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Dual Learning Dynamics: Career Options for Agri-Food Students in Kazakhstan

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ABSTRACT

The successful implementation of the German-originated dual learning system in various national settings inspired Kazakhstan to introduce this approach to address the shortage of specialists. The self-employed status of professionals in the agri-food industry raises concerns about the intentions of young individuals to remain in the industry. This study aims to identify factors influencing the intentions of students and graduates to remain with the same employer in the agri-food industry, change employers in the same industry or leave the industry altogether. The study evaluated 651 learners undertaking dual learning (hence dual) and 217 learners undertaking traditional education (hence non-dual). Kirkpatrick's training evaluation model provided the theoretical framework for designing satisfaction dimensions potentially influencing the career intentions of students and graduates. Multinomial Logistic Regression was used to examine the career intentions of both dual and non-dual groups. The dual learners demonstrated a stronger association between tested factors (satisfaction and motivation) and intention to remain with the company/industry than the non-dual learners. Despite positive outcomes in retaining skilled professionals, concerns remain regarding the career intentions of young people in the agri-food industry. Stakeholders should provide career development opportunities and incentives to attract and retain young individuals within the agri-food sector.

1 | Introduction

Youth unemployment and intense occupational changes challenge many countries, prompting debate on vocational education and training (VET) in addressing these issues (Valiente and Scandurra 2017). The German dual learning system (DLS), which combines company-based learning with part-time theory-based learning, has been proven to be a good practice worldwide for promoting VET and ensuring a qualified workforce (Beckmann 2023; Dummert 2021; Seidel 2019; Wagner and Wolf 2013). Collaboration between educational institutions and training companies helps students integrate quickly into the labour market (Wydra-Somaggio 2021). However, entering a VET apprenticeship does not guarantee completion or long-term retention in the profession, as many factors can influence the decision to remain (Holtmann and Solga 2023; Forster-Heinzer et al. 2016).

Completion and retention in the specialised field or with the training employer are key indicators of VET programme performance (such as DLS) (Donkor 2012). The high retention rate of apprentices in Germany (around 70%) has brought substantial international attention (Haasler 2020). Inspired by these successful outcomes, Kazakhstan adopted a similar system in 2012 to address skills mismatches and labour shortages in different industries, including the agri-food sector, which ranks as one of the five industries with the greatest need for personnel across different qualification levels (NCE 2022). Chulanova (2021) noted that in 2018, 40% of young professionals were unable to secure a job within a year, mainly due to qualification

mismatch. In 2023, the agriculture sector alone required more than three thousand specialists—most of those employed in the agri-food sector had vocational education, totalling 549.5 thousand people, a 4.6% decrease from the previous year (Bureau of National Statistics 2023a). Increasing unemployment among young people is also linked to non-coordinated migration from rural areas to cities (Kenzhin et al. 2016), making it essential to examine the intentions of students and graduates regarding their decisions to remain in or leave the agri-food sector.

While DLS improves employment rates overall, its ability to retain workers in the agri-food industry is unclear due to sector-specific challenges, such as working and training conditions, lower wages and career growth opportunities (Bulasheva et al. 2024). This study aims to study the effectiveness of DLS by understanding factors influencing the career intentions of students and graduates in the agri-food sector and comparing participants of DLS (dual learners: SDLS[1], GDLS) with those in traditional education programmes (non-dual learners: STF[2], GTF[3]). It specifically seeks to answer the following questions:

1. How do demographic conditions, satisfaction levels and motivational factors affect intentions to remain within their current industry or training company, switch employers within the same industry or transit to entirely different industries unrelated to their trained specialisation?
2. Are there differences between dual and non-dual learners in terms of these influencing factors?

This research contributes to addressing several critical research gaps. Firstly, while previous studies have explored reasons for dropping out of apprenticeship (Beckmann 2023; Bessey and Backes-Gellner 2015; Donkor 2012; Holtmann and Solga 2023; Laporte and Mueller 2013; Nielsen 2016; Seidel 2019; Wydra-Somaggio 2021), they underscore the complexity of dropout decisions, emphasising the need for early identification of at-risk trainees and tailored interventions to improve retention rates and often overlook career perspectives after graduation (Lee and Chao 2013; Liu 2021). Secondly, research on career intentions often lacks a structured approach to constructing satisfaction factors, focusing primarily on monetary dimensions (Werwatz 2002), workplace satisfaction (Dummert 2021; Wagner and Wolf 2013) and motivational factors (Forster-Heinzer et al. 2016). Since DLS is a blend of theoretical training and workplace application, training satisfaction experiences should encompass both settings to ensure engagement, favourability and relevance of training. Lastly, prior research on DLS in Kazakhstan has neglected to address the role of dual learning in enhancing retention prospects, especially within the agri-business sector. Earlier studies of DLS in Kazakhstan offer insights into the implementation benefits and challenges (Muhambetaliev & Kasymova. 2016), emphasising personal development, facilitation of abilities and creative skills in students (Alshynbayeva et al. 2016), their level of preparation (Issayeva et al. 2017) and the enhancement of their academic achievement and job market confidence (Doskeyeva et al. 2024).

It is therefore important to understand the career intentions of dual learners, particularly within the agri-food industry, and compare them with those of students in traditional education. This enables us to understand the effectiveness of DLS and design policies and interventions, influencing experiences and increasing retention rates of young professionals. This alignment is especially critical in the agri-food sector, where high turnover rates and unique workforce challenges require tailored solutions (Bulasheva et al. 2024). Apart from the satisfaction factors with the learning environment (including both workplace and educational institution), the demographic characteristics of the respondents and motivational factors, such as compensation, opportunities for promotion and motivational factors will be considered in this study. As such, the present study not only contributes to previous research by extending satisfaction variables but also provides an understanding of factors influencing intentions among learners in both DLS and traditional systems, which was not done before. By employing Kirkpatrick's learning evaluation model (Kirkpatrick and Kirkpatrick 2006) to evaluate satisfaction factors, this study offers a structured approach to analysing retention dynamics. Insights gained will inform stakeholders—educational institutions, businesses and policymakers—on strategies to improve the DLS and address the skilled labour shortage in Kazakhstan's agri-food sector.

2 | Literature Review

2.1 | DLS and Its Influence on Career Prospects

Initially, the DLS was designed to be equivalent to secondary vocational education at levels 3 and 4 of the International Standard Classification of Education (Doskeyeva et al. 2024, p. 2). It integrated classroom education (in educational institutions) within work-based training (in the company) and offered more extended practical hours (up to 70% of the curriculum), which were 30% more than previously suggested (Muhambetaliev & Kasymova 2016, p. 5). Later, it has been integrated into the higher education levels, involving close collaboration between educational institutions and companies, aiming to prepare students for their future careers by providing them with valuable opportunities to develop practical skills within authentic production environments (Issayeva et al. 2017, p. 454). Students enrol in DLS, governed by three-party agreements with educational institutions and training companies. Practice in DLS involves a long-term commitment to a real work environment, spanning a maximum of 3 years and a minimum of 2 years, while practice in a traditional or non-dual approach involves mostly classroom-based learning, which is also formal and follows the national curriculum, with substantially shorter duration (1–3 months) of practical training (Muhambetaliev & Kasymova. 2016, p. 2). This short-term practical experience for non-dual learners results in less direct involvement with the workplace, lacking the hands-on experience that dual learners gain. DLS, instead, is designed to create an immersive learning environment that mirrors industry conditions, equipping learners with recognised qualifications and practical work experience to enhance their employment prospects (Tastanbekova et al. 2021, p. 180). This approach not only expects learners to stand out in the job market but also increases the likelihood that dual graduates will secure employment during their training and remain in the company or

industry after graduation, compared to non-dual learners (Billett et al. 2020). Motivational aspects are often established for dual learners during training through practical placements in companies, and they may receive job offers during or after these placements, influencing their career perceptions. This study explores whether such training shapes learners' career intentions to **remain** in the agri-food industry/company they were trained in after graduation, which can be regarded as a positive outcome of the DLS implementation. While DLS aims to align training with industry demands and improve employment rates, some training companies lack the capacity to retain all graduates. However, the work experience gained, enables graduates to secure positions with other employers in the same field. Thus, employment within the **same** industry, even with a different employer, should be considered a positive outcome when evaluating learners' career intentions. Nevertheless, students and graduates may decline job opportunities aligned with their specialisation and pursue careers in **other** (different) industries.

2.2 | Previous Research and Their Shortcomings

Examining the intentions and/or career choices of learners were covered in studies from a variety of aspects. Nielsen (2016) found that 40% of Danish VET students dropped out of the system and provided a deeper look at student engagement as a key reason behind this issue. Donkor (2012) interviewed automobile trade apprentices who had already left their programmes to determine their true motivation for quitting and found that dissatisfaction with the workplace is a key reason for dropping out. Liu (2021) examined learning experiences and found positive correlations between learning satisfaction and intentions to remain at the current job in Taiwan's dual education system. Holtmann and Solga (2023) examined dropout and stopout patterns in German VET and concluded that performance-related factors and satisfaction with training led to stopouts or occupational changes. Seidel (2019) investigated whether having a second job influences apprentices' inclination to quit their training. The study concluded that apprentices needing a second job to cover living costs were more likely to intend to quit their apprenticeship in Germany. Detailed demographic characteristics were tested by Laporte and Mueller (2013) who identified that completion of German apprenticeship programmes is positively related to being married and having at least a high school education. Finally, Beckmann (2023) delved into the gender reasons behind German apprenticeship attrition and found that especially males in female-dominated occupations are more likely to drop out of their apprenticeships compared to their majority peers. These studies above share a common context: the effectiveness of apprenticeship programmes, which are highly comparable to the DLS (Valiente and Scandurra 2017). They all emphasise aligning training with industry needs and providing practical, hands-on experience within authentic work environments. This similarity lies in their shared goal of bridging the gap between theoretical education and industry readiness, making apprenticeship models a relevant benchmark for understanding and improving DLS outcomes.

However, the structure and availability of apprenticeship programmes can differ based on the educational system of the country and industry-specific needs (Carr-Chellman et al. 2007, p. 638). Apprenticeship systems in countries with deep historical roots, such as Germany and Switzerland, feature well-established direct employer involvement. In these systems, students secure apprenticeships directly through employers for specific positions (Dummert 2021, p. 369; Masdonati et al. 2010). That is why, most studies published in the field (Bessey and Backes-Gellner 2015; Gow et al. 2008; Smyth and Zimba 2019; Wydra-Somaggio 2021) have mainly addressed factors influencing the decisions of apprentices to quit the programme rather than exploring intentions to choose career paths following graduation. Adopted models, such as DLS in Kazakhstan, however, rely on educational institutions and government regulations to facilitate employer involvement (Alshynbayeva et al. 2016). Apprenticeship completion, in this case, may mean apprentices have to deal with the agreement and academic tasks to fulfil graduation criteria, which can complicate quitting and make it more relevant to examine their intentions after graduation.

While previous studies have investigated the intentions of learners in various educational settings, they were not specifically focused on apprenticeship programmes (Law 2010; Lee and Chao 2013; Nguyen and Taylor 2003; Sigot and Vero 2020; Xu 2013). Research on assessing factors influencing the career intentions of apprentices (Billett et al. 2020; Dummert 2021; Forster-Heinzer et al. 2016; Wagner and Wolf 2013; Werwatz 2002) often lacked a systematic approach to constructing satisfaction variables. Despite existing research on the influence of training quality (Liu 2021; Wydra-Somaggio 2021), job satisfaction (Dummert 2021; Holtmann and Solga 2023; Smyth and Zimba 2019; Wagner and Wolf 2013; Werwatz 2002) and motivational factors (Donkor 2012; Ferri et al. 2019; Forster-Heinzer et al. 2016; Gow et al. 2008; Kalule et al. 2023; Werwatz 2002), the formulation of satisfaction variables have often been inconsistent across studies. Consequently, comparing findings across different research efforts is challenging, which limits the ability to draw clear conclusions about the factors influencing learners' career intentions.

While various theoretical approaches could explain the link between training satisfaction and career intentions, this study employs Expectancy Theory, which posits that individuals are motivated to act when they believe their efforts will lead to desired outcomes (Vroom et al. 2005). In the context of DLS, this theory explains how training satisfaction enhances individuals' expectations that their acquired skills will result in future employment and career growth. This approach was selected over alternatives for several reasons. Firstly, while Social Exchange Theory (SET) emphasises reciprocal loyalty, it does not account as explicitly for the role of individual perceptions about the utility of training in achieving personal career goals (Smyth and Zimba 2019). Secondly, the Theory of Reasoned Action (Law 2010) and the Theory of Planned Behaviour (Lee and Chao 2013) focus more on attitudinal loyalty or normative pressures rather than the cognitive evaluation of effort-reward expectations. Lastly, the Expectancy Theory best aligns with Kirkpatrick's training evaluation model[4] (Kirkpatrick and Kirkpatrick 2006) by providing a direct link between satisfaction and the processes influencing decision-making about staying or leaving. Kirkpatrick's evaluation method, exemplified by the goal-based approach, is found to be most suitable for the

assessment of career intentions concerning training satisfaction (Alsalamah and Callinan 2021). Unlike system-based evaluation, which primarily focuses on organisational context, or responsive evaluation, which heavily relies on actual need, promoting inclusivity and relevance, the goal-based approach provides a structured framework that aligns with the objectives of training programmes. For an agribusiness, the main goal for conducting DLS could be gaining qualified specialists and, for students—secure employment. This model is based on four levels: Reaction (Level 1), Learning (Level 2), Behaviour (Level 3) and Results (Level 4). Existing goal-approach training models (Kaufman et al. 1996; Phillips 2003) incorporated additional steps or variations within their evaluation frameworks, such as evaluation of the context and return on investment. However, they all share the core of the four steps of Kirkpatrick's model. This approach is widely used due to its effectiveness in evaluating training programmes across various fields and adapting to different training environments, including apprenticeship programmes (Carr-Chellman et al. 2007). Kirkpatrick's model surveys include a combination of rating scale items, and because of the general nature of the questions, many companies use the exact same format of questions or adapt them according to the training activity to understand if the training was favourable, engaging and relevant (Alsalamah and Callinan 2021).

2.3 | Conceptual Framework

Figure 1 illustrates the conceptual framework that has been developed to define the scope of the research and is used to demonstrate the relevant variables employed in the modelling of dimensions of satisfaction. Specifically, the conceptual framework illustrates the factors that are tested to examine students' and graduates' intentions to remain or leave the industry (Figure 1).

2.4 | Demographic Factors

Older apprentices have greater difficulties obtaining a suitable job than their younger counterparts since their age influences apprenticeship completion (Laporte and Mueller 2013, p. 22) and employment outcomes (Dummert 2021, p. 382). Additionally, Xu (2013, 360) stated that age influences the choice between a job closely related to the major in Science, Technology, Engineering and Maths (STEM) fields or one unrelated (non-STEM) to the major. Gender, along with age factors, contributes to shaping the perspectives and decisions of students when considering their future careers and education (Billett et al. 2020). A study by Holtmann and Solga (2023) showed differences in dropout rates from VET between males and females. It may be because male apprentices tend to quit more often if they need a secondary job to cover living costs, while family plans may have more influence on female apprentices (Seidel 2019).

2.5 | Satisfaction Factors

The training satisfaction measure describes how satisfied students are with the training and internship experiences they receive during their educational programme (Liu 2021). Satisfaction with the training is an important factor in predicting job satisfaction and confidence about future careers (Lee and Chao 2013, p. 762). Generally, higher training satisfaction levels lead to fewer quits from the apprenticeship programme, suggesting that improving satisfaction could reduce dropout rates (Forster-Heinzer et al. 2016, p. 9; Seidel 2019, p. 572). Holtmann and Solga (2023, 487) also stated that if someone is not satisfied with their VET, they might change jobs or training programmes.

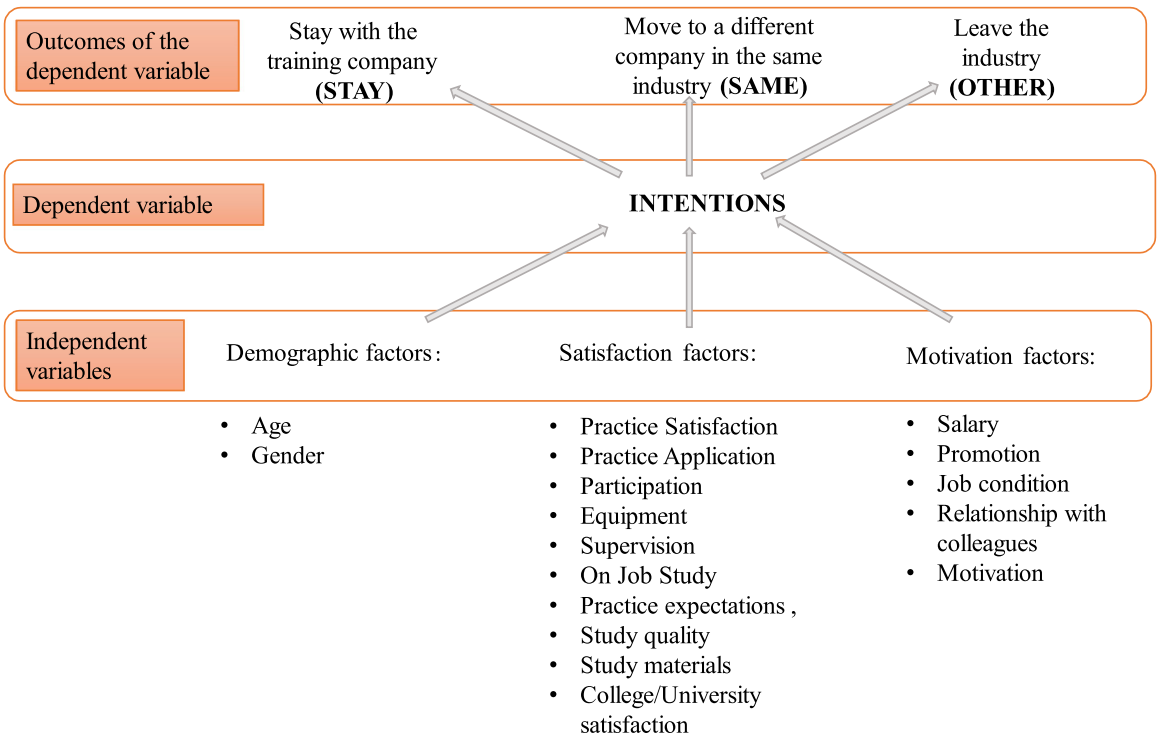

FIGURE 1 | Conceptual framework. [Color figure can be viewed at wileyonlinelibrary.com]

2.6 | Motivation Factors

Practice in a workplace and being hired during practice allows learners to assess the corporate environment and prospects of future positions. Training programmes that offer payment are highly valued by apprentices as they facilitate their ability to remain enroled without financial strain (Holtmann and Solga 2023, p. 438; Smith et al. 2021, p. 516) and increase job satisfaction (Gow et al. 2008, p. 61; Xu 2013, p. 375). According to Beckmann (2023, 15) and Donkor (2012, 32), apprentices are more likely to quit if they are dissatisfied with their payment structure and future earnings.

The quality of interpersonal relationships within the training environment is another crucial factor. Masdonati et al. (2010, 409) state that apprentices may abandon training prematurely because of poor relationships with trainers or a negative atmosphere. Furthermore, positive relationships with colleagues foster a sense of belonging at work and improve job satisfaction and retention (Holtmann and Solga 2023, p. 477; Lee and Chao 2013, p. 760).

Career progression and better employment prospects also strongly influence decisions to remain or depart post-completion (Smith et al. 2021, 519; Smyth and Zimba 2019, 89). As noted by Lee and Chao (2013, 756), promotion opportunities are crucial to employee retention, emphasising the importance of clear pathways for career advancement as well as opportunities for personal and professional growth. A conducive work environment and motivation among apprentices in a training programme cannot be overstated (Lee and Chao 2013, p. 760). The perceptions of working conditions (Wydra-Somaggio 2021) and motivational initiatives (Gow et al. 2008, p. 218) play an important role in determining the willingness of apprentices to remain in their programmes. Assigning students tasks unrelated to their trade during training may significantly diminish their motivation, resulting in a lack of interest in the profession (Donkor 2012, p. 35).

2.7 | Hypothesis

As it has been illustrated in Figure 1, the main objective is to assess the career intentions of both dual and non-dual learners and graduates. Therefore, a set of hypotheses to be tested has been developed to guide this research:

H1. *Demographic factors influence the choice of dual and non-dual respondents to remain with the agri-food company/industry.*

H2. *Practice and study satisfaction factors influence the choice of dual and non-dual respondents to remain with the agri-food company/industry.*

H3. *Motivation factors influence the choice of dual and non-dual respondents to remain with the agri-food company/industry.*

Table 1 provides an overview of the hypothesis and the explanatory variables, including their measurements and hypothesised directions.

3 | Methodology

The study focuses on students and graduates from technical and vocational education (TVE) and higher education institutions in the Akmola region, including Astana city, Kazakhstan, all of whom have either completed or are enroled in agri-food specialities. This region is a major agro-industrial area, hosting a significant number of institutions offering agri-food educational programmes. Specifically, there are 18 educational institutions (16 colleges and two universities) in the region, enroling approximately 9921 students in TVE and 15,000 in higher education (Bureau of National Statistics 2023c). In 2024, 3,215 TVE students in the Akmola region, including Astana city, are engaged in DLS, with 53.3% (1744 students) specialising in the agri-food sector (NCE n.d.).

Data on the demographic characteristics, practice experience and motivations of dual and non-dual respondents were collected by administering an online questionnaire that comprised three sections. The first section captured demographic data (age and gender). The second section was designed based on the Level 1 Kirkpatrick model (Appendix 1) to ask respondents a series of questions about their reactions to practice experience at the workplace and educational institution. This level measures how participants perceive the training as favourable, engaging and relevant to their jobs. 'Favorability,' gauges overall satisfaction with the training; 'Engagement,' assessing participants' active involvement in the learning process; and 'Relevance,' which evaluates how participants perceive the training's applicability. These components have been validated in diverse training outcomes and align with existing research on training effectiveness (Alsalamah and Callinan 2021; Carr-Chellman et al. 2007). A 7-point Likert scale was used for the questions to assess satisfaction and motivational variables. They included seven possible choices for a statement or question, allowing respondents (students and graduates) to express their positive (point 7) or negative (point 1) level of agreement or perception regarding their working and learning experiences during the internship at the workplace. The scale included three negative points, one neutral point and three positive points, allowing for a comprehensive range of responses. Cross-checking measures, such as a pilot survey with 20 participants, ensured the questionnaire accurately captured respondents' perceptions to enhance clarity, structure and validity. In the last section, respondents were asked questions on initiatives they would like to see from the employer or motivations to remain in a training company and asked to specify their intentions:

1. to remain with the company where they practised/practising (intentions to **REMAIN)**;
2. to apply for another position in the same industry (intention to change the company, but in the **SAME** industry);
3. to find a position in the **OTHER** industry (intention to leave the industry)

Overall, 868 responses (STF = 497, GTF = 154, SDLS = 164, GDLS = 53) were collected. Respondents were chosen randomly

TABLE 1 | Hypothesised direction of variables influences.

Hypothesis	Variables	Measurement	Hypothesised direction of influence	
			Dual	Non-dual
(H1) Demographic factors			±	±
including:	Age	Year categories	+	±
	Gender	Number: 1 male: 2 female	±	±
(H2) Practice and study satisfaction factors			+	±
including *Practice satisfaction:*	Practice satisfaction	Likert scale 1–7	+	±
	Practice application	Likert scale 1–7	+	±
	Participation	Likert scale 1–7	+	±
	Equipment	Likert scale 1–7	+	±
	Supervision	Likert scale 1–7	+	±
	On-the-job study	Likert scale 1–7	+	±
	Practice expectations	Likert scale 1–7	+	±
Study satisfaction:	Collage/university satisfaction	Likert scale 1–7	+	±
	Study materials	Likert scale 1–7	+	±
	Study quality	Likert scale 1–7	+	±
(H3) Motivation factors			+	±
	Salary	Categories of salary	+	±
	Promotion	Number: 1—yes: 2—no	+	±
including *Motivation initiatives*:	Job condition	Likert scale 1–7	+	±
	Relationship with colleagues	Likert scale 1–7	+	±
	Motivation	Likert scale 1–7	+	±

Note: ± is indeterminate hypothesised direction of influence; + is positive hypothesised direction of influence.

among educational institutions, which were selected based on available data published by NCE (n.d.), indicating information about involved colleges in DLS, including the number of trained students in the context of regions and industries. The main criteria for selecting the educational institutions are: (a) have students in their last year of study and graduates who finished in recent years within agri-food specialities and (b) adopt both dual and non-dual approaches. Official communication has been established via email to the Administration Office of selected colleges and universities in the Akmola region (including Astana city) to request their support in the survey to distribute questionnaires to the sampled respondents. Six colleges and one university have responded positively to support the research. Each institution designated a school coordinator responsible for distributing the online questionnaire link randomly among students and graduates.

Due to the presence of polychotomous dependent variables (intention choices) with no natural ordering, multinominal logistic (MNL) regression analysis was used as the most appropriate method (Kwak and Clayton-Matthews 2002), as such model has been found to be a reliable tool for predicting occupational distributions accurately (Bessey and Backes-Gellner 2015; Laporte and Mueller 2013; Lee and Chao 2013).

MNL can be considered the concurrent estimation of binary logits for all pairs of outcome categories (in our case, Remain = R, Same = Sa, and Other = O). However, it is not optimal because each binary logit is based on a different sample $\left(\frac{\Pr(R \mid x)}{\Pr(O \mid x)};\ \frac{\Pr(Sa \mid x)}{\Pr(O \mid x)};\ \frac{\Pr(R \mid x)}{\Pr(Sa \mid x)}\right)$ (Freese and Long 2000).

Respondents of this study make one career choice among the $L > 1$ alternatives they might choose. Their behaviour can be represented in terms of the polychotomous response variable (in our case, y = R, Sa, O) (Shabbir. 1993), and the MNL model can be written as:

$$\ln \varphi_{m|b}(x) = \ln \frac{\Pr(y = m|x)}{\Pr(y = b|x)} = x\beta_{m|b} \text{for m} = 1 \text{ to L} = , \quad (1)$$

where b is a base outcome or the reference category. As $\ln \varphi_{b|b}(x) = \ln 1 = 0$, it follows that $\beta_{b|b} = 0$. The probabilities will be the same regardless of the base outcome b that is used. Since our study has three outcomes, we fit the model with alternative 1 ('R' Remain) as a base[5], so we obtain estimates $\beta_{Sa|R}$ and $\beta_{O|R}$, with $\beta_{R|R} = 0$. The probability equation of MNL calculates the probability of choosing a specific alternative (y = R, Sa, O) as a function of the characteristics

of the factors influencing their choice (x) and the associated coefficients (β):

$$\Pr(y = m|x) = \frac{\exp(x\beta_{m|R})}{\sum_{j=1}^{L} \exp(x\beta_{j|R})}. \quad (2)$$

A principal component extraction method with VARIMAX rotation was used to extract the dimensions of 13 satisfaction and motivational variables (Figure 1). Variables with factor loadings greater than 0.3 were selected for analysis. The principal component analysis (PCA) (Beattie and Esmonde-White 2021) extracted three components: (1) Practice satisfaction, (2) Study satisfaction and (3) Motivation initiatives for both groups. Three components explain 74.2% (non-dual) and 77.6% (dual) of the total variance, and all these three components were then used for further analysis (MNL). The overall Cronbach's alpha for the scale is high at 0.94 for both groups. Values for each component exceed its reliable value (0.7), which is considered adequate for a satisfactory level of reliability in basic research (Tavakol and Dennick 2011).

Since some independent variables have multiple categories (e.g., three for age and four for salary), this results in an expanded set of variables: age categories: 0. age, 1. age, 2. age or salary categories: 0. salary, 1. salary, 2. salary, 3. salary:

$$\begin{aligned}\ln \varphi_{S|R}(x_i) = {} & \beta_{0,\ S|R} + \beta_{1,S|R}1.\ \text{age} + \beta_{2,S|R}2.\ \text{age} \\ & + \beta_{3,S|R}\text{gender} + \beta_{4,S|R}1.\ \text{salary} + \beta_{5,S|R}2.\ \text{salary} \\ & + \beta_{6,S|R}3.\ \text{salary} + \beta_{7,S|R}\text{promotion} \\ & + \beta_{8,S|R}\text{practice satisfaction} \\ & + \beta_{9,S|R}\text{motivation initiatives} \\ & + \beta_{10,S|R}\text{study satisfaction}\end{aligned} \quad (3)$$

$$\begin{aligned}\ln \varphi_{O|R}(x_i) = {} & \beta_{0,\ O|R} + \beta_{1,O|R}1.\ \text{age} + \beta_{2,O|R}2.\ \text{age} \\ & + \beta_{3,O|R}\ \text{gender} + \beta_{4,O|R}1.\ \text{salary} + \beta_{5,O|R}2.\ \text{salary} \\ & + \beta_{6,O|R}3.\ \text{salary} + \beta_{7,O|R}\text{promotion} \\ & + \beta_{8,O|R}\text{practice satisfaction} \\ & + \beta_{9,O|R}\text{motivation initiatives} \\ & + \beta_{10,O|R}\text{study satisfaction}\end{aligned} \quad (4)$$

Ethical approval was granted by the School of Agriculture, Policy, and Development Ethics Committee, University of Reading, UK, on November 4, 2021, with reference number 001696.

3.1 | Descriptive Statistics

Table 2 presents the summary of the intentions of learners after graduation. The intention of dual learners to remain with the training provider is higher than non-dual (42.4% vs. 28.8%) whereas the intention of moving to other industries is higher for non-dual (21/7% vs. 17.5%). There is no difference in the percentages of intentions between dual and non-dual learners to remain within the industry (40% vs. 40.9%).

Table 3 presents basic summary statistics of socioeconomic characteristics of learners. Most non-dual learners are youth (20–25 years old), whereas dual learners are teenagers (16–19 years old). The gender distribution of non-dual learners is closely similar (48.2% women, 51.8% men), whereas dual learners are mostly men (66.4%); 44.7% of non-dual learners received payment during their practice, while around 61% of dual respondents reported earning wages, primarily within the average salary range of 51,000 KZT to 150,000 KZT. Those who have promotion opportunities were noted to be nearly similar in both groups (non-dual 64.4%, dual 67.7%) (Table 3).

The mean scores of dual group respondents were generally higher, ranging from 5.4 to 5.9, suggesting generally higher satisfaction levels compared to the non-dual group. This trend was consistent across motivational variables (Table 4).

4 | Results

4.1 | Intentions of Learners: A Multinomial Logit Analysis

Results of the multinomial logit model of factors influencing the intentions of dual and non-dual learners after graduation are presented in Table 5. Both dual and non-dual learners aged 26 and over are less likely to apply to the same sector or leave the sector. They are also more likely to remain with their practice/training company after graduation compared to their 16–19-year-old students.

Older dual learners (> 26) are significantly less likely to apply to the same industry (compared to their younger counterparts) rather than remain with their practice company ($b = -2.034$, $p = 0.001$, RRR = 0.130). Similarly, older non-dual learners are less likely to leave the industry ($b = -1.151$, $p = 0.049$, RRR = 0.316), indicating higher intention among older respondents only. Gender has no influence on these intentions for either group. The results partially confirm the first hypothesis (H1)

TABLE 2 | Intention outcomes.

	Non-dual			Dual		
Intentions	**STF, *n* (%)**	**GTF, *n* (%)**	**Total, *n* (%)**	**SDLS, *n* (%)**	**GDLS, *n* (%)**	**Total, *n* (%)**
Remain	129 (68.6)	59 (31.4)	188 (28.8)	64 (69.6)	28 (30.4)	92 (42.5)
Same	259 (80.4)	63 (19.6)	322 (49.5)	70 (80.5)	17 (19.5)	87 (40)
Other	109 (77.3)	32 (22.7)	141 (21.7)	30 (79)	8 (21)	38 (17.5)
Total	497 (76.3)	154 (23.7)	651 (100)	164 (75.6)	53 (24.4)	217 (100)

TABLE 3 | Summary statistics of socioeconomic characteristics.

	Non-dual respondents ($N = 651$)				Dual respondents ($N = 217$)			
	Outcome-dependent variables			Total Non-dual	Outcome-dependent variables			Total dual
Variables	**Remain $y = 1$**	**Same $y = 2$**	**Other $y = 3$**	**(% in group)**	**Remain $y = 1$**	**Same $y = 2$**	**Other $y = 3$**	**(% in group)**
Demographic variables:								
Age								
< 16–19	43 (35.3)	56 (45.9)	23 (18.8)	122 (18.7)	42 (38.9)	48 (44.4)	18 (16.7)	108 (49.7)
20–25	110 (23.5)	245 (52.4)	113 (24.1)	468 (71.8)	24 (32)	35 (46.7)	16 (21.3)	75 (34.6)
> 26	35 (57.4)	21 (34.4)	5 (8.2)	61 (9.3)	26 (76.5)	4 (11.8)	4 (11.7)	34 (15.7)
Gender								
Male	95 (30.3)	149 (47.5)	70 (22.2)	314 (48.2)	65 (45.1)	52 (36.1)	27 (18.8)	144 (66.4)
Female	93 (27.6)	173 (51.3)	71 (21.1)	337 (51.8)	27 (37)	35 (48)	11 (15)	73 (33.6)
Motivation variables:								
Salary								
Not Paid	77 (21.4)	201 (55.8)	82 (22.8)	360 (55.3)	31 (36.5)	40 (47.1)	14 (16.4)	85 (39.2)
< 50,000 KZT	15 (26.8)	28 (50)	13 (23.2)	56 (8.6)	6 (23.1)	12 (46.2)	8 (30.7)	26 (12)
51,000–150,000 KZT	42 (32.6)	55 (42.6)	32 (24.8)	129 (19.8)	37 (52.1)	25 (35.2)	9 (12.7)	71 (32.7)
> 151,000 KZT	54 (50.9)	38 (35.9)	14 (13.2)	106 (16.3)	18 (51.4)	10 (28.6)	7 (20)	35 (16.1)
Promotion								
Yes	156 (37.2)	195 (46.6)	68 (16.2)	419 (64.4)	78 (53.1)	53 (36.1)	16 (10.8)	147 (67.7)
No	32 (13.8)	127 (54.7)	73 (31.5)	232 (35.6)	14 (20)	34 (48.6)	22 (31.4)	70 (32.3)

Note: n (%). KZT–Kazakhstani tenge (1 KZT = 0.0017 GBR).

TABLE 4 | Summary statistics of the satisfaction and motivational variables.

Practice experience variables	Non-dual respondents ($N = 651$)								Dual respondents ($N = 217$)								Chi-square
	Outcome-dependent variables						Total non-dual n (% in group)		Outcome-dependent variables						Total dual (% in group)		
	Remain $y = 1$		Same $y = 2$		Other $y = 3$				Remain $y = 1$		Same $y = 2$		Other $y = 3$				
	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd			$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd			
Satisfaction variables																	
Practice satisfaction	5.3	1.5	5	1.5	4.4	1.8	4.9	1.6	6.2	1.3	5.4	1.6	4.8	1.3	5.6	1.5	29.2***
Practice application	5.2	1.6	4.9	1.4	4.5	1.7	4.9	1.6	5.8	1.4	5.3	1.6	4.8	1.5	5.4	1.5	19.5***
Participation	5.4	1.5	5.3	1.5	5.1	1.7	5.3	1.5	6	1.3	5.6	1.3	5.1	1.6	5.7	1.4	12.5***
Usage of equipment	5.5	1.4	5.2	1.5	4.7	1.7	5.2	1.6	6	1.3	5.4	1.4	5	1.4	5.6	1.4	9.9***
Supervision	5.8	1.4	5.5	1.6	5.2	1.6	5.5	1.5	6.3	1.1	5.8	1.3	5.3	1.6	5.9	1.3	11.3***
On job study	5.7	1.5	5.5	1.5	4.9	1.7	5.4	1.6	6.2	1.1	5.7	1.3	5.1	1.5	5.8	1.3	13.5***
Practice expectations	5.4	1.5	5	1.4	4.3	1.6	4.9	1.5	6	1.3	5.2	1.4	4.6	1.5	5.4	1.5	13.3***
Study quality	5.7	1.4	5.4	1.4	5.1	1.5	5.4	1.4	6	1.3	5.9	1.2	5	1.6	5.8	1.4	11.2***
Study materials	5.6	1.4	5.4	1.4	5.1	1.5	5.4	1.4	5.7	1.6	5.7	1.5	5.1	1.6	5.6	1.5	6.0***
College/ university satisfaction	5.8	1.3	5.5	1.4	5.2	1.5	5.5	1.4	6	1.3	6	1.2	5.1	1.5	5.8	1.3	9.9***
Motivation variables																	
Job condition	5.8	1.3	5.1	1.5	4.8	1.6	5.2	1.5	6.1	1.1	5.4	1.3	4.8	1.5	5.6	1.3	10.9***
Colleagues	6	1.2	5.6	1.4	5.3	1.5	5.7	1.4	6.2	1.1	5.8	1.4	5.5	1.4	5.9	1.3	5.1**
Motivation	5.7	1.4	5.3	1.3	4.6	1.6	5.3	1.4	6.2	1	5.5	1.4	5	1.6	5.7	1.4	15.0***

Note: $\bar{x}$, mean; sd, standard deviation.
**significant at 2% level ($p < 0.02$).
***significant at 1% level ($p < 0.01$).

TABLE 5 | Determinants of the intentions of dual and non-dual learners after graduation.

Base: REMAIN, $y = 1$	SAME, $y = 2$			OTHER, $y = 3$			
Variables	***b***	***P*** > ***z***	**RRR**	***b***	***P*** > ***z***	**RRR**	**LR, *P*** > **chi^2**
Dual learners							
Age: (< 16–19)							
20–25	−0.228	0.598	0.795	0.544	0.924	1.056	0.809
> 26	**−2.034**	**0.001**	**0.130**	−0.855	0.235	0.425	0.001
Gender (female)	0.159	0.686	1.172	−0.484	0.371	0.616	0.431
Salary (not paid)							
-less than 50K–51K	0.094	0.876	1.098	1.178	0.100	3.250	0.159
-51K–150K	−0.665	0.102	0.513	−0.575	0.313	0.562	0.244
-151K and more	−0.599	0.273	0.548	−0.100	0.882	0.904	0.511
Promotion (no)	0.535	0.208	1.948	**1.299**	**0.009**	**3.667**	0.031
Practice satisfaction	**−0.181**	**0.018**	**1.708**	**−0.337**	**0.000**	**0.713**	0.001
Motivation initiatives	**0.353**	**0.035**	**1.424**	0.080	0.665	1.083	0.056
Study satisfaction	**0.382**	**0.043**	**1.466**	0.265	0.230	1.304	0.113
_cons	−0.186	0.827	0.830	−1.879	0.078	0.152	
Non-dual learners							
Age: (< 16–19)							
20–25	0.419	0.086	1.521	0.490	0.113	1.633	0.170
> 26	−0.490	0.186	0.612	**−1.151**	**0.049**	**0.316**	0.097
Gender (Female)	0.067	0.739	1.069	0.021	0.932	1.021	0.938
Salary: (not paid)							
-less than 50K–51K	−0.29	0.937	0.971	0.234	0.601	1.263	0.781
-51K–150K	−0.338	0.192	0.713	0.249	0.423	1.283	0.080
-151K and more	**−0.849**	**0.002**	**0.427**	**−0.725**	**0.054**	**0.484**	0.008
Promotion (no)	**0.769**	**0.001**	**2.158**	**1.216**	**0.000**	**3.375**	0.000
Practice satisfaction	**−0.099**	**0.010**	**0.905**	**−0.205**	**0.000**	**0.813**	0.000
Study satisfaction	0.022	0.820	1.023	−0.029	0.802	0.970	0.859
Motivation initiatives	**0.286**	**0.018**	**1.332**	**0.353**	**0.013**	**1.423**	0.025
_cons	−0.473	0.340	0.309	−2.115	0.001	0.120	

Note: Bold figures represent significance at a 5% level ($p < 0.05$). "Not paid" means those students and graduates who did not receive payment or were not employed during their practice experience.
Number of obs. dual learners = 217; Number of obs. non-dual learners = 651. Model fitting indicates a robust model fit ($x^2 = 76.2$ (dual), $x^2 = 115.9$ (non-dual), $p = 0.000$). Tests for combining dependent categories indicate that all the categories are distinguishable. IIA test showed negative results meaning that results have not been violated. Some researchers do not believe that IIA results are useful since, using the same model, they can obtain different results (Long and Freese 2014).

that only age significantly influences the intentions of both dual and non-dual learners to remain in the company/industry with no influence of gender.

Practice satisfaction is a strong predictor for both groups and higher satisfaction levels significantly reduce the likelihood of changing employers or leaving the industry. However, this effect is more pronounced for dual learners ('remain' $b = -0.181$, $p = 0.018$, RRR = 1.708; 'other' $b = -0.337$, $p < 0.000$, RRR = 0.713) than for non-dual learners ('remain' $b = -0.099$, $p = 0.010$, RRR = 0.905; 'other' $b = -0.205$, $p = 0.000$, RRR = 0.813). Additionally, dual learners showed higher satisfaction with their studies at the educational institution ($b = 0.382$, $p = 0.043$, RRR = 1.466) and are more inclined to pursue careers in the same industry. These significant differences among groups lead us to accept the second hypothesis (H2).

For non-dual respondents, a higher salary of > 151,000 KZT during practice decreases the probability of changing employer in the same industry ($b = -0.849$, $p = 0.002$, RRR = 0.427) or leaving the industry ($b = -0.725$, $p = 0.054$, RRR = 0.484) compared to those who are not paid. However, this dimension is not significant for dual respondents.

Lack of promotion increases the likelihood for non-dual learners to switch employers ($b = 0.769$, $p = 0.001$, RRR = 2.158) or leave the industry ($b = 1.216$, $p = 0.000$, RRR = 3.375), indicating a broad impact on employment stability due to the

lack of career opportunities. Dual learners showed a stronger effect than non-dual learners to leave the industry due to the lack of promotion. Both dual and non-dual learners have a significant positive relationship between motivation initiatives and intention to remain. Dual learners have a bit greater chance to remain in the same industry ($b = 0.353$, $p = 0.035$, RRR = 1.424), whereas non-dual learners may also consider leaving the industry despite opportunities facilitated by such initiatives ($b = 0.353$, $p = 0.013$, RRR = 1.423). Since salary, motivation initiatives and promotion are the key factors affecting the intentions of respondents to remain with the company/industry at a significant level, we accept the H3 hypothesis.

MNL supports the hypothesised directions of several key variables influencing the career intentions of dual and non-dual learners, with distinct patterns emerging for each group. Age had a positive influence on dual learners, while its effect on non-dual learners was indeterminate. Gender showed no significant influence for either group as predicted. Satisfaction factors consistently had a positive influence on dual learners, while the effect on non-dual learners remained indeterminate, especially for the study satisfaction variable. Among motivational factors, promotion and motivation initiatives positively influenced both groups, but salary had an indeterminate effect on dual learners and a positive effect on non-dual learners.

5 | Discussion

5.1 | Intention to Remain

While our findings indicate that older individuals are more likely to remain with the training company or industry, differing from Gow et al. (2008, 218) who found age not to be a significant predictor for staying in a trade, other scholars support our conclusion. Xu (2013, 368) noted that compared to those aged 30 or older, younger graduates are less likely to find jobs aligned with their majors. Dummert (2021) also stated that older apprenticeship completers are less mobile than younger graduates due to family responsibilities, which might suggest a higher likelihood of remaining with their training establishment. Career aspirations or limited professional experience could be contributing factors to this discrepancy (Wydra-Somaggio 2021, p. 23). In addition, research indicates that the probability of completing an apprenticeship programme increases with age, peaking around age 41 before gradually declining (Laporte and Mueller 2013, p. 22). The high migration of young Kazakhstani people from rural areas to cities (Kenzhin et al. 2016), an increase in ageing workers and the unwillingness of young people to remain in the agri-food industry can also explain this phenomenon (Bulasheva et al. 2024).

Our results align with many studies examining the satisfaction dimension of apprentices or motivation, suggesting that the satisfaction of apprentices is one of the factors that could predict their intentions to remain in the programme or training company (Forster-Heinzer et al. 2016; Holtmann and Solga 2023; Lee and Chao 2013; Liu 2021; Seidel 2019). According to our results, dual respondents have lower odds of leaving the industry than non-dual respondents. This is because dual students are more exposed to the practice experience, spending about 60% of their time at the workplace and have the opportunity to master practical knowledge in a real production environment that can contribute to better academic performance (Doskeyeva et al. 2024), deeper understanding of their chosen profession (Holzer and Lerman 2014) and better job prospects afterwards (Haasler 2020).

5.2 | Intention to Stay With the Same Employer/Industry

Dual learners who are satisfied with their educational institution studies are more likely to obtain careers aligned with their industry. This is facilitated by strong connections forged between educational institutions and businesses in DLS as involved businesses are actively engaged in both providing training materials and shaping curricula, thereby ensuring specialised training meets the dynamic demands of the labour market (Doskeyeva et al. 2024).

Similarly to our findings, studies have shown that providing opportunities for career development can influence the decision of both dual and non-dual learners to remain in a training company (Lee and Chao 2013; Smith et al. 2021; Smyth and Zimba 2019). However, dual respondents have a stronger effect than non-dual learners to leave the industry due to the lack of promotion opportunities. The majority of dual respondents of this study reside in rural areas, while most respondents in traditional education are primarily university and college students located in the city. Ismukhanova et al. (2020) highlight the differences between rural and urban residents, emphasising that the importance of career opportunities is higher for rural people. The notable shift of young people from rural areas to cities could also explain these findings (Kenzhin et al. 2016).

5.3 | Intention to Leave

Our findings are also consistent with the studies, indicating that motivation initiatives, such as relationships between peers (Holtmann and Solga 2023; Masdonati et al. 2010), work environment (Kossivi et al. 2016; Wydra-Somaggio 2021) and motivation (Donkor 2012; Gow et al. 2008) strongly influence the intentions of apprentices to drop out. Non-dual respondents, however, also showed the likelihood of leaving the industry. One of the explanations might be a compensation amount, which could play a significant role in leaving the sector.

According to our results, non-dual respondents earning 151,000 KZT or more are generally willing to stay in the same industry; however, among the highest-paid non-dual learners, there is a tendency to seek opportunities outside the agri-food sector. Low compensation in this sector might drive young individuals to better-paid opportunities by leaving the industry. In 2023, agricultural workers earned just 242,000 KZT, the lowest income across all industries (Bureau of National Statistics 2023b).

While studies reveal that compensation (Lee and Chao 2013, p. 760), favourable pay increases (Beckmann 2023, p. 17; Xu 2013, p. 367) and post-training salaries (Dummert 2021, p. 373) significantly influence the decisions of apprentices to

remain at their training establishments, Wagner and Wolf (2013, 10) argue that salary is not the primary factor. This aligns with our results for dual respondents, suggesting that for apprentices, the potential for higher earnings after completing their studies is more important than the compensation they receive during the training period (Muehlemann and Wolter 2020).

Our study found no significant influence of gender on the intentions of respondents, contradicting Forster-Heinzer et al. (2016, 11). Similarly, research on apprenticeship completion by Laporte and Mueller (2013, 64) found no substantial gender differences in apprenticeship completion rates. While prior studies have identified that males and females might face different challenges during training (Seidel 2019), these challenges do not necessarily translate into differences in post-training career intentions. The gender split in the agri-food sector of Kazakhstan is 58% male and 42% female (Bureau of National Statistics 2023a), suggesting no strong gender predominance, which may explain our results.

6 | Conclusions and Policy Implications

Identifying factors influencing young individuals' career decisions in the agri-food industry and how DLS is contributing in this decision-making process, is essential in addressing youth unemployment and staff shortages. By comparing satisfaction with practice and study environments between dual and non-dual learners and analysing their career intentions post-graduation using MNL statistical methods, key findings emerged. Satisfaction with practice and study environments strongly influences dual learners' intentions to remain in the industry, while non-dual learners prioritise compensation. Moreover, motivation initiatives and promotion opportunities have greater effects on dual learners' decisions. In addition, age influences retention intentions among older respondents, while gender has no impact on either group. Nevertheless, the migration rate and location of respondents may explain differences in career intentions. Overall, the study highlights the importance of tailored initiatives to enhance satisfaction and retention in the agri-food sector.

Therefore, DLS demonstrates promising potential in retaining qualified specialists in the agri-food sector. However, concerns remain about the intentions of younger individuals. Understanding the genuine reasons behind their reluctance to remain in the agri-food sector is crucial. The emphasis should be on enhancing rural infrastructure, potentially leading to the generation of more job opportunities and increasing the incentive for young individuals to engage in rural areas. The recent Concept of development of the agro-industrial complex of the Republic of Kazakhstan for 2021–2030, 2021–2030 (2021) aims to improve labour productivity, attract investments and raise the income of rural residents. However, it is premature to draw conclusions on outcomes. Prior initiatives aimed at enhancing rural living standards have shown limited success (Khalitova et al. 2023). Considering the shortcomings and oversights of previous programmes, authorities should consider incorporating measures to attract youth to remain in the agri-food sector. For example, DLS programmes should be developed that emphasise modern agricultural practices, technological advancements, and sustainable farming methods to attract young individuals. For agri-businesses looking to engage with DLS, establishing a robust technological infrastructure is essential for effective training and attracting youth to the agri-food industry. The current legal framework for dual education in Kazakhstan mainly regulates DLS activities for educational institutions rather than businesses (Doskeyeva et al. 2024, p. 2). It is essential to establish regulatory standards ensuring that businesses participating in DLS meet modern farming practices and provide adequate technology for quality workplace training.

Attracting young individuals to the agri-food industry could involve the provision of clear career paths, development of opportunities and incentives to attract and retain young talent in the industry. There should be initiatives to encourage graduates to work in rural areas by offering a salary bonus or subsidising businesses that offer competitive salaries. At the Governmental level, mitigating wage disparities between rural and urban areas should be considered to discourage the migration of young people seeking higher wages and promotion opportunities in cities.

Monitoring the performance of DLS requires systematic and periodic data collection on key indicators. According to available statistics during this research, the data fail to capture employment outcomes, track students' career trajectories within DLS programmes or offer industry-specific insights. This lack of comprehensive data hinders the ability to effectively monitor and evaluate the system's success. European apprenticeship programmes benefit from centralised databases, such as those managed by CEDEFOP (2021), which compiles structured and comparable information on apprenticeship schemes. These databases track vital metrics, including student demographics, training costs for enterprises and the alignment between workers' skills and job requirements. Implementing a similar system in Kazakhstan would significantly enhance the ability to measure DLS effectiveness and support further research.

This is the first attempt to assess the intentions of participants in Kazakhstan's DLS, specifically for the agri-food sector. While it provides valuable insights and suggestions for improving the structure and nature of interventions in the agribusiness sector, future work can build on these findings to further enhance policy design and delivery of the DLS. Hence, consideration of other variables influencing career choices, such as students' academic performance, education level, parental influence, and geographical location could further improve the outcome of the modelling exercise. By acknowledging that the increasing availability of alternative career paths expands the options for all individuals, which may influence their decisions. Moreover, analysing students and graduates separately for each group could offer a deeper understanding of their career intentions. The DLS also can be assessed more comprehensively by incorporating data from educational institutions in terms of performance and engagement.

Conflicts of Interest

The authors declare no conflicts of interest.

Endnotes

[1]In this study, SDLS stands for current (2021/22 academic year) students of DLS.

[2]In this study, STF stands for current (2021/22 academic year) students of traditional form (of education).

[3]In this study, GTF stands for graduates of traditional form (of education).

[4]This study uses Level 1 strategies to assess learners' satisfaction and engagement with the DLS by developing a set of satisfaction dimensions (Kirkpatrick and Kirkpatrick 2006).

[5]The 'Remain' outcome is chosen as the base outcome category since it is the most desired outcome, demonstrating a good performance of DLS for students in secure employment as well as for employers in keeping professionals (Lee and Chao 2013).

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Appendix
Table A1.

TABLE A1 | Questions for evaluating reactions of learners to the DLS and their relation to Kirkpatrick's Model.

	Dimensions	Questions adapted to examine DLS/practice at the workplace	Reaction (Level 1)—Questions of Kirkpatrick's learning evaluation model (Kirkpatrick and Kirkpatrick 2006)
Favourability The degree to which participants are satisfied with the training	Practice satisfaction	How satisfied are/were you with the dual learning in the organisation as a whole?	Did the trainees like and enjoy the training?
	College/university satisfaction	How satisfied are/were you with the training in the college/university as a whole?	
	On the job study	Are you satisfied with the quality of teaching in the workplace?	
	Study quality in the College/university	How satisfied are/were you with the teaching and learning quality in College or University	
	Study materials	Evaluate the provision of educational and methodological material	Did the content and material make sense to them?
	Supervision	How satisfied are/were you with the support of the company's mentor (head of the practice)?	Was the leader (trainer) knowledgeable, credible, and helpful?
	Practice expectations	Did/does practice meet your expectations?	Did you feel that the training was worth your time?
Engagement The degree to which participants are actively involved in and contributing to the learning experience	Equipment	Rate the usage opportunity of necessary equipment and technology in the practice workplace (e.g., during preparation for your assignments)	Perceived practicability and potential for applying the learning
	Participation	Do/did you actively engage in activities and tasks related to your role and responsibilities?	Were the training activities engaging? (or the level of participation)
Relevance The degree to which training participants will have the opportunity to use or apply what they learned in training on the job	Practice application	Have you been or are you able to apply the theoretical knowledge you gained in college into practice consistently and logically?	