

# INFLUENCE OF AGRICULTURAL EXTENSION SERVICES ON THE ADOPTION OF SELECTED MODERN MARKETING PRACTICES AMONG MANGO PRODUCERS IN MAKUENI COUNTY, KENYA

Ooga<sup>1</sup>, D.M.\*, Mugambi<sup>2</sup>, J., and Muraya<sup>3</sup>, M.

<sup>1</sup> Ph.D. Student, AGECE, AGBM, & AGEX, Chuka University, Tharaka Nithi, Kenya

<sup>2</sup> Senior Lecturer, AGECE, AGBM, & AGEX, Chuka University, Tharaka Nithi, Kenya

<sup>3</sup> Senior Lecturer, Plant Science, Chuka University, Tharaka Nithi, Kenya

## ABSTRACT

Mango yields about 40% of fruit production around the globe; thus, it plays a significant role in enhancing food security and economic growth. Therefore, mango producers need to adopt more efficient and effective marketing practices to boost their profitability. Modern marketing practices (MMPs), though costlier than traditional marketing practices, are more efficient and have a greater market reach. Nevertheless, the adoption of MMPs among mango producers is still very low. The study aimed to determine the influence of agricultural extension service factors on the adoption of MMPs among mango producers in Makueni County. The study employed a descriptive survey research design targeting 28,982 producers. A stratified sampling was utilized, selecting 395 producers from three strata based on farm size (small farm size, medium farm size, and large farm size). A structured questionnaire was used, with face validity from experts and pilot testing, ensuring validity, while Cronbach alpha was used to check reliability, with a coefficient ranging between 0.8 and 0.90. Training types of agricultural extension services ( $B = -0.319$ ,  $S.E. = 0.265$ ,  $Wald = 1.449$ ,  $p = 0.029$ ,  $OR = 1.727$ ) and the satisfaction with training sessions ( $B = 0.054$ ,  $S.E. = 0.328$ ,  $Wald = 0.027$ ,  $p = 0.019$ ,  $OR = 1.056$ ) influenced the adoption of modern marketing practices significantly ( $p < 0.05$ ). Farmer-to-farmer direct sales and local market marketing had the highest scores of 73.43% and 98.52%, respectively. Promotional campaigns and product differentiation received low scores due to high transactional costs. Overall, agricultural extension factors have a positive influence on marketers' adoption of modern practices. The study emphasizes the need to increase and refine training programs needed for the integration of advanced marketing.

**Keyword:** - Mango production, Modern marketing practices, Agricultural extension services, Descriptive survey design, Adoption, Market participation

## 1. INTRODUCTION

Mango is a common tropical fruit grown in many countries, such as India, China, Thailand, and Mexico, contributing about 60–70% of the total world's mango production (Muriithi et al., 2020; Wangu et al., 2020). Asia dominates in production with 78%, followed by Africa at 14% and the Americas at 8% (Wangu et al., 2020). Nonetheless, the mango industry has faced setbacks, especially in marketing. Stringent quality requirements are an important factor motivating buyers' decisions, especially when exporting to European markets. Consequently, many small- to medium-scale growers fail to meet the required quality requirements, which has impacted their

competitiveness (Ncube et al., 2020; Asare-Nuamah et al., 2022). The major European countries that import mangoes are France, Germany, the United Kingdom, Peru, and the Netherlands (Borychowski et al., 2020).

In most African countries like Kenya, a number of small-scale mango growers market their fruit in nearby centers; thus, there are fewer marketing outlets (Ayyaz et al., 2019; De Corato, 2020). Farmers mostly depend on the nearby institutions, whose customers include hotels, restaurants, individual buyers, market segment stores, and whole sellers (Lucas, 2020; Musyoka et al., 2021). For a greater market reach, mango producers need to opt for modern marketing practices to improve their profitability (Wangu et al., 2020). In Uganda and Tanzania, products with low market value and traditional forms of marketing such as open-air markets and farm gates are widely used in the marketing of mangoes, hence low profitability (Mwungu et al., 2020; Nyamu, 2020). Mango farming in Kenya has significant economic implications, providing about 2% of Kenya's gross domestic product with over 4% of horticultural exports (Karienyee, 2020; Musyoka et al., n.d.). However, the market systems for mangoes encounter various challenges, especially in regions that have poor market structures, including Makueni County, where local markets prevail (Reporter, 2024).

In Kenya, extension services, which are crucial in the delivery of agricultural information, are offered by the government, NGOs, and private enterprises. Such services include providing training on how to differentiate the products, branding and positioning, price determination, and market coverage. Product differentiation, such as quality improvement and sorting, enables farmers to supply the required products in the markets, hence boosting their competitiveness (Muriithi et al., 2020). Exports can be branded and packed to make a good impression on the market and control most of the consumers' decisions, hence being able to charge high prices (Mairura, 2019). The aspect of pricing, on the other hand, when it is in tune with the actual cost of production and market trends, greatly determines profitability. In addition, the adoption of appropriate distribution channels and effective promotional strategies are crucial in as far as market access and demand creation are concerned (Wangu et al., 2020). However, the level of implementation of modern marketing practices among the mango producers in Kenya is still low (Muriithi et al., 2020). Most previous studies focused on the availability and efficiency of agricultural extension services instead of their impact, especially in rural areas such as Makueni County in Kenya, as indicated by Wangu et al. (2020). Verma et al. (2020) noted that extension services differ across regions.

### **1.1 Research Question**

How do agricultural extension services affect the adoption of modern marketing practices among mango producers in Makueni County?

### **1.2 Conceptual Framework**

The conceptual framework focuses on the relationship between agricultural extension service factors and the adoption of modern marketing practices. Extension services play a vital role in increasing the farmers' knowledge, which may influence the farmer's decision to adopt effective marketing strategies. The framework categorizes the extension service factors into two main categories: training exposure and training outcomes. Training exposure relates to the number of training sessions undertaken and the type of training attended. Attendance at the training sessions improves farmers' knowledge and understanding of modern marketing strategies, including differentiation, branding, and pricing (Muriithi et al., 2020). Various types of training equip farmers with technical competency, thus improving their capability to incorporate advanced aspects of marketing such as market and export orientation (Wangu et al., 2020). Outcomes of training are centered on satisfaction with the training given. High satisfaction levels suggest that the training was not only pertinent but also tactical and in line with farmers' requirements, thus enhancing the chances of practicing more progressive forms of marketing, including distribution and promotion activities (Karienyee, 2020). Thus, both the training exposure and training outcome significantly influence the adoption of modern marketing practices by mango producers.

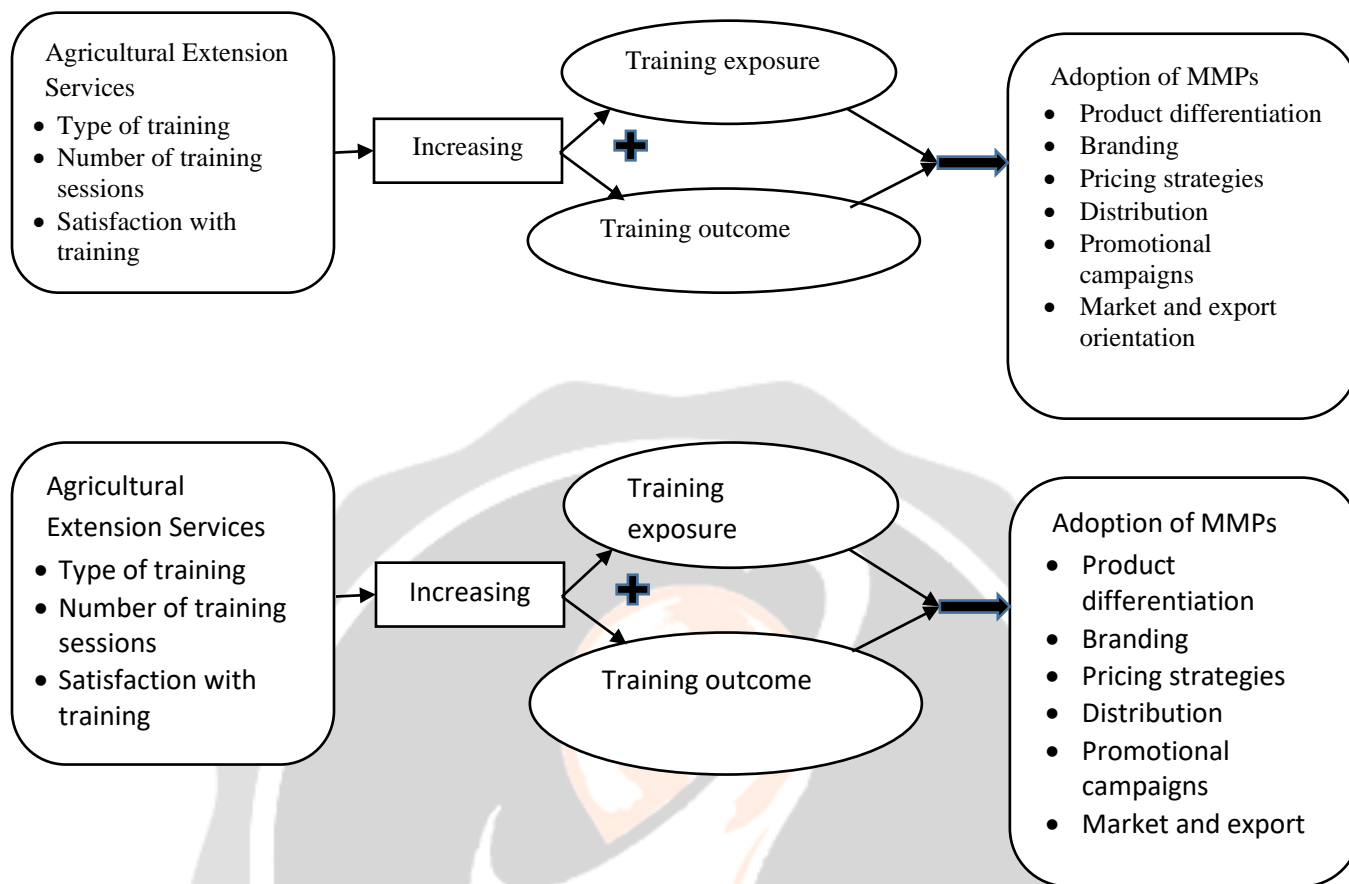


Figure 1: Conceptual Framework

**2. METHEDODOLOGY**

**2.1 Study Area and Participants**

The study was conducted in Makueni County, formerly under the Eastern Province of Kenya. The county leads in mango production due to its favorable temperatures and semi-arid climatic conditions. Makueni County occupies a land space of 8,008.9 square kilometers with a population size of 987,653. The study targeted a population of 28,982 mango producers in the county (small-scale, medium-scale, and large-scale producers). The study employed a descriptive survey design to investigate the influence of agricultural extension service factors on the adoption of modern marketing practices among mango producers. A stratified random sampling technique was used, selecting participants from three strata (small farm size, medium farm size, and large farm size), ensuring the sample’s representativeness of the entire population. Kothari’s (2004) formula yielded a required sample size of 395 mango producers.

**2.2 Data Collection**

A questionnaire was administered, and it comprised of three parts: demographic characteristics, agricultural extension services, and adoption of marketing practices. The agricultural extension service section focused on the number of training sessions, the types of training received, and their satisfaction with training efforts. A pilot test of the questionnaire was conducted in Tharaka Nithi County with 10% of the total sample size (40 participants) to validate the research instrument. A Cronbach alpha coefficient ranging from 0.8 to 0.9 signified good internal consistency, as shown in Table 1. Enumerators underwent training and administered the questionnaires on the researcher’s instructions and helped farmers while answering the questions to give proper responses.

**Table 1:** Reliability Coefficients

Construct	No. of Items	Alpha Coefficient
Agricultural extension services	6	0.9
Adoption of marketing practices	9	0.8

### 2.3 Data Analysis

A statistical package for social sciences (SPSS version 26) was used to generate descriptive and inferential statistics. Descriptive statistics were used to describe and summarize the data. Logistic regression analysis was used to assess the effect of agricultural extension services on the adoption of modern marketing practices. Diagnostic tests were conducted to assess the assumptions of logistic regression: normality, linearity, and multicollinearity. The results also showed that all assumptions were met.

## 3. RESULTS AND DISCUSSION

The questionnaire return rate was 100%, thus minimizing non-response bias. About 37.8% of mango producers fell in the age group of 46-55. Male mango producers were a dominant group of 67.6%. A majority of farmers producing mangos had more than 21 years of experience in mango farming (33%). The majority had attained secondary education (47.6%) or college education (40%), thus indicating a propensity of using modern marketing practices. The main income was obtained from informal employment (54.9%), implying that full-time farming could pose some impact on the level of implementing modern marketing practices. The majority of the mango producers (83.3%) practiced small-scale farming involving farms of up to 9 hectares. The distribution of the farm sizes shows that 5 acres were the most common, indicating that smallholder farming is prevalent in Makueni County.

### 3.1 Adoption of MMPs

Mango producers were prompted to rate their responses on a Likert scale (1 = very low, 2 = low, 3 = moderately, 4 = high, and 5 = very high), as shown in Appendix 2. The study showed that most producers (92.2%) were involved in farmer-to-farmer marketing at a relatively high level, while 74.7% were actively involved in local markets. Cooperative marketing was relatively moderate (42.9%) and low (39.9%). Moderate levels of product differentiation were taken up by 39.9% of the producers, although 19.8% of the producers indicated very low adoption levels. The level of branding adoption was moderate for a larger percentage of the producers (59.7%), although few of the producers (5%) ventured into branding at very high levels. Pricing strategies were moderately adopted by 82.3% of the producers. Distribution and promotional campaigns were not as effective; they had relatively low to very low percentages of producers within the respective adopter categories: very low (19.8%) and 34.9% of adopters, respectively, and low (32.8% and 22.5% of low adopters, respectively). Market/export orientation was the least adopted, with 47.7% for the very low category. Tables 2 and 3 show the mode, frequency, and percentage of adoption levels.

**Table 2:** Mode Scores for the Adoption of Various Marketing Practices

Marketing Practices	Mode
Farmer-to-farmer direct sales	4.00
Local market participation	4.00
Cooperative marketing	3.00
Product differentiation	3.00
Branding	3.00
Pricing strategies	3.00
Distribution (local and international distributors)	3.00
Promotional campaigns (advertisement, and trade shows and exhibitions )	1.00
Market and export orientation (market research, standardization, and certification)	1.00

**Table 3:** Frequency and Percentage Distribution for Adoption of Various Marketing Practices

Marketing Practices	Yes		No	
	Freq.	%	Freq.	%
Farmer-to-farmer direct sales	290	73.4	105	26.6
Local market participation	389	98.5	06	1.5
Cooperative marketing	25	6.3	370	93.7
Product differentiation	29	7.3	366	92.7
Branding	27	6.8	368	93.2
Pricing strategies	135	34.2	260	65.8
Distribution	26	6.6	369	93.4
Promotional campaigns	41	10.4	354	89.6
Market and export orientation	03	0.8	392	99.2

The findings show a mixed uptake of the different marketing practices, with differences in the level of practice. The results show that farmer-to-farmer direct sales and local markets attained a mode score of 4.00, indicating frequent adoption. Specifically, 73.4% of the producers gave direct sales, and this was attributed to its suitability as it does not involve intermediaries, as supported by Muthini et al. (2017) and Dlamini-Mazibuko et al. (2019). Additionally, 98.35% (n = 389) of producers reported engaging in local markets; this reveals the ease with which the local markets can be accessed by the mango producers, in agreement with Abate et al. (2019) and Agrawal (2022) on the importance of proximity to markets.

However, cooperative marketing, product differentiation, and branding had moderate degrees of practices with mode values of 3.00. Cooperative marketing was implemented by only 6.3% (n = 25) of producers, which indicates their low confidence or success in cooperatives, as argued by Ermias's (2021) analysis of cooperative management and perceived advantages. Product differentiation and branding had very low values, which ranged from 7.3% (n = 29) and 6% (n = 60), respectively, thus confirming the findings of Mehdi et al. (2020) and Gichungi et al. (2021) on issues of additional costs and cumbersome nature. Pricing strategies were moderately implemented with 34.2% (n = 135), thus showing a significant use of traditional techniques for pricing (Hagos et al., 2020).

Distribution practices were also low, with a mode scoring of 3.00 and a 6% (n = 26) adoption rate, indicating perhaps the problem of transport costs or the lack of efficient transport channels, as pointed out by Hagos et al. (2020). The mode score of promotional campaigns and market/export orientation produced the lowest results, both having a mode value of 1.00, with only 10.4% (n = 41) and 0.8% (n = 3), respectively, due to lack of resources or knowledge to practice as posited by De Corato (2020) and Asare-Nuamah et al. (2022), regarding the expenses and knowledge needed for these approaches.

### 3.2 Influence of Agricultural Extension Services on the Adoption of MMPs

Mango producers were required to give an opinion on a scale of 1 to 5 (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree) on the influence of agricultural extension services on the adoption of MMPs. As indicated in Appendix 1, about half of the respondents (52.3%) agreed that the type of training they had received influenced their use of modern marketing practices. Information from training and extension services influenced the adoption, with 44.5% agreeing. A smaller percentage (2.5%) indicated a strong agreement with both the type of training and attending training sessions. A less substantive response in the agreement level was observed in the number of contacts with extension officers and the topics covered in the agricultural extension services, with 20.2% and 27.4% of the producers agreeing, respectively. Neutral responses ranged from 32.2% to 64.6% across different categories, with satisfaction or consensus remaining quite moderate. Altogether, the results imply that, although there is apparently a positive effect of training and extension services on the use of modern marketing practices, the extent of influence is dissimilar across perspectives. The mode values of the most occurring responses for each statement are shown in Table 4.

**Table 4:** Influence of Agricultural Extension Services on the Adoption of MMPs

Statement	Mode
Adoption of modern marketing practices is influenced by the type of extension training received (training exposure).	4.00
Adoption of modern marketing practices is influenced by utilization of information from extension training.	4.00
Adoption of modern marketing practices is influenced by training session attendance (training exposure).	3.00
Adoption of modern marketing practices is influenced by satisfaction with the training received.	3.00
Adoption of modern marketing practices is influenced by frequent interaction with extension officers.	3.00
Adoption of modern marketing practices is influenced by the topics covered in agricultural extension.	3.00

The statement “adoption of modern marketing practices is influenced by the type of extension training received (training exposure)” got the mode score of 4.00, indicating that the majority of producers assumed that the training type changed their marketing practices appreciably. This is in concordance with Muthini et al. (2017), who pointed out that effective, specific training determines the use of new marketing practices. Likewise, the response “adoption of modern marketing practices is influenced by utilization of information from extension training.” received a mode score of 4.00, suggesting that producers appreciated the real-life application of the knowledge acquired during training. On the other hand, the mode score for the statement “adoption of modern marketing practices is influenced by training session attendance (training exposure)” was 3.00. This reaction indicates that the degree of perceived usefulness of these sessions might be a function of the content of these sessions and their style. A similar neutral response was found when mango producers were asked: “adoption of modern marketing practices is influenced by satisfaction with the training received,” which indicates a need to strengthen the content and approach to training.

The mode score of 3.00 for “adoption of modern marketing practices is influenced by frequent interaction with extension officers” and “adoption of modern marketing practices is influenced by the topics covered in agricultural extension” means that mango producers did hold a positive view on these interactions and topics. This implies that the nature, frequency, and topics of the interaction might require improvement, as pointed out by Abate et al. (2019) and Midingoyi et al. (2019), since quality and relevance were identified as key to the efficiency of extension services. Therefore, the high mode values of the training type and information usage indicated that the appropriateness of training is essential to the diffusion of modern marketing strategies. Thus, the mixed views regarding training sessions, satisfaction, and extension interactions imply the need to further fine-tune the extension services required by mango producers.

### 3.3 Binary Logistic Regression Analysis of Agricultural Extension Service Factors and Adoption of MMPs

A binary logistic regression technique was used to assess how agricultural extension service factors influenced mango producers’ use of various marketing practices. The key independent variables were training sessions attended, type of training received, and satisfaction with training, utilization of information from extension training, frequent interactions, and topics covered in extension training. The results showed insignificant influence on the adoption of modern marketing practices. The value of -2 log likelihood for the model was 453.590, with Cox and Snell  $R^2$  and the Nagelkerke  $R^2$  equal to 0.20 and 0.204, respectively, indicating that variables in the model explained 20.4% of the variance in the adoption of MMPs. Training types of agricultural extension services ( $B = -0.319$ ,  $S.E. = 0.265$ ,  $Wald = 1.449$ ,  $p = 0.029$ ,  $OR = 1.727$ ) and the satisfaction with training sessions ( $B = 0.054$ ,  $S.E. = 0.328$ ,  $Wald = 0.027$ ,  $p = 0.019$ ,  $OR = 1.056$ ) influenced the adoption of modern marketing practices significantly ( $p < 0.05$ ). Others variables (were training sessions attended, utilization of information from extension training, frequent interactions, and topics covered in extension training) demonstrated an insignificant influence on the adoption of MMPs ( $p > 0.05$ ).

The low  $R$  squared value defined that a minimum amount of variance in adoption of the MMPs was explained by the predictors. This finding is underpinned by the study by Kariuki (2020), which established that product differentiation, branding, and promotional strategies are more determined by marketing skills and customers’ interaction than the extension services. The results accord with the study of Obare et al. (2021) on the effective promotional strategies and market and export orientation practices, indicating that reliance on market-specific marketing and media efforts can be more significant than on the training of extension workers. The low impact of the extension service factors on the promotional campaigns contradicts the finding of the study by Njuguna et al.

(2020) that highlighted that market as well as export orientation practices are determined by the marketing innovations and consumer trends and not solely by the extension services.

Overall, as pointed out by Menard (2002), low R square values in logistic regression do not necessarily imply a dataset with a poor model fit. Specifically, the predictive power of logistic regression models in social sciences is low because of the intrinsically high complexity of the social phenomena being explained (Menard, 2002; Hosmer Jr et al., 2013). Rogers also evaluated the diffusion process and indicated that the adoption of new practices depends on many factors, which are social, economic, and even cultural factors (Rogers et al., 2014). Thus, future research studies should perhaps focus on other variables or use different research approaches to dissect out more factors that explain the current modern marketing amongst mango producers.

#### 4. CONCLUSIONS

A large number of mango producers engaging in farmer-to-farmer direct selling and participating in local markets indicate that these practices are probably preferred by farmers as they are easy and efficient. However, practices like cooperative marketing, product differentiation, branding, and distribution, despite being effective, are used less frequently, maybe because of perceived complexity and transactional costs. Low ratings on promotional campaigns and market and export orientation could be taken to mean inadequate resource support and awareness. Extension education, while not having a major impact, demonstrated some positive impact. Nonetheless, the effect of extension services is insubstantial, as evidenced by the low R<sup>2</sup> values of the logistic regression analysis. This implies the presence of flaws in the kind of content trainers provide, the way they provide the content, and the monitoring/interactions that are accomplished. Therefore, extension services need to be tailored to the requirements of producers to improve the training's quality in relation to the challenges of mango producers. Further, future studies will need to examine other variables that affect the adoption of MMPs for robust interventions.

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## APPENDICES

### Appendix 1: Adoption of Modern Marketing Practices (%)

Category (%)	Farmer-to-farmer marketing	Local market participation	Cooperative marketing	Product differentiation	Branding	Pricing strategies	Distribution	Promotional campaign	Market/export orientation
Very low	0.0	0.0	7.3	19.8	5.0	5.0	19.8	34.9	47.7
Low	0.0	4.8	39.9	32.8	22.8	0.0	32.8	22.5	39.7
Moderately	5.3	10.1	42.9	39.9	59.7	82.3	37.6	32.9	12.6
High	92.2	74.7	9.9	7.5	7.5	12.7	9.8	9.8	0.0
Very high	2.5	10.4	0.0	0.0	5.0	0.0	0.0	0.0	0.0
Total	100	100	100	100	100	100	100	100	100



**Appendix 2: Influence of Agricultural Extension Services on the Adoption of Modern Marketing Practices (%)**

Category (%)	Adoption of modern marketing practices is influenced by the type of training received.	Adoption of modern marketing practices is influenced by utilization of information from extension training.	Adoption of modern marketing practices is influenced by training session attendance.	Adoption of modern marketing practices is influenced by satisfaction with the training.	Adoption of modern marketing practices is influenced by frequent interaction with extension officers.	Adoption of modern marketing practices is influenced by the topics covered in the agricultural extension services.
Strongly disagree	5.0	5.0	5.0	5.0	5.0	0.0
Disagree	7.3	7.3	7.3	7.3	24.8	20
Neutral	32.2	42.5	47.5	64.6	50.0	52.6
Agree	52.3	44.5	36.9	22.4	20.2	27.4
Strongly agree	2.5	0.0	2.5	0.0	0.0	0.0
Total	100	100	100	100	100	100

