries use WhatsApp to stay in touch with friends and family, anytime and anywhere. WhatsApp is free and offers simple, secure, messaging and calling, available on phones all over the world (WhatsApp, 2018).

Technology and social media are a growing influence in modern society and also in agriculture. Organisations like Teagasc are operating websites (www.teagasc.ie) and also social media pages (www.facebook.com, www.twitter.com). These websites offer extension

organisations another platform to advertise and communicate with the target audience. Technology and social media must be driven by the consumer's wants and needs. This aids organisations in entering into global markets, in expanding new technology being invested in by industry stakeholders and in the transformation in communication and information technologies (Birner, 2008).

Social media is growing among the younger generations. Galvin stated that nine out of forty nine farmers held Facebook accounts prior to her research taking place, while one hundred and fifty out of two hundred agricultural students used Facebook (Galvin, 2014). The students aged between 17 and 18 years old had the highest usage of Facebook. It is clear from these statistics that the level of social media usage is growing among younger people. Galvin also validated in her research that farmers who had been previously trained in computer skills were also the highest social media users in her study (Galvin, 2014). This would indicate that computer illiteracy is a problem among some farmers, and may be a barrier to uptake for the use of social media.

Previous research carried out by Padraig Wims and Colman Byrne found that Irish farmers are familiar with mobile phones, but are not using them to their full potential. Farmers are not utilising emails or internet to its maximum efficiency (Wims & Byrne, 2015). This research also found that younger farmers are more likely to have smart phones and use a wider range of services and applications compared to older farmers. Wims and Byrne also found that broadband speed, although improving, remains a constant constraint for internet usage in rural Ireland (Wims & Byrne, 2015).

Previous research from India conducted on the use of WhatsApp as a form of social media for livestock advisory services illustrates that social media tools such as WhatsApp have a remarkable ability to reduce the transaction costs of extension services (Thakur & Chander, 2016). This research validates that WhatsApp can be a cost-effective method to improve advisory services. WhatsApp use can overcome issues with time and location too for agricultural extension agents (Thakur & Chander, 2016). In this study, WhatsApp emerged as the preferred choice of referencing to information on livestock by the farmers.

3.5 Conclusion

This literature review illustrates the key roles that discussion groups, knowledge transfer, innovations and social media have in the development of agriculture in Ireland. Knowledge transfer is fundamental in increasing efficiency at farm level on dairy farms in Ireland and dairy discussion groups are playing a central role in facilitating knowledge transfer and knowledge sharing among dairy farmers and extension agents. Discussion groups are a very successful method used by extension agents to transfer knowledge, as farmers can learn from the group facilitator and also share experiences and learn from other group members. By increasing farmer's knowledge and education levels through knowledge sharing and knowledge transfer, it enables farmers to make educated decisions on their farms to increase the profitability and sustainability of their system. It is crucial that farmers and extension agents are innovative when making decisions to come up with new methods of increasing efficiency at farm level.

Chapter 4

4.1 Introduction

This research was conducted on dairy discussion group members to analyse WhatsApp as a knowledge transfer tool. Questionnaires were dispersed to dairy farmers at discussion group meetings. Two focus groups were then held to gain a deeper insight into WhatsApp as a knowledge transfer tool. One focus group contained a group offarmers, while the other focus group contained a group of discussion group facilitators. Farmers and facilitators could be from dairy discussion groups using WhatsApp or not using WhatsApp as an online discussion group. Analysing dairy discussion groups using WhatsApp could provide insight into their experiences of using the tool, while analysing dairy discussion group members without a WhatsApp group could aid us in finding out the barriers to uptake of online discussion groups.

4.2 Results from the Questionnaires

Section 3.2 is split into two separate sections. Section 3.2a analyses the results from the discussion groups using a WhatsApp group as an online discussion group. Section 3.2b analyses the results from discussion groups without an online discussion group for the discussion group.

There were a wide range of ages, herd sizes and agricultural education levels among the participants in the questionnaires, even though the overall numbers were small. Tables 5-7 below show the variation in backgrounds among discussion group members in each discussion group.

It is clear from table 5 that there were wide ranges of variation in herd sizes among discussion group members. There was no significant correlation between WhatsApp usage and herd size in this study.

Table 5: Number of Milking Cows:

	60 or less	61-90	91-120	121-150	151+
Discussion Group 1 (N=7)	1	0	1	4	1
Discussion Group 2 (N=13) (1 Farmer: NA)	3	1	0	6	2
Discussion Group 3 (N=8)	0	3	1	1	3
Discussion Group 4 (N=8)	1	4	1	2	0
Discussion Group 5 (N=6)	0	0	2	2	2
Discussion Group 6 (N= 7)	2	3	1	0	1
Total Number of Farmers	**7**	**11**	**6**	**15**	**9**

The following table illustrates the age profile of the discussion group members that took part in the questionnaires. The age profile of these farmers is young, as only one farmer 61 or older took part in the study. There was no significant correlation between WhatsApp usage and the age profile of farmers in this study.

Table 6: Age of the Farmers:

	30 or Less	31-45	46-60	61 or older
Discussion Group 1 (N=7)	1	3	2	1
Discussion Group 2 (N=13) (1 Farmer: NA)	3	0	9	0
Discussion Group 3 (N=8)	1	3	4	0
Discussion Group 4 (N=8)	6	2	0	0
Discussion Group 5 (N=6)	1	5	0	0
Discussion Group 6 (N= 7)	1	2	4	0
Total Number of Farmers	**13**	**15**	**19**	**1**

The following table illustrates the level of agricultural education levels among discussion group members that took part in the study. 9 farmers in total had no agricultural education at

all. There was also no significant correlation between WhatsApp usage and education levels among farmers in this study.

Table 7: The Level of Agricultural Education of the Farmers:

	Level 8	Level 7	Level 6	Level 5	None	Other
Discussion Group 1 (N=7)	2	1	1	1	2	
Discussion Group 2 (N=13) (1 Farmer: NA)	2	1		5	2	2
Discussion Group 3 (N=8) (1 Farmer: NA)	2	0	1	3	1	0
Discussion Group 4 (N=8)	3	0	5	0	0	0
Discussion Group 5 (N=6)	1	0	2	3	0	0
Discussion Group 6 (N= 7)	0	1	1	1	4	0
Total Number of Farmers	**10**	**3**	**10**	**13**	**9**	**2**

4.2a Discussion Groups Using WhatsApp

The following tables and figures are based on data collected from the four dairy discussion groups using WhatsApp as an online discussion group. Results are based on responses from questionnaires dispersed at discussion group meetings. There were a total of 37 farmers that completed questionnaires in this section.

To find out if farmers like using WhatsApp in a discussion group setting, it was important to analyse farmer's general attitudes towards their online discussion group. Table 8 reports farmer's responses to a question regarding attitudes towards WhatsApp as an online discussion group. It is clear from the table that farmers are positive about WhatsApp and like being part of an online discussion group. There was a wide range of responses within the groups with three groups containing farmers that do not like being part of an online discussion group at all. However, the overall responses were positive with the group means being indicating that farmers like being part of an online discussion group and with the number of farmers that very much like being part of a discussion group outnumbering the number of farmers that don't like being involved in a discussion group at all.

Table 8: Farmers Attitudes towards WhatsApp Groups:

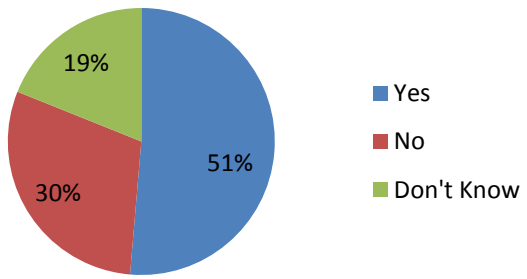
Do you like being involved in a WhatsApp discussion group on a scale of 1-5 (1: not at all, 5: Very much so)		
	Mean Rating:	Range:
Discussion Group 1 (n=7)	3.57	2-5
Discussion Group 2 (n=13)	3.3	1-5
Discussion Group 3 (n=8)	4	1-5
Discussion Group 4 (n=8)	4.125	1-5

A learning objective of this research was to ascertain if farmers feel they are acquiring technical information from an online discussion group. Table 9 and figure 2 represents farmer's responses when asked if they feel they have learned technical information as a result of interaction in the WhatsApp discussion group. 51% of the farmers felt that they gained technical information as a result of interaction in a WhatsApp group, while 30% of the farmers were not sure if they acquired technical information or not. 51% of farmers feeling that they have gained technical information from the online discussion group is substantial, however there is scope for improvement with good management practices and structure within the tool.

Table 9: Farmers Perception of Learning Technical Information as a Result of Interaction in WhatsApp groups:

Do you think you have learned technical information as a result of interaction in your WhatsApp group?			
	Yes	No	Don't Know
Discussion Group 1 (n=8)	7 (87.5%)	1 (12.5%)	0 (0%)
Discussion Group 2 (n=13)	7 (53.8%)	5 (38.5%)	1 (7.7%)
Discussion Group 3 (n=8)	1 (12.5%)	1 (12.5%)	6 (75%)
Discussion Group 4 (n=8)	4 (50%)	4 (50%)	0 (0%)

Figure 2: Do you think you have learned technical information as a result of interaction in your WhatsApp group? (All groups aggregated)

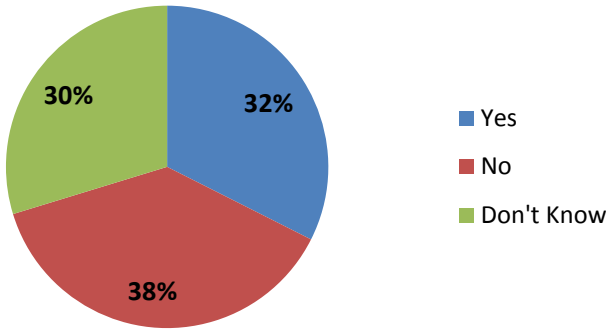


Following the question on farmers' perception of learning technical information, the respondents were asked if they perceive to have increased the profitability of their dairy enterprises as a result of WhatsApp usage. Table 10 and figure 3 show that there was a large variation between results from the groups, with Group 3 feeling strongly that WhatsApp interaction can increase profitability, while Group 4 (excluding 1 member) felt that there is no correlation between WhatsApp usage and profitability. Overall 32% of the farmers felt that WhatsApp interaction has helped them increase the profitability of their dairy enterprise. Again, this is a substantial amount of farmers, but there is scope to increase this further.

Table 10: Farmers perception of Increasing Profitability through WhatsApp Usage:

Do you think you have increased the profitability of your system as a result of interaction in your WhatsApp group?			
	Yes	No	Don't Know
Discussion Group 1 (n=8)	2 (25%)	2 (25%)	4 (50%)
Discussion Group 2 (n=13)	3 (24%)	5 (38%)	5 (38%)
Discussion Group 3 (n=8)	6 (75%)	0 (0%)	2 (25%)
Discussion Group 4 (n=8)	1 (12.5%)	7 (87.5%)	0 (0%)

Figure 3: Do you think you have increased the profitability of your system as a result of interaction in your WhatsApp group? (All groups aggregated)



It is interesting to compare tables 9 and 10. Interestingly 87.5% of group 1 learned learned technical information, but did not perceive to increase the profitability of their system (25%). 75% of group 3 did not know if they had learned technical information from WhatsApp, however still felt that they had increased profits through WhatsApp usage. It is not clear why such differences arise.

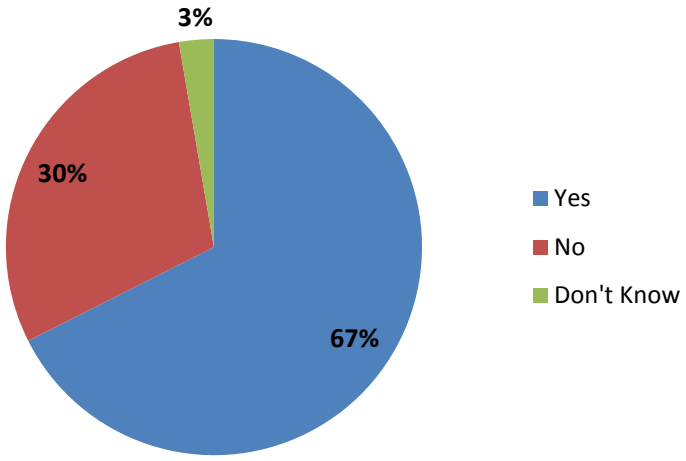
Another aspect of an online discussion group is the convenience of communicating with discussion group members and an advisor. A message into a discussion group can reach other group members and an advisor instantly through WhatsApp. Table 11 and figure 4 report farmers' responses to a question on the likelihood of contacting an advisor during busy periods on the farm through WhatsApp. 67% of farmers indicated that they use WhatsApp to contact their advisor or other discussion group members during busy times.

Results are similar across the groups showing that farmers use WhatsApp to contact group members and extension agents in busy periods.

Table 11: The Convenience of Communicating Through WhatsApp

Do you use WhatsApp to contact your advisor or other farmers during busy periods on your farm?			
	Yes	No	Don't Know
Discussion Group 1 (n=8)	6 (75%)	2 (25%)	0 (0%)
Discussion Group 2 (n=13)	7 (53.8%)	5 (38.4%)	1 (7.6%)
Discussion Group 3 (n=8)	6 (75%)	2 (25%)	0 (0%)
Discussion Group 4 (n=8)	6 (75%)	2 (25%)	0 (0%)

Figure 4: Do you use WhatsApp to contact your advisor or other farmers during busy periods on your farm? (All groups aggregated)

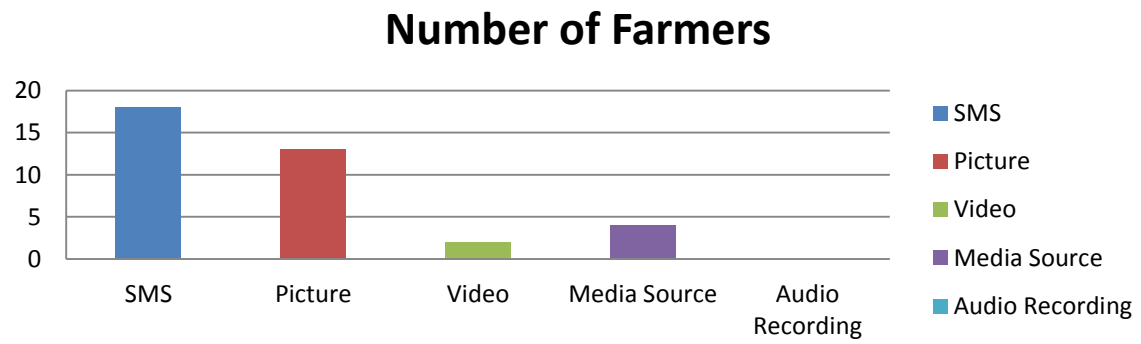


Interaction methods are also important to effectively communicate in an online discussion group. Table 12 and figure 5 report farmers' preferred method of interaction in their WhatsApp groups. It was surprising to see that 18 farmers indicated that they prefer to receive/send an SMS message as opposed to pictures and videos. There was a variation between discussion groups. In particular, strikingly all of the members in Group 4 indicated that they prefer pictures to be used in the group chat. Presumably the use of pictures is being used to good effect in Group 4.

Table 12: Interaction Methods in WhatsApp Groups

Rate your favourite form of interaction method on WhatsApp					
	SMS	Picture	Video	Media Source	Audio Recording
Discussion Group 1 (n=8)	6 (75%)	2 (25%)	0	0	0
Discussion Group 2 (n=13)	8 (61.5%)	2 (15.38%)	1 (7.69%)	2 (15.38%)	0
Discussion Group 3 (n=8)	4 (50%)	1 (12.5%)	1 (12.5%)	2 (25%)	0
Discussion Group 4 (n=7)	0	7 (100%)	0	0	0

Figure 5: Rate your favourite form of interaction method on WhatsApp (All groups aggregated)



4.2b Discussion Groups without a WhatsApp Group

The following tables and figures are based on data collected from dairy discussion groups who do not currently use WhatsApp as an online discussion group. They are based on responses from questionnaires dispersed at two discussion group meetings. A total of 13 farmers completed questionnaires from these dairy discussion groups, and hence the sample size is very small.

It was important to establish initially whether the farmers in these groups had smart phones or not. If farmers did not have smart phones, this could obviously act as a barrier to WhatsApp usage and therefore a barrier to the creation and development of a WhatsApp group. Table 13 however indicates that all of the farmers in these two discussion groups possessed smart phones.

Table 13: Farmers and Smart Phones:

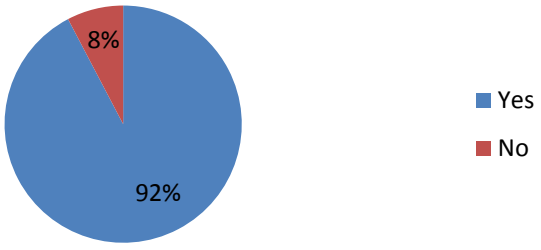
Have you got a smart phone?			
	Yes	No	Don't Know
Discussion Group 5 N=6	6 (100%)	0 (0%)	0 (0%)
Discussion Group 6 N=7	7 (100%)	0 (0%)	(0%)

Following the question on smart phones, it was necessary to establish if the farmers had downloaded WhatsApp. If the farmers had not downloaded WhatsApp, it would mean that they were not using WhatsApp at all (even socially). It would also provide a challenge for a group member or facilitator to set up a WhatsApp discussion group. In fact, 92% of farmers had WhatsApp downloaded on their phones (see table 14 and figure 6).

Table 14: The Number of Farmers that have Downloaded WhatsApp

Have you downloaded WhatsApp on your phone?			
	Yes	No	Don't Know
Discussion Group 5 N=6	5 (83.3%)	1 (16.7%)	0 (0%)
Discussion Group 6 N=7	7 (100%)	0 (0%)	0 (0%)

Figure 6: Have you downloaded WhatsApp on your phone?



One very interesting finding was the number of farmers involved in alternative discussion groups on WhatsApp. Twelve out of the thirteen farmers involved in a non- WhatsApp using discussion group were involved in alternative online discussion group on WhatsApp. Farmers have even created their own sub-groups within the discussion groups. This shows the appetite there is for online discussion groups among these farmers.

Table 15: Alternative Discussion Groups for Members in a Discussion Group without WhatsApp:

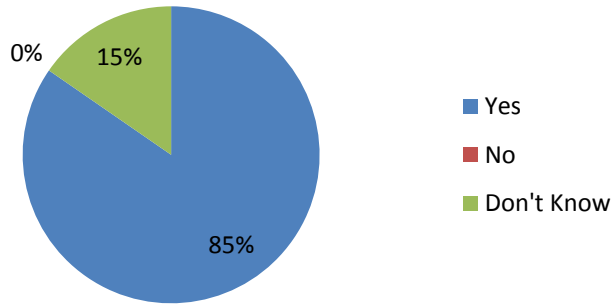
Are you involved in any discussion groups on WhatsApp?			
	Yes	No	Don't Know
Discussion Group 5 N=6	5 (83.3%)	1 (16.7%)	0 (0%)
Discussion Group 6 N=7	7 (100%)	0 (0%)	0 (0%)

It was clear that the non-WhatsApp discussion group members wanted to be part of an online discussion group on WhatsApp. 85% of the group members indicated that they would like to be part of a WhatsApp group (see Table 17 and Figure 7). There was no negative responses, even from the farmer who had not downloaded WhatsApp on his smart phone.

Table 16: Do Non- WhatsApp Discussion Group Members want a WhatsApp Group?

Would you like to be part of a WhatsApp group for this discussion group?			
	Yes	No	Don't Know
Discussion Group 5 N=6	6 (100%)	0 (0%)	0 (0%)
Discussion Group 6 N=7	5 (71.4%)	0 (0%)	2 (28.6%)

Figure 7: Would you like to be part of a WhatsApp group for this discussion group? (All groups aggregated)

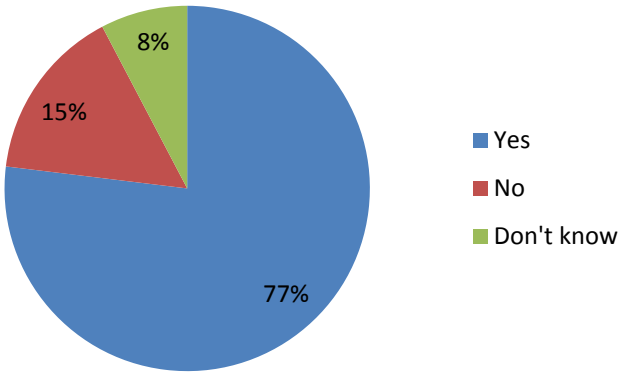


The results from the questionnaire's show that WhatsApp appears to be a labour efficient tool to contact an advisor and other group members. 77% of farmers indicated that they would use WhatsApp to contact an advisor and other group members during busy periods on their farms (see Table 17 and Figure 8). This result is very close to the 67% of farmers who did so in the sister sample (Figure 4).

Table 17: The Prospect of Using WhatsApp in a Busy Period to Contact a Group Facilitator and Other Group Members

Would you use WhatsApp to contact your advisor or other farmers during busy periods on your farm?			
	Yes	No	Don't Know
Discussion Group 5 N=6	5 (83.3%)	0 (0%)	1 (16.7%)
Discussion Group 6 N=7	5 (71.4%)	2 (28.6%)	0 (0%)

Figure 8: Would you use WhatsApp to contact your advisor or other farmers during busy periods on your farm? (All groups aggregated)

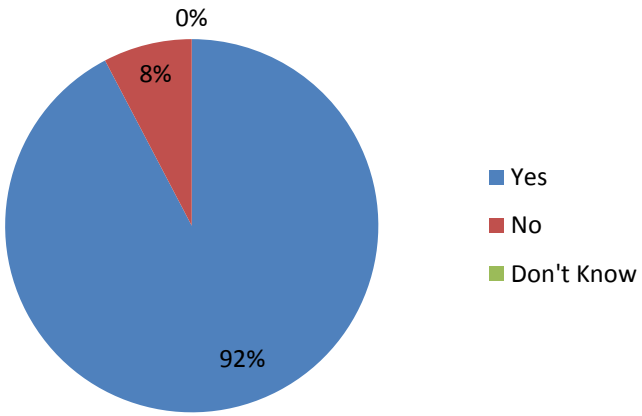


Farmers' who participated in this research felt strongly that they could learn technical information from each other through interaction in a WhatsApp group. As many as 92% of the farmers agreed that they could pick up technical information through an online discussion group, while only one farmer disagreed (see Table 18 and Figure 9).

Table 18: The Perception of Gaining Technical Information from a WhatsApp Group:

Do you think you could pick up technical information from your advisor and other farmers through a WhatsApp discussion group?			
	Yes	No	Don't Know
Discussion Group 5 N=6	6 (100%)	0 (0%)	0 (0%)
Discussion Group 6 N=7	6 (85.7%)	1 (14.3%)	0 (0%)

Figure 9: Do you think you could pick up technical information from your advisor and other farmers through a WhatsApp discussion group?



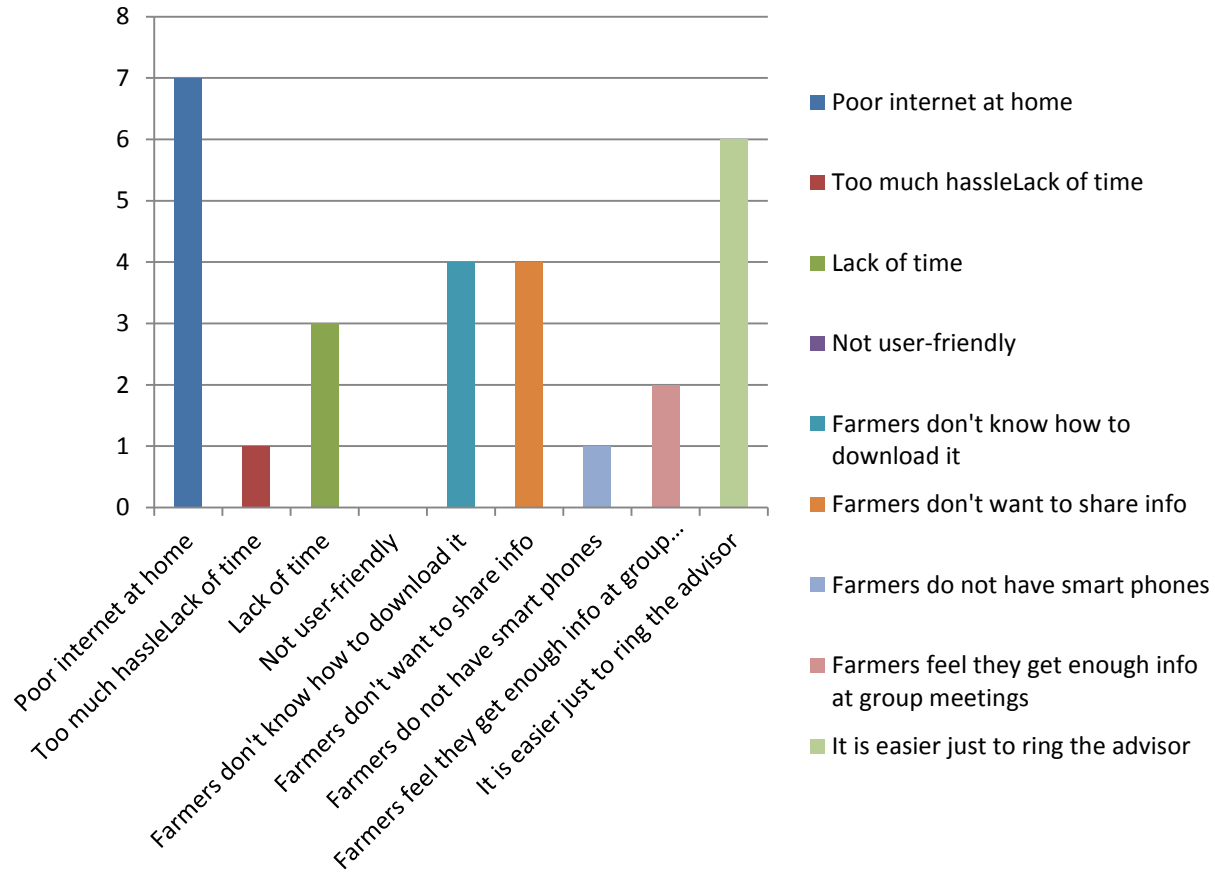
This perception is much higher than the actual figure in the sister sample (51%) (Figure 2).

Farmers were asked to indicate their perceived barriers to uptake to WhatsApp usage. The farmers were given a multiple choice template and could select more than one answer. Interestingly “poor internet at home” was the farmers’ perceived main barrier to uptake of WhatsApp usage. Table 19 and Figure 10 report the results.

Table 19: The Perception of Barriers to Uptake to WhatsApp Usage:

What do you think are the main barriers stopping farmers from using WhatsApp? Tick the appropriate boxes									
	Poor internet at home	Too much hassle	Lack of time	Not user-friendly	Farmers don't know how to download it	Farmers don't want to share info	Farmers do not have smart phones	Farmers feel they get enough info at group meetings	It is easier just to ring the advisor
Discussion Group 5 N=6	4	1	2	0	2	1	1	0	2
Discussion Group 6 N=7	3	0	1	0	2	3	0	2	4

Figure 10: What do you think are the main barriers stopping farmers from using WhatsApp? Tick the appropriate boxes

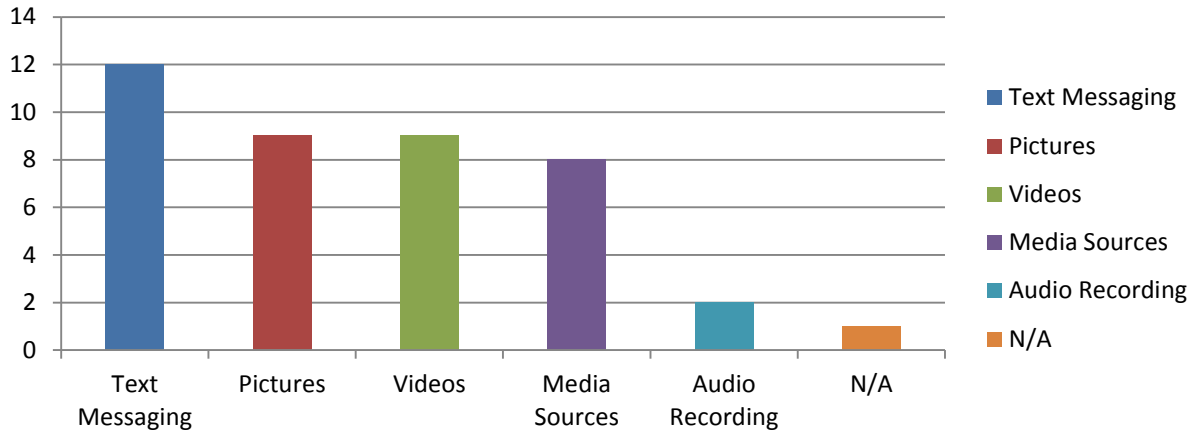


The farmers were asked to indicate what they use their phones for. This was also a multiple choice question where farmers could select more than one answer. One farmer from Group 1 failed to answer the question. All the farmers that answered the question used their phones for text messaging, with a small drop off in usage for pictures, videos and media sources.

Table 20: Farmers and Types of Phone Usage:

If you already have a smart phone, do you use it for the following?						
	Text Messaging	Pictures	Videos	Media Sources	Audio Recording	N/A
Discussion Group 5 N=6	5 (83.3%)	5 (83.3%)	5 (83.3%)	3 (50%)	2 (33.3%)	1 (16.6%)
Discussion Group 6 N=7	7 (100%)	4 (57.1%)	4 (57%)	5 (71.4%)	0 (0%)	0 (0%)

Figure 11: If you already have a smart phone, do you use it for the following?



4.3 Results from the Focus Groups

4.3a Farmer Focus Group

One focus group took place with a group of 11 dairy discussion group members to build a deeper insight and understanding of farmer's needs and wants out of an online discussion group tool such as WhatsApp, and to get an insight into their experience of using the tool. The group discussed the strengths, weaknesses, opportunities and threats of WhatsApp in the meeting.

The farmers were very positive about WhatsApp as a knowledge transfer tool in the meeting. They were asked to give a background on their experience of using WhatsApp and responses were progressive, with farmers reflecting on encouraging personal experiences. One farmer alluded to the "speed of the response, its knowledge at your fingertips", which proved to be a recurring theme throughout the meeting. Farmers seemed to have a progressive attitude towards the tool throughout the discussion.

The first thing that became apparent at the meeting was that there is no correlation between age and the use of the tool. Each farmer introduced themselves at the beginning of the meeting and gave their background including previous WhatsApp usage. One farmer commented on his previous WhatsApp usage using the following statement: “It’s a new tool to me, but it’s pretty good”- an elderly dairy discussion group member milking cows since 1967. There was a substantial variation in ages between the farmers in the meeting and all farmers stated that they were using WhatsApp and part of dairy discussion groups. Younger farmers also stated of the importance of having these older members involved in the online discussion group. One farmer said that “getting information from the older generation to younger generation (is very important), as they’ve seen it all before”. He highlights the importance of the older generations experience to guide younger people through the process of running a dairy enterprise.

The farmers were all impressed with how quick the tool is. “The speed of the response” was a recurring theme. “If I say something everyone can see it straight away.

The dairy discussion group members clearly liked how informative the tool is. “At least you know what everyone else is doing this week and you can benchmark yourself against them” one farmer stated during the meeting. Farmers liked information being posted into the group chat and comparing this to their own situation. “Comparison purposes” was a theme evident throughout the meeting. One farmer stated that in an emergency situation such as fodder crises spring 2018 or summer drought 2018, farmers’ posting in information helps another farmer come to the realisation that “I’m not the only one in this situation; this is what everyone else is doing to solve the problem”.

Although this did not show up strongly in the questionnaire results (section 4.2a above), the farmers in the meeting liked photographs being posted into the WhatsApp groups. “Photos are very good, the visual aspect of it” was a comment that one farmer made.

Farmers identified times when other farmers showed respect by using the tool. “If I cannot attend a meeting, it is respect to send a message into the group with an apology for not being able to attend and explaining why” one farmer outlined. However, numerically poor responses from other farmers can be seen as disrespectful and discouraging for the farmer sending in the message. Many group members outlined how responses can be poor in the groups at different stages in group development. “Why would I put something up, if nobody is going to respond to me” and “It should be courtesy to respond to a message from a farmer or an advisor” were some comments made on this issue. Farmers referred to previous experiences where they got poor responses from other discussion group members: “I was organising a trip and I told everyone to put in their passport details. I didn’t get one response and that includes the advisor! Not one thank you even”. This experience can be discouraging for a farmer who is trying to contribute to the group.

Farmers recognised that this tool works best when it’s structured and when everyone realises their role in the group. “If people recognise a structure, they are more obliged to contribute” was a comment made by a farmer during the meeting, and this comment was welcomed by the other group members. Clarity in role was also a talking point. “There should be a co-ordinator and it should be a group member” stated one farmer at the meeting. He continued to say “if we (farmers) take ownership, there is a better chance of uptake”, which was also welcomed by the other discussion group members.

Farmers had an issue with the number of messages entering groups, and recommended for advisors to post in a key message at the beginning of each week with targets for the week. “Use it for what it’s good for, no point in doubling up” was a comment made by a farmer, suggesting not to use WhatsApp for purposes that are available on other software (avoid overlaps with ICBF, PastureBase Ireland etc.). Other farmers commented on WhatsApp being a “motivational” tool and that if a group facilitator posts in targets, it can motivate them for the week ahead.

Farmers in this focus group found that WhatsApp usage was particularly useful for grassland management throughout the grazing season. “The biggest thing is grass. We need to be at grass all the time” stated a farmer during the meeting.

The main suggestion for improvement that was gathered from the focus group was that farmers need to be trained on how to use WhatsApp as a communication and knowledge transfer tool. The farmers suggested that an initial meeting should be held to set out a structure for use and for training on the tool to take place. “There should be a training evening where the rules are laid out” argued one farmer. Another member suggested that young people should help older farmers get set up on the tool. He spoke of his experience getting set up on WhatsApp: “We handed the phones back to two students to get things done. They knew exactly what to do. A training evening with young people would be good.” It was clear that the farmers need training in order to be able to use the tool properly. Many farmers didn’t know how to use some basic functions on the tool, such as turning off notifications in group chats. “For some reason, I’m able to knock off the noise on WhatsApp. We have an awful lot to learn about these phones” was a comment by one farmer regarding using the tool.

4.3b Group Facilitator Focus Group

The 7 group facilitators also were very positive about WhatsApp usage in dairy discussion groups. The group facilitators, like the farmers, agreed that age was not the main barrier to WhatsApp usage. “We have older fella’s on WhatsApp that are actually more active than younger group members” was a quote from a group facilitator referring to farmers in their sixties using WhatsApp as a communication tool in a discussion group.

The group facilitators have also noticed that some farmers who are keen on using WhatsApp have started creating their own sub-groups outside of the dairy discussion groups to discuss farming matters with each other. “They have started groups within the group, sub-groups. They’re going to do it anyway” stated one group facilitator during the focus group meeting.

The group facilitators recognised grassland management as an ideal subject to be discussing in a WhatsApp group. “They use it a lot for grass” stated one group facilitator and he followed by stating that “pictures in the springtime about paddocks” were particularly useful to encourage discussion group members to let out cows earlier. The group facilitators, like the farmers focus group, agreed that pictures are very useful in a group chat, because other members can visually see what is happening on the farm (although this did not show up strongly in the surveys in section 4.2a). “You can send your photographs and it’s all backed up. You have a file” was one group facilitator’s response when outlining the

strengths of a WhatsApp group. One group facilitator said that photographs are useful to identify poaching and covers on paddocks throughout the grazing season. “How do you know the cover is 500-600 kgDM/ha. Get them to take a photo. It’s the starting block” said an advisor when referring to the importance of visual aids. Another advisor also argued that “a picture can make it more interpersonal” for the farmers in the group. The group facilitators said that farmers found this very useful and would be more likely to post in when other post in photographs. “A lot of lads showed paddocks damaged in the spring” commented one advisor.

The facilitators in this focus group, like their farmer counterparts, also found that the lack of clarity in roles and structure can be a problem in some WhatsApp groups. “When do you first establish a WhatsApp group from when you first establish a discussion group?” was a question by a group facilitator during the meeting, displaying a sense of uncertainty. The group facilitators also said they prefer it when a farmer sets up the group. “There’s a lot better buy in when it’s set up by a farmer” claimed one facilitator at the meeting.

The participants also agreed that the tool works best when it is structured. “You’d want to do it once a week- 5 key messages for the week” stated one group facilitator when referring to a group facilitators input into a WhatsApp group. The group facilitators concurred that a timely message once per week can be more beneficial than “overloading information” into a WhatsApp group chat. “If we start bombarding them with stuff it can be too much. We have to be careful” stated one facilitator. The group facilitators also recognised that untimely messages can be off-putting for farmers. “I think we should be promoting to confine it to certain times of the day. If you’re sending in by night, you’re never stepping back from the job” argued one advisor. All the facilitators agreed that it was better for both farmers and facilitators to confine messages to during the day.

Without structure, the responses into groups can be poor. “A lot of the time, the same people doing traffic on WhatsApp as contributing in groups” said one advisor, as the topic of farmers not contributing became prominent in the discussion. Often this can be seen as a weakness and can cause tension between group members. “The sharing of information and questions; the response isn’t hectic a lot of the time. There might be tension over that. That’s a bit of a weakness with it” stated one advisor. It is important that facilitators facilitate the discussion and create a structure and atmosphere that encourages responses from all group members.

Facilitators all concurred that WhatsApp groups are a time saver by posting one message to a group of farmers, rather than a number of separate messages. Facilitators also agreed that it can be convenient in the promotion of events in the local area. One facilitator explained how he uses WhatsApp “for promotion of events” and how he believes this is a “large opportunity” for other facilitators. This worked successfully for this facilitator in the past and he will use WhatsApp as a medium for promotion of events in the future.

Chapter 5:

5.1 Summary of Research

The farmers who participated in this research were very positive about having a WhatsApp group as part of a dairy discussion group. Current online discussion group members indicated that they like being part of a WhatsApp discussion group in both the questionnaires and the focus groups. Farmers without an official WhatsApp group indicated that they would like to have a WhatsApp group for their discussion group. 12 out of 13 members (92%) of non- WhatsApp discussion groups were members of other online discussion groups using WhatsApp. This shows the appetite among these farmers to be involved in an online discussion group.

51% of farmers involved in WhatsApp discussion groups indicated that they have learned technical information as a result of interaction in a WhatsApp group. 92% of farmers in a discussion group without WhatsApp felt that they could pick up technical information if they set up an online discussion group. WhatsApp is an innovation that can act as a medium for knowledge transfer to take place between discussion group members and extension agents. As stated in the literature review, innovation is required across all sectors including Irish dairying to increase efficiency on farms (Boyle, 2010).

67% of farmers use WhatsApp to contact their advisor during busy periods on the farm, while 77% of the non-WhatsApp discussion group members indicated that they would use WhatsApp to contact their advisor or other discussion group members during busy periods.

There was no correlation between age and the use of WhatsApp as a tool in this research. The farmers in the focus group were all impressed with how quick the tool is and the speed of response. Both farmers and extension agents recognised that this tool works best when it's structured and when everyone is sure of their role in the group. Farmers and extension agents need to be clear of their role in WhatsApp groups to maximise uptake and the efficiency of the tool. Group facilitators all agreed that WhatsApp groups are a time saver and that time can be saved by posting one message to a group of farmers, rather than a number of separate messages to individual farmers

There is a better chance of uptake and usage if the farmers take ownership of the WhatsApp group. Farmers felt that if they take the responsibility of running a WhatsApp group, there is better chance of uptake and usage from fellow discussion group members. Farmers in the focus group had an issue with the number of messages entering groups, and recommended for group facilitators to post in a key message at the beginning of each week with targets for the week. This could overcome the problem of too much "traffic" in the group chats and also make the tool less of a distraction for farmers.

Farmers commented on WhatsApp being a "motivational" tool and that a weekly message from a facilitator with targets can motivate them for the week ahead. Farmers outlined that it is important that targets are realistic and relevant to everyone in the discussion group. Farmers found that interaction on WhatsApp between discussion group meetings keep them interested and motivated to increase efficiency on the farm. Farmers in the focus group found that WhatsApp is particularly useful for grassland management throughout the grazing season. Visuals are useful in the springtime, particularly when it comes to the topic of

poaching/damaging paddocks. Like the farmers, group facilitators recognised that grassland management is an ideal topic to be discussing in a WhatsApp group. The facilitators acknowledged grass as a fundamental aspect to their discussion group members' dairy enterprises and felt that this is a great topic to be discussing in WhatsApp groups. Grassland management is changing weekly and facilitators felt that WhatsApp is a good medium to get messages out to farmers with grassland management tips. As stated in the background to this research, grassland management is fundamental in achieving a sustainable business, with trends continually showing a strong correlation between grass utilised and the profitability of the business (Shalloo, Creighton, & O'Donovan, 2011).

The group facilitators also were very positive about WhatsApp usage in dairy discussion groups and indicated that WhatsApp usage has had a positive influence on their discussion group members. The group facilitators also noticed that some farmers are that keen on using WhatsApp, that they have started creating their own sub-groups outside of the dairy discussion groups to discuss farming with each other. The discussion group facilitators did not mind discussion group members creating their own sub-groups on WhatsApp and having their own farming discussion groups online. I refer to Kelly and his definition of the aim of Teagasc advisors. Kelly stated that the aim of a Teagasc advisor is to provide specific advice to farmers and to assist farmers in understanding the strengths and weaknesses of their enterprise helping to make good decisions into the future (Kelly, 2017). WhatsApp is an effective tool for extension agents to give farmers advice.

Both farmers and extension agents need to be trained on how to use WhatsApp as a communication and knowledge transfer tool. There was a lot of functions on the tool that farmers and extension agents did not know how to use and they also referred to mistakes being made in the groups throughout the focus group meetings e.g. sending messages into the wrong groups. When setting up a WhatsApp group, farmers and extension agents need to have an initial meeting so that everyone understands the tool, to set ground rules, and to clarify the purpose of the online discussion group. WhatsApp groups need a designated co-ordinator to take control and to show leadership in the group to have a successful and substantial online discussion.

Table 21: A Swot Analysis on WhatsApp as a Knowledge Transfer Tool

SWOT Analysis	
Strengths: • The Speed of the Response • Informative Messages • Benchmarking • Visuals (Grassland) • Motivational Tool	**Weaknesses:** • Poor Responses • Distraction • Irrelevant Messages • Number of Messages • Clarity in Roles
Opportunities: • Training • Group Structure • Topic of Grassland Management • Labour Efficiency	**Threats:** • Poor Responses/ Dominant Farmers • Lack of Structure • Untimely Messages

Strengths:

The Speed of the Response: The farmers and facilitators alluded to the "speed of the response, its knowledge at your fingertips", which proved to be a recurring theme.

Informative: The dairy discussion group members clearly liked how informative the tool is. "Its knowledge at your fingertips" was a quote from a farmer outlining how informative he finds the tool. 51% of farmers felt that they have learned technical information as a result of interaction in WhatsApp groups.

Benchmarking: "Comparison purposes" was a theme evident throughout the focus groups. One farmer stated that in an emergency situation such as fodder crises spring 2018 or summer drought 2018, farmers' posting in information helps another farmer come to the realisation that "I'm not the only one in this situation; this is what everyone else is doing to solve the problem". Farmers liked the idea of comparing other discussion group members situation to their own in the online discussion groups.

Visuals: Although this did not show up strongly in the questionnaires, the farmers in the focus group meeting liked photographs being posted into the WhatsApp groups. Farmers found visuals particularly useful when it comes to grassland management on farms (poaching, grass covers etc.). In Discussion Group 4, 100% of the farmers indicated that a picture message was their favourite form of interaction, indicating that pictures are being utilised very well in their online discussion group.

Motivational Tool: Farmers indicated that interaction in WhatsApp groups between discussion group meetings can keep them motivated to increase efficiency on their farms. Farmers also felt that if group facilitators post in realistic targets once a week, it can help them keep focused and motivate them to achieve these targets.

Weaknesses:

Poor Responses: Poor responses from other farmers can be seen as disrespectful and discouraging for the farmer sending in the message. Many group members outlined how responses can be poor in the groups at different stages in group development. "Why would I put something up, if nobody is going to respond to me" and "it should be courtesy to respond to a message from a farmer or an advisor" were some comments made by farmers on this issue. Farmers referred to previous experiences where they got poor responses from other discussion group members. Poor responses can be discouraging to an enthusiastic farmer.

Distraction/ Irrelevant/ Number of Messages: Farmers had an issue with the number of messages entering groups, and recommended for advisors to post in a key message at the beginning of each week with targets for the week. "Use it for what it's good for, no point in doubling up" was a comment made by a farmer, suggesting not to use WhatsApp for purposes that are available on other software (avoid overlaps with ICBF, PastureBase Ireland etc.).Farmers did not appreciate irrelevant material entering the group chats and felt that keeping "traffic" to a minimum in group chats could be beneficial to both farmers and extension agents.

Clarity in Roles: The group facilitators and farmers felt that the lack of clarity in roles and structure can be a problem in WhatsApp groups. A lack of structure in group chats can lead

to poor responses, irrelevant material entering the chats and poor uptake in usage of the tool. Both farmers and extension agents agreed that the tool works best when its structured.

Opportunities:

Training: Farmers and facilitators need to be trained on how to use WhatsApp as a knowledge transfer tool. The farmers suggested that an initial meeting should be held to set out a structure to be laid out and for training on the tool to take place. “There should be a training evening where the rules are laid out” was stated by one farmer at the meeting. Another farmer suggested that young people should help older farmers get set up on the tool. He spoke of his experience getting set up on WhatsApp- “We handed the phones back to two students to get things done. They knew exactly what to do. A training evening with young people would be good.” It was clear throughout this research that the farmers need a training evening in order to be able to use the tool properly. Many farmers didn’t know how to use some basic functions on the tool, such as turning off notifications in group chats.

Structure: Both farmers and group facilitators felt that the tool works best when it is structured. “You’d (group facilitators) want to post in once a week- 5 key messages for the week ahead” stated one group facilitator when referring to a group facilitators input into a WhatsApp group. The group facilitators agreed that a timely message once per week can be more beneficial than “overloading information” into a WhatsApp group chat. “If we start bombarding them with stuff it can be too much. We have to be careful” was a comment made by a facilitator on the matter. A structure can create an environment where all group members want to participate in the chat and where informative interaction can take place.

Topic of Grassland Management: Farmers in this focus group found that WhatsApp usage was particularly useful for grassland management throughout the grazing season. “The biggest thing is grass. We need to be at grass all the time” stated a farmer during the meeting. Visuals are useful when it comes to grassland management, to see what is actually going on at farm level. Poaching and grass covers can be discussed in detail using pictures in group chats.

Labour Efficiency: Facilitators all agreed that WhatsApp groups are a time saver and that time can be saved by posting one message to a group of farmers, rather than a number of separate messages. 67% of farmers indicated that they use WhatsApp to contact their advisor or other discussion group members during busy periods on the farm. 77% of farmers without a WhatsApp discussion group indicated that they would use WhatsApp to contact their discussion group facilitator or other group members during busy periods on the farm.

Threats:

Poor Responses/ Dominant Farmers: A lot of the time, the same people doing traffic on WhatsApp as contributing at the group meetings. The topic of farmers not contributing became prominent in the focus groups. Often times this can be seen as a threat and can cause tension between group members. If a WhatsApp group becomes dominated by a select few farmers, or fails to get any posts at all, a large proportion of farmers can feel alienated or become disinterested in the online discussion group.

Lack of Structure: Without structure, the responses into groups can be poor. “The sharing of information and questions; the response isn’t hectic a lot of the time” said one farmer. There

might be tension over that. It is important that facilitators facilitate the discussion and create a structure and atmosphere that encourages responses from all group members.

Untimely Messages: The farmers and group facilitators recognised that untimely messages can be off-putting for farmers in a WhatsApp group. “I think we should be promoting to confine it to certain times of the day. If you’re sending in by night, you’re never stepping back from the job” stated one advisor. All the facilitators and farmers agreed that it was better for both farmers and facilitators to confine messages to during the day and to avoid congesting group chats with irrelevant messages.

5.2 Conclusions and Recommendations

The conclusions from this research are as follows:

Dairy discussion group members (farmers and extension agents) need to be trained on how to use WhatsApp as a knowledge transfer tool. It was obvious throughout this research that a large proportion of farmers, both in WhatsApp groups and not using WhatsApp, do not fully understand how the tool works. There were many examples of miss-use of WhatsApp by both farmers and extension agents in the focus groups. Farmers and extension agents should be trained as a result, to maximise efficiency of knowledge transfer in an online discussion group. Both farmers and extension agents see the tool as an opportunity to gain information, problem solve and to ask questions, however if the group members using the tool do not understand how the tool works, this quickly becomes compromised.

51% of farmers indicated that they have learned technical information as a result of interaction in a WhatsApp group. The knowledge sharing between WhatsApp groups is very beneficial for the members in the groups. SMS messages, pictures, videos and media articles can all share information among the group members and educate them as a result. This is very positive for farmers and enhances the impact of a discussion group between meetings. As I stated previously on this paper, the department of agriculture identified adoption of new technologies as a method for farmers to increase efficiency on farms (The Department of Agriculture Fisheries and Food and Marine, 2018). By encouraging farmers to join WhatsApp groups, farmers will learn technical information and increase efficiency as a result. It is important that group facilitators post informative information into WhatsApp groups and create an environment where discussion group members want to post in informative information into group chats.

Farmers in dairy discussion groups without an official WhatsApp group indicated that they would like to have a WhatsApp group for their discussion group. It is important that discussion group facilitators meet and exceed the wants and needs of their farmers. Anything positive, that could enhance a discussion group or facilitate knowledge transfer, should be encouraged and supported by the group facilitator. Therefore, it is important that discussion group members who want an online discussion group are guided by the group facilitator through the process of creating and establishing an online discussion group.

Many farmers in this research indicated that they use WhatsApp to contact their advisor and discussion group members during busy periods on the farm. WhatsApp is a labour efficient method of communicating with a discussion group facilitator and other group members. It is also a labour efficient tool for a group facilitator, to send messages through WhatsApp

groups rather than a number of separate messages to group members. I referred to Kelly's research in the background to this study. Kelly identified labour and large workload as the crucial challenges facing farmers in Ireland today (Kelly, 2017). If WhatsApp can reduce workload for farmers, it is a very positive communication and knowledge transfer tool for farmers to be engaging with.

An initial meeting must be held between farmers and advisors to set up the WhatsApp group, allocating a co-ordinator, setting up ground rules, outlining what is expected from group members, and creating a structure for the tool. Both farmers and group facilitators agreed in this research that the tool works best when it's structured, and when members know what is expected from them. Responses can be poor in groups if there is a lack of clarity in roles. It is important that groups have an initial meeting to ensure that the group has a co-ordinator in place, that everyone is sure of the rules, and that everyone knows what is expected from them in the group. I refer back to Bogue's research referring to the three main qualities of a successful dairy discussion group. These qualities were regular group meetings, a committed group facilitator and an identified group chairman (Bogue, 2013). It is clear from this research that this is also the case in online discussion groups, however instead of regular meetings, an online discussion group needs regular responses from group members.

The final recommendation from this research is for a similar thesis to be carried out covering the drystock enterprises. This research was carried out solely on dairy discussion groups. It would be interesting to see if the same results and conclusions would be identified from drystock discussion groups.

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Appendices

Questionnaire for Discussion Group Containing WhatsApp Users:

This research is being conducted by Fergus Bogue as part of his masters study: *WhatsApp as a knowledge transfer tool for dairy discussion groups.*
All research gathered as part of this study will remain anonymous.

1. Do you like being involved in a WhatsApp discussion group on a scale of 1-5 (1: not at all, 5: Very much so)
   1 ☐
   2 ☐
   3 ☐
   4 ☐
   5 ☐

2. Do you think you have learned technical information as a result of interaction in your WhatsApp group?
   Yes ☐
   No ☐
   Don't Know ☐

3. Do you think you have increased the profitability of your system as a result of interaction in your WhatsApp group?
   Yes ☐
   No ☐
   Don't Know ☐

4. Do you use WhatsApp to contact your advisor or other farmers during busy periods on your farm?
   Yes ☐
   No ☐
   Don't Know ☐

5. Rate your favourite form of interaction method on WhatsApp from 1-5
   (1 being favourite, 5 being least favourite)

- SMS Message ☐
- Picture ☐
- Video ☐
- Media Source e.g. Article ☐
- Audio Recording ☐

6. What do you like about being involved in a WhatsApp discussion group? List 3 reasons:

    1. _____

    2. _____

    3. _____

7. What negatives are there from being a member of a WhatsApp discussion group? (Please State 3 reasons)

    1. _____

    2. _____

    3. _____

8. How many cows are you currently milking? Tick the correct box

60 or less	☐
61-90	☐
91-120	☐
121-150	☐
151+	☐

9. What age are you? Tick the correct box

30 or less	☐
31-45	☐
46-60	☐
61 or older	☐

10. Have you an agricultural education? Tick the correct box

Agricultural Level 8	☐
Agricultural Level 7	☐
Agricultural Level 6	☐
Agricultural Level 5	☐
None of the above	☐
Other:	

_____
_____

11. How many discussion groups are you involved in? Please Specify:
    ☐
    _____
    _____
    _____
12. How many WhatsApp discussion groups are you involved in? Please Specify:
    ☐
    _____
    _____
    _____
13. Were you using WhatsApp before this Discussion Group started using it?

    Yes ☐
    No ☐
    Don't Know ☐

Questionnaire for Discussion Group Without WhatsApp:

This research is being conducted by Fergus Bogue as part of his masters study: WhatsApp as a knowledge transfer tool for dairy discussion groups.
All research gathered as part of this study will remain anonymous.

1. Have you got a smart phone?
   Yes ☐
   No ☐
   Don't Know ☐
2. Have you downloaded WhatsApp on your phone? Yes/No If not, why not?
   Yes ☐
   No ☐
   Don't Know ☐
   Comment: _____
3. Are you involved in any discussion groups on WhatsApp?
   Yes ☐
   No ☐
   Don't Know ☐
   Comment: _____

4. Would you like to be part of a WhatsApp discussion for this discussion group?
   Yes ☐
   No ☐
   Don't Know ☐
   Please give a reason:
   _____
   _____
   _____

5. Would you use WhatsApp to contact your advisor or other farmers during busy periods on your farm?
   Yes ☐
   No ☐
   Don't Know ☐
   Reason:
   _____
   _____

6. Do you think you could pick up technical information from your advisor and other farmers through a WhatsApp discussion group?
   Yes ☐
   No ☐
   Don't Know ☐

7. What do you think are the main barriers stopping farmers from using WhatsApp? Rate your top 3:
   - Poor internet at home ☐
   - Too much hassle to use it ☐
   - Lack of time to use it ☐
   - WhatsApp is not user friendly ☐
   - Farmers don't know how to download the app ☐
   - Farmers don't want to share information ☐
   - Farmer do not have smart phones ☐
   - Get enough information at discussion group meetings ☐
   - It is easier just to ring the advisor ☐
   - Other:_____

8. If you have a smart phone, do you already use it for the following: tick the appropriate box(es)
   Text messaging ☐
   Pictures ☐
   Videos ☐
   Media Sources ☐
   Recording (audio) ☐

9. How many cows are you currently milking? Tick the correct box
   - 60 or less ☐
   - 61-90 ☐
   - 91-120 ☐
   - 121-150 ☐
   - 151+ ☐

10. What age are you? Tick the correct box
   - 30 or less ☐
   - 31-45 ☐
   - 46-60 ☐
   - 61 or older ☐

11. Have you an agricultural education? Tick the correct box
   - Agricultural Level 8 ☐
   - Agricultural Level 7 ☐
   - Agricultural Level 6 ☐
   - Agricultural Level 5 ☐
   - None of the above ☐

12. How many discussion groups are you involved in?
   ☐

13. Do you think WhatsApp could help you increase profits on your farm?
   - Yes ☐
   - No ☐
   - Don't Know ☐