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Tasmanian Dairy Farmers' Attitudes towards Using E-Extension Methods; Strengthening the Dairy Extension System for a Sustainable Dairy Industry in Tasmania, Australia

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Abstract: The Tasmanian dairy industry is one of the major contributors to the Tasmanian economy and Australia's export portfolio. The Tasmanian Government funding plan (2018–2023) for RD&E focuses on sustainable dairy farm production with an impact pathway incorporating provisions for extension services. Considering the need for an effective extension system, the continued adaptation of extension services is required to ensure that there is a collaborative and learning mechanism between extension experts and farmers that supports relationship building and innovation. E-extension methods can increase dairy farmers' access to timely information while addressing time and cost challenges by reducing personal visits and establishing frequent communications between farmers and extension workers. This study uses the Technology Acceptance Model (TAM) to understand the attitudes of dairy farmers toward using E-extension methods. It was revealed that dairy farmers who are young, educated, and managing dairy farms with large herd sizes hold positive attitudes toward E-extension. These farmers regularly seek online dairy-related guidance as well as regularly participate in different extension activities. This study concludes that establishing a hybrid framework incorporating E-extension methods with complementary face-to-face extension activities will help maintain a profitable and sustainable dairy industry in Tasmania.

Keywords: dairy industry; dairy farmers; dairy extension; E-extension; technology acceptance model; sustainability

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1. Introduction

Tasmania's temperate weather conditions support premium perennial pasture growth and result in high-quality dairy products. Tasmanian dairy cows are exposed to one of the cleanest environments in the world while grazing outside all year round [1]. The dairy industry is one of the most important sectors of Tasmania's agricultural industry and the greatest contributor to the Tasmanian economy, contributing more than $1 billion to the state economy every year. It offers several investment opportunities, including large-scale milk production, cheese manufacturing, and commercial-scale dairy processing [2]. As Tasmania recovers from the global COVID-19 restrictions, upward pressure on major inputs like fertilizer, seed, fuel, and chemicals, and a competitive employment market are expected to continue. In addition, labor shortages and increasing land and commodity prices in other sectors are expected to influence on-farm decisions in the coming years [3].

The Tasmanian Government, industry, and the Tasmanian Institute of Agriculture (TIA) manage research and development projects collaboratively. These projects aim to increase agricultural productivity, food production, and address natural resource management challenges. The TIA is home to the Livestock Production Centre, which provides dairy research, development, and extension services of international standards [1]. Increasing farmers' awareness and knowledge related to farm management practices has been a core focus point of extension services in the Tasmanian dairy industry [4]. According

to Agricultural Research, Extension Principles, and Investment Strategy (2018–2023), a considerable amount of Tasmanian Government funding for Research, Development, and Extension activities (RD&E) will focus on sustainable farm production. That is further articulated with the help of a clear impact pathway incorporating a credible connection from RD&E investment to dairy farms, including facilitating extension and advisory services [5]. Furthermore, Dairy Australia's strategic plan (2022–2027) for the Tasmanian dairy industry emphasizes an effective extension system in its priority action list, specifically highlighting the need for increased participation of dairy farmers engaged with activities and programs incorporating new engagement methods [3].

Dairy extension helps capacity building and facilitates innovation so that dairy farmers can adopt sustainable, profitable, and better farming practices [6]. It enables researchers and entrepreneurial farmers to facilitate dairy growth. The corporate and industrial establishments utilize the benefits of the latest research with the dairy stakeholders at large, including farmers. It also contributes to the communication of scientific developments in the dairy industry to the stakeholders, assessment and upgradation of dairy extension methodologies, exploring the reasons for non-adoption of new technology, and keeping extension activities up-to-date with changing levels of technology [7]. The current dairy research and extension system is transitioning from a focus on technology transfer to including more participatory approaches. The contemporary scenario requires behavioral changes through education which needs to be addressed with the help of using different extension methods [7]. This reflects the need for incorporating participatory approaches to the extension system, which recognizes the active contribution of farmers as well as other dairy actors. However, the concept of participation is complex and resource intensive, as farmers cannot act alone but need to act collectively with other farmers and RD&E stakeholders. It needs to be built upon a communication network established on the basis of mutual understanding with reliability, time, and cost-effectiveness [8].

As this translates into an extension system that transforms from a knowledge transfer process to a knowledge exchange mechanism [9], with facilitation delivered in a learning process [10], convergence to a range of online platforms and information communication tools (ICTs) to support interactions that co-produce knowledge and build networks of innovative people, institutions, and systems is required [11]. A collaboration and learning mechanism between extension personnel, entrepreneurs, and dairy farmers that creates new space for building relationships and innovation makes it a complete package [12]. Further classifying and merging it into extension services using a combination of different online tools, platforms, and the latest ICTs, which support networking, online interaction, and knowledge exchange, are termed E-extension [13,14]. E-extension methods can profoundly enhance ease of access, real-time information delivery, instant feedback, the ability to reach geographically scattered audiences, and decreased travel by audiences or presenters [15]. Recent developments in ICTs and innovations have opened many new opportunities to improve veterinary practices [16], timeliness, the accuracy of data collection, reporting for disease surveillance, and animal health monitoring [17]. Information communication tools, in combination with different online platforms, can increase dairy farmers' access to timely information while addressing time and cost challenges by reducing personal visits and establishing frequent communications between farmers and extension workers [11,18].

A theoretical framework incorporating perceived ease of use (EoU) and perceived usefulness (U) of existing ICTs and online platforms informing dairy farmers' attitudes towards E-extension was utilized [19]. There are several different theoretical approaches based on the Innovation Diffusion Theory [20], which helps identify different attributes of a technology influencing users' adoption. However, in this study, we wanted to identify characteristics of certain behaviors within the individuals rather than the technology. The Theory of Reasoned Action (TRA) [21] identifies how an individual's beliefs, perceptions, and attitudes are related to their desire to perform and act. According to TRA, attitude related to a behavior is controlled by how an individual responds to the repercussions of a behavior and the evaluation of those repercussions by that individual. Beliefs are

described as an individual's understanding that performing a given behavior will result in a specific consequence [21]. This constitutes an information processing mechanism of attitude development and change, which argues that external factors influence attitudes only through changes in the individual's belief structure [22]. Thus, the TRA provides a complete justification for the transition of a person's perception toward a system to attitudes about its usefulness and perceived benefits and ultimately to actual usage behavior [21].

For this study, TRA is further enhanced into the Technology Acceptance Model (TAM), which forecasts an individual's acceptance built upon the influence of two factors: perceived usefulness and perceived ease of use of a system (Figure 1) [19]. TAM argues that an individual's perception of usefulness and ease of use determines their attitudes towards adopting and using the system. Taking into consideration the TRA concept, behavioral intentions to use are controlled by attitudes toward using the system. According to this concept, behavioral intentions to use in return determine actual system use. Also, a relationship between perceived usefulness and behavioral intentions by individuals towards a system is also proposed by TAM. Perceived usefulness (U) is the level to which an individual thinks that using the system will increase his/her performance. Perceived ease of use (EoU) is the level to which an individual thinks that using the system will need effort. Both factors are modeled as having a significant impact on their attitude toward using a system. Behavioral intentions (BI) to use are the resulting functions of U and EoU. The actual use of a system is then determined by BI. Research has demonstrated that BI is the strongest predictor of the actual use of a system [19,23]. According to Davis [19], EoU directly influences U. It was revealed that while comparing two systems offering the same functionality, the easier-to-use system was considered more useful by its user. Davis [19] argues that because some of the individuals' work requirements include the use of a computer system, if an individual becomes more productive by using a new system, then he or she should become more productive overall. He further states that constructing a system that is easier to use, with all other factors kept constant, should result in a more useful system.

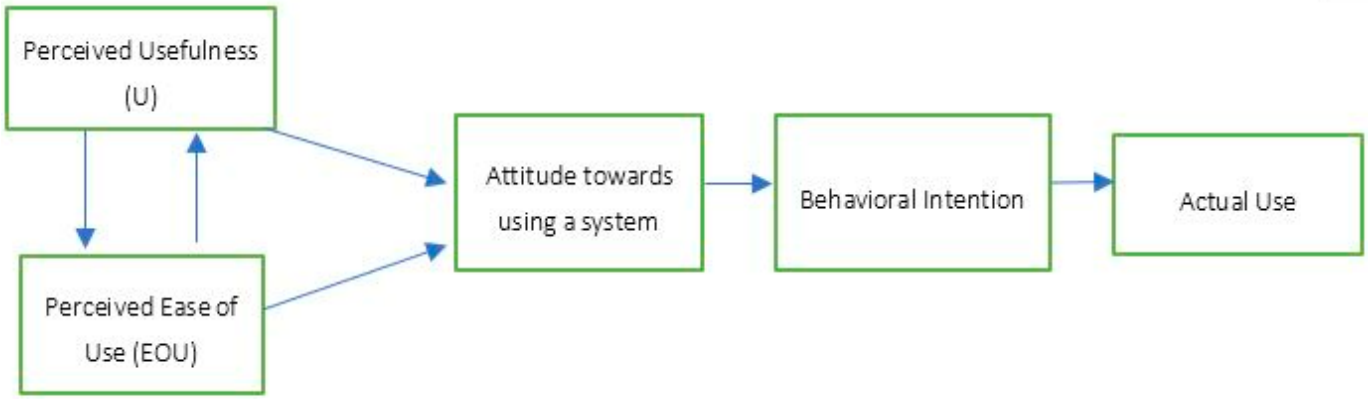

Figure 1. Technology Acceptance Model [19].

There are no or very few studies that focus on the use of a combination of different online tools, platforms, and the latest ICTs in the dairy industry. This is the first time that attitudes towards the use of E-extension methods have been studied in the Tasmanian dairy industry. This research aimed to explore the current attitudes of dairy farmers toward the use of E-extension methods in Tasmania, Australia. The focus is identifying what demographic factors and other characteristics of dairy farmers influence their attitudes toward using E-extension methods.

2. Methods

The selection of dairy farmers for this study was based on whether they could provide sufficient information. The participants were expected to be: (1) actively involved and engaged in dairy farming and dairy extension-related activities to have the necessary

knowledge and experience of the phenomenon under study, and (2) show a willingness to participate in the study. Participants who met the above criteria were surveyed. The research was conducted in line with the University of Tasmania's ethical guidelines and obtained ethical approval from the University of Tasmania Human Research Ethics Committee (H0021920).

Surveys were pretested and validated through piloting with Tasmanian dairy farmers [24]. According to the data available from the Dairy Australia report for Tasmania, there are 387 estimated dairy farms operating on a commercial scale in Tasmania [25]. In 2021, a paper-based survey was distributed through the post to all 220 Tasmanian dairy farms using their contact details which were registered with TIA. The survey was mailed out to each dairy farm once with a reply envelope included. The response rate was 74 (33.6%). As the survey was sent to the dairy farms individually, one response per dairy farm was expected with a limitation of the data representing the respondent's attitude and characteristics only.

The survey intended to collect information on dairy farmers' demographics, dairy farm information, participation in extension activities, current use of ICTs, and how decisions were made to adopt E-extension methods. Some questions in the survey had multiple-choice options for responses to get a better insight into the respondent's situation. To enable further analysis, numerical coding was done for the responses which could not be grouped into 'yes' or 'no' options. The survey comprised two sections, the first section with demographic characteristics and characteristics reflecting ICT usage. The second section comprised a Likert scale instrument with 22 statements representing attitudes towards using E-extension methods. These statements were designed to reflect the ease of use and usefulness of E-extension methods [23,26]. The simplicity and uniformity of the Likert scale makes it the most frequently used research instrument for the measurement of attitudes. As measuring the statements that constitute these attitudes directly is challenging, it is common to develop the variables that represent these statements by adding or averaging the valuations obtained from the items used to measure them [27,28].

Statistical Package for the Social Sciences (SPSS 28) was used to analyze the data. Results are reported using descriptive and summary statistics with correlations produced. Spearman correlation was used to determine the effect of dairy farmers' age, education, milking area, and herd size on their attitudes towards using E-extension methods [29,30]. To understand how dairy farmers' genders, formal agricultural/dairy qualifications, extension activities involvement, online dairy-related interactions, and associated interaction frequencies can influence their attitudes towards E-extension, non-parametric Mann-Whitney and Kruskal-Wallis tests were used, respectively. The participants marked their response to attitude statements through a five-point Likert-type scale: 1 = strongly disagree to 5 = strongly agree, with 3 = neutral. The mean value of the overall attitude (summated across the 22 statements) of the dairy farmers towards the use of E-extension was calculated to help identify the relationship between dairy farmers' characteristics and their overall attitude [31–33]. Further post-hoc tests were performed to identify relationships between specific characteristic groups and attitudes towards E-extension [29,34,35].

3. Results and Discussion

Dairy farmers' demographics and other characteristics related to dairy extension engagement are presented in Table 1. Most of the participants of the study (81%) were farm owners. Forty-six percent of the respondents were between 46–60 years of age. Only 11% of them were females, with the majority (89%) being males. Slightly less than one-third (31%) of the respondents held university degrees. About 16% of the respondents had a diploma or other educational certificate, with the rest of the respondents declaring their highest education (28%, 24%) up to 'year 11/12′ and 'year ten or below,' respectively. Fifty percent of the respondents had a formal agricultural/dairy-related qualification. Milking areas ranging from 100–200 ha were declared by more than one-third (38%) of the respondents, while 34% of the respondents had larger than 300 ha of milking area at their dairy farms.

The average milking area in Tasmania of 357 ha was reported in a study conducted by Dairy Australia; however, that study was based on the feedback provided by 30 dairy farms [3]. Slightly more than half (51%) of the respondents in that study were managing a herd size ranging from 200–500 cows, with around one-third (33%) from the rest found managing herd sizes larger than 500 cows. This finding is comparable to the average herd size in Tasmania of 450 cows [36], suggesting that the survey population represents the broader Tasmanian dairy farm population. When asked about involvement in extension activities, 77% of the respondents were engaged in face-to-face interactions, with 'field days' (49%) and 'regional on-farm discussions' (49%) as the most attended activities. About 37% of the respondents reported that they attended 3-5 extension activities in the last year. While exploring dairy farmers' online interactions and their frequency, it was revealed that 89% of the respondents were seeking dairy-related information and guidance online, and 45% of them consulted online resources every week.

3.1. Dairy Farmers' Attitudes towards E-Extension

The mean value of the overall attitude (summated across the 22 statements) of the dairy farmers towards the use of E-extension was 3.43; SD = 0.42 (Table 2). This overall mean value suggests that dairy farmers generally had a positive attitude towards the use of E-extension methods [31]. Similar findings emerged in different studies focusing on dairy farmers' attitudes toward using ICTs [33,37,38].

Respondents who agreed with the statement, 'Online dairy farming-related information and support is useful.' were 76% of the total sample with the highest mean value of 3.90; (SD = 0.70), and 77% of the respondents with the second highest mean value of 3.87; (SD = 0.70) agreed with the statement, 'Smartphones help in getting latest market and weather information.' 'Smartphones and tablets are playing an important role in strengthening dairy research and industry linkages' was agreed by 72% of the respondents with a mean value of 3.83; (SD = 0.70). It can be assumed that the usefulness of online resources and associated tools helped develop positive attitudes in dairy farmers toward E-extension methods. Using smartphones and online resources to increase production and effective farm management specifically, innovation adoption is seen as a crucial factor in different studies [39,40].

Innovation is a concept that an individual perceives as a new way to find solutions [41]. Today, technological innovation is a key driver for increasing growth and productivity [42] and has assisted in meeting the increasing demand of consumers, which is also greatly driven by the enhancements in consumption technologies and commercial operations [43]. The ability to innovate is a strategic instrument for those industries which want to remain competitive in the global market [44,45].

It is precisely here where the concept of E-extension emerges, which is the modernization of the extension and advisory services. E-extension strengthens extension services through harnessing innovations in the field of ICTs: new communication systems and tools, online data standards, and mobile and smart communication devices with advanced accessibility [46,47]. In terms of the innovative capabilities offered by ICTs, as demonstrated by Guo [48] in their research conducted in Beijing, or in other studies like those performed by Young in Igloolik (Canada) [49], it is exhibited that innovations in online interaction and ICTs are increasing the human capacity of storing information and communication, which means that people have more opportunities to process, communicate, and use digital media as never before.

Table 1. Demographics, farm characteristics, use of extension methods, and usage frequency of survey participants (n = 74).

Variable	Survey Sample
Farm Role %	
Farm owner	81.1
Farm manager	4.1
Share farmer	14.9
Age %	
18–30	2.7
31–45	33.8
46–60	45.9
Above 60	17.6
Gender %	
Male	89.2
Female	10.8
Education level %	
Year 10 or below	24.3
Year 11/12	28.4
Diploma/Other	16.2
University	31.1
Agricultural/Dairy qualification %	
Yes	50
No	50
Milking area %	
<100 ha	8.1
100–200 ha	37.8
201–300 ha	20.3
>300 ha	33.8
Herd size %	
<200	13.5
200–500	51.4
501–1000	32.4
>1000	2.7
Attend face-to-face extension activities %	
Yes	77
No	23
Frequency of attending extension activities in last year %	
None	28.4
1–2	28.4
3–5	36.5
6–8	6.8
Seek online dairy-related guidance %	
Yes	89.2
No	10.8
Frequency of seeking online content %	
None	8.1
Weekly or more often	44.6
Fortnightly	13.5
Monthly	20.3
Less often than monthly	13.5

Table 2. Distribution of the respondents according to their responses regarding different statements about E-extension (n = 74).

Statements	Mean	SD
Online dairy farming-related information and support is useful.	3.90	0.70
Smartphones help in getting the latest market and weather information.	3.87	0.70
Smartphones and tablets are playing an important role in strengthening dairy research and industry linkages.	3.83	0.70
I am comfortable using devices and online sources to access information.	3.78	0.88
Online discussion groups provide access to dairy experts who could not attend regional discussion groups.	3.75	0.59
Online dairy farming-related information and support is reliable.	3.71	0.56
Dairy extension personnel are actively participating in online discussion forums.	3.64	0.60
Online discussion with dairy experts on dairy farm management is a cost and time-effective way of communication.	3.62	0.65
I have access to a reliable internet connection that allows me to participate in webinars, zoom sessions, and online activities.	3.59	1.00
Dairy social media groups help in connecting with dairy extension workers.	3.50	0.70
Social media groups help in connecting and sharing ideas with fellow farmers.	3.48	0.72
I am comfortable interacting in an online discussion group/workshop (e.g., asking questions, making comments)	3.43	1.00
Online communication is a useful tool to access dairy experts.	3.43	0.75
Expert opinions and success stories on video sharing platforms help in solving farm management issues.	3.39	0.67
Webinars on farm management provide sufficient and useful information.	3.37	0.67
Social media chat applications, e.g., (WhatsApp, Facebook, Skype, Signal) could serve as an effective tool to communicate with extension workers and fellow farmers.	3.36	0.73
Dairy social media groups provide sufficient help and support.	3.18	0.71
DairyTas and other dairy-related organizations' Twitter accounts are providing useful information.	3.14	0.80
Online learning platform "Enlight" by DairyTas is a useful program to promote and strengthen the dairy farming business.	3.14	0.51
Dairy extension could be more effective by increasing the online proportion of extension activities.	2.98	0.73
Video chat and Zoom sessions could be a better alternative to face-to-face and in-person meetings.	2.70	0.93
I get as much value from attending an online training session as I do in-person training sessions.	2.66	0.84

Note: 1 = strongly disagree to 5 = strongly agree, with 3 = neutral.

The lowest mean value of 2.66; (SD = 0.84) was attained by the statement, 'I get as much value from attending an online training session as I do in-person training sessions'. and was agreed with by only 14% of the respondents. Similarly, only 21% of the respondents were of the view that 'Video chat and Zoom sessions could be a better alternative to face-to-face and in-person meetings,' with the second lowest mean value of 2.77; (SD = 0.93). It can be assumed from the results that dairy farmers do acknowledge the importance and effectiveness of using ICTs but oppose completely replacing face-to-face interactions. Perhaps, a tailored combination of both methods reinforcing each other could be a preferable package. It is observed in similar studies that when it comes to specific and detailed advice on farming issues, there is still a strong preference for the more traditional interpersonal communication methods that are face-to-face, i.e., farm visits, field days, and discussion groups [50–52].

The impact of Tasmanian dairy farm attributes and dairy farmers' characteristics on ICT adoption is also evident in a study by Watson [53]. Young and educated dairy farmers with large herd sizes were found to be more comfortable with using ICTs [53]. With increasing emphasis on the organizational efficiency of extension services, frequent visits to farms by extension workers are expected to be curtailed [50]. Considering these

factors, ICT usage will have to be increased by extension personnel and dairy farmers at a pace suited to both being conscious of the digital divide that can occur through various levels of adoption. Farmers' uptake and usage of technology will be driven by personal requirements, characteristics, and ease of use. Consequently, the extension system must continue managing and offering field days, farm visits, office consultations, and face-to-face communications while ensuring that these are used to maximum efficiency and not for just the transfer of information that can easily be accessed through online resources.

3.2. Factors Affecting Attitudes towards E-Extension

The findings presented in Table 3 show a highly significant relationship at the 0.001 level between age and overall dairy farmers 'attitudes towards E-extension (p = 0.001; rs = −0.393). The negative value indicates that, as the age of the respondents' increases, their attitude towards E-extension becomes negative, conversely indicating a positive attitude from young respondents. Older adults adopt new technologies and innovations slowly compared to younger adults [54] but will adopt if they find those technologies valuable and useful, for example, in improving their quality of life [55]. To make technologies more age-friendly, it is important to understand how older people perceive their advantages and disadvantages [56]. To facilitate E-extension adoption, especially for older dairy farmers, it is suggested that E-extension methods be promoted from a benefits-based perspective, focusing on its positive attributes and the creation of a peer support network to assist with the learning of new systems and technologies.

Table 3. Relationship between age, education, milking area, herd size, and the attitudes towards E-extension.

Factor	r_s	p
Age	−0.393	0.001 **
Education	0.307	0.008 **
Milking Area	0.113	0.340
Herd size	0.264	0.023 *

* Significant at 0.05 (2-tailed); ** Significant at 0.01 (2-tailed).

Dairy farmers' education also showed a highly significant relationship with their attitudes towards E-extension (p = 0.008; r_s = 0.307). It was observed that as the dairy farmers' level of education increased, their attitude towards E-extension became more positive. However, dairy farmers' milking areas were found to have no significant relationship with their attitudes towards E-extension. A study by Kilpatrick [57] found that most innovative, efficient, and progressive farmers in Australia tended to be younger, had higher levels of education, were open to new ideas and ways of implementing them, were better at planning and management in general and were more likely to participate in learning groups. Several other studies with a focus on the impact of education on ICT's adoptability found similar results [58–60]. It was observed that education helps increase human exposure and knowledge spectrum, which results in enhanced decision-making and adaptability. This could be the reason that individuals with higher education found ICTs easy to use and developed a positive attitude toward E-extension.

It was observed that farmers with larger herd sizes had a relatively more positive attitude towards E-extension (p = 0.023; r_s = 0.264). Managing a large herd size comes with a few challenges which need to be addressed to maintain profitability and sustainability. An increase in the average herd size on dairy farms also increases the labor and herd management pressure on farmers, thus potentially encouraging the adoption of innovative and resource-efficient methods [61]. In this case, dairy farmers realized the usefulness of online platforms and ICTs to face challenges associated with large herd sizes, which led them to have positive attitudes toward E-extension. Information communication tools have been found to increase resource efficiency and productivity in food systems in different studies [62,63]. In an earlier study on Tasmanian dairy farmers, it was revealed that

herd management software was being used by farmers irrespective of their herd size, but automation was adopted by farmers with larger herd sizes to manage tasks requiring costly human resources [53].

Dairy farmers who revealed that they do seek online guidance (U = 93.5; $p = 0.003$; Mean rank: Yes = 40, No = 16) for their dairy-related issues found this practice more useful compared to non-users (Table 4). Realizing the usefulness of online resources leads them to develop a specific behavioral intention resulting in a positive attitude toward E-extension [19,23].

Table 4. Relationship between role at farm, gender, formal qualification, types of extension activities, frequency of interaction, and the attitudes towards E-extension.

Factor	Test	Value
	MW (U)	*p*
Gender	226.5	0.513
Agricultural/dairy qualification	585.5	0.284
Attend face-to-face extension activities	335	0.054
Seek online guidance	93.5	0.003 **
	KW (H)	*p*
Role at farm	1.636	0.441
Frequency of attending face-to-face extension activities	9.696	0.021 *
Frequency of seeking online guidance	8.251	0.083

* Significant at 0.05 (2-tailed); ** Significant at 0.01 (2-tailed). MW = Mann-Whitney test, KW = Kruskal-Wallis test.

The frequency of attending face-to-face extension activities was also found to be a significantly related factor influencing the attitudes of dairy farmers towards E-extension (H = 9.69; $p = 0.021$). Further post-hoc tests revealed that the dairy farmers who attended 3–5 face-to-face extension activities (Average rank = 45.46) in the last year held a more positive attitude ($p < 0.05$) towards E-extension compared to those who had not been involved in any type of extension activities (Average rank = 27.95). Dairy farmers' gender, role at farm, agricultural/dairy qualification, face-to-face interaction, and frequency of seeking online guidance were found to have no significant relationship with their attitudes towards using E-extension methods.

It can be concluded from the results that the dairy farmers attending 3–5 extension activities annually wanted to remain connected with extension personnel and available advisory services as well as utilize E-extension opportunities. Hall [64] revealed a positive relationship between the level of extension engagement and farmer adoption of best-practice pasture management tools. The farmers regularly engaging with extension services were optimizing learning opportunities and actively developing new knowledge and skills. At the time of the current study, Tasmanian dairy extension activities had to be adapted to COVID-19 social distancing restrictions [65]. Due to these restrictions, dairy farmers were mostly left with E-extension methods for seeking assistance and guidance, and this helped them to experience their ease of use and usefulness in terms of accessibility. The Dairy extension team from the TIA played an important role at that time by remaining engaged and providing due support through their dairy twitter handle, online webinars, discussion groups and online dairy literature [65,66]. Understanding these factors, it could be assumed that using E-extension methods are not only important to strengthen already available extension services, but they can also help all dairy stakeholders remain engaged under unforeseen circumstances.

It is observed from the results that dairy farmers' age, education, herd size, online interaction, and frequency of face-to-face interaction directly influence their perceived ease of use (EoU) and perceived usefulness (U) of E-extension methods. Ease of use affects U and vice versa; the easier a technology or system is to use for an individual, the higher the perceived usefulness by that same individual. Similarly, it also becomes easy for the individual to adopt an innovative system or technology if it is found useful [19]. A study

by Borchers and Bewley [67] informs that dairy farmers who do not know how to use precision farming and are less familiar with its benefits are less likely to be adopters.

Thus, if dairy farmers think implementing and using E-extension methods is easy, they will have a higher intention to use such methods. According to the results, it can be concluded that dairy farmers who were young, educated, and were already engaged in seeking online dairy-related information found E-extension methods easy to use. Dairy farmers handling large herd sizes and who attended relatively more extension activities found E-extension methods more useful. Both factors lead dairy farmers with the aforementioned attributes and characteristics to develop a behavioral intention to use online platforms and ICTs, ultimately developing a positive attitude toward E-extension.

4. Conclusions

Considering the factors that emerged from the results of this study, it is understood that E-extension deployment induces far-reaching changes that impact individuals, societies, and the environment. Community interaction dynamics change significantly with the multiplication of devices and their increased connectivity. Dairy farmers who are young, educated, handling a relatively big dairy business, and are more engaged with extension activities are more inclined towards using new ways of interaction. After realizing the usefulness' and possible ease of use, they developed a behavioral intention to use online platforms and ICTs, leading to a positive attitude towards using E-extension methods. However, the results also indicate that holding a positive attitude does not mean that dairy farmers want a complete replacement for face-to-face activities. E-extension methods should complement the already established extension system in a hybrid framework to assist and support dairy farmers in varying conditions and circumstances, leading the way to a comprehensive and seamless extension and advisory system for a sustainable dairy industry in Tasmania.

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