

# Effect of Scheduling Tools on the Performance of the Cooproriz Abahuzabikorwa Cooperative in Rwanda

Umuhire Colombe Sinzi<sup>1</sup>, Dr. Martin Kimemia Gathiru, (PhD)<sup>2</sup>

<sup>1</sup> Postgraduate Student (Project Management) Mount Kigali University, Rwanda

<sup>2</sup> Vice Chancellor - Mount Kigali University, Kigali Rwanda

DOI: <https://doi.org/10.5281/zenodo.17736345>

Published Date: 27-November-2025

---

**Abstract:** This study examined the effect of scheduling tools on the performance of Cooproriz Abahuzabikorwa Cooperative, a rice-producing agricultural cooperative in Rwanda. Adopting a descriptive-correlational case study design, the research employed mixed methods combining structured questionnaires, semi-structured interviews, and documentary analysis to collect data from cooperative members, managers, and project records. Findings from regression analysis revealed a statistically significant positive relationship between the use of scheduling tools and project performance, with scheduling tools explaining approximately 23.8% of the variance in performance outcomes. Key indicators such as task completion timeliness, milestone achievement, and budget adherence improved notably following the adoption of both digital and low-tech scheduling practices. The study concludes that intentional integration of accessible, context-appropriate scheduling tools enhances operational efficiency, coordination, and overall project success in agricultural cooperatives. These insights offer practical value for cooperative leaders, development practitioners, and policymakers seeking to strengthen smallholder agricultural enterprises through improved planning mechanisms in resource-constrained settings.

**Keywords:** Scheduling tools, project performance, agricultural cooperatives, Cooproriz Abahuzabikorwa, Rwanda, project planning.

---

## 1. INTRODUCTION

### 1.1 Introduction

The integration of scheduling tools into organizational workflows has become essential for enhancing operational efficiency globally. Beyond facilitating logistics, effective scheduling aligns human, financial, and time resources with strategic goals (Kerzner, 2022). The Project Management Institute (PMI, 2021) further notes that over 77% of high-performing organizations attribute their success to strong scheduling and time-management systems, demonstrating their role in productivity and competitiveness.

In the United States, advances in digital infrastructure have enabled widespread adoption of enterprise resource planning (ERP) and cloud-based project management platforms. AI-enabled scheduling technologies have driven labor productivity gains of up to 25% in firms across sectors (Brynjolfsson & McAfee, 2023). The agricultural sector also benefits from precision scheduling, reducing input waste and improving yields (USDA, 2022). China has rapidly digitized its cooperative systems through initiatives such as the “Digital Village” strategy, promoting mobile and AI-enabled coordination in farming activities. More than 60% of rural cooperatives now utilize integrated scheduling platforms, contributing to notable increases in member income (MARA, 2022; Zhang & Li, 2023).

In Sub-Saharan Africa, adoption varies due to infrastructure limitations; however, mobile-based and low-tech scheduling solutions continue to gain traction. Interventions like SMS alerts and shared calendars have improved task completion rates among cooperatives by up to 20%, even in resource-constrained environments (World Bank, 2022; IFAD, 2023). South

Africa reflects the coexistence of advanced digital innovation and rural inequalities. Hybrid scheduling approaches—combining mobile tools with community notice boards—have reduced post-harvest losses and boosted cooperative resilience during supply disruptions (Mafanya & Nkosi, 2023; DSBD, 2022).

Kenya stands out as a regional leader in digital cooperative transformation. Agritech platforms such as Twiga Foods and DigiFarm enable real-time activity scheduling, helping cooperatives enhance market responsiveness and product quality (Ochieng et al., 2023; KALRO, 2022).

In Rwanda, cooperative strengthening and digitalization are policy priorities. With more than 15,000 registered cooperatives, recent programs such as “Smart Cooperatives” have introduced basic mobile scheduling tools, leading to improved coordination and productivity (RCA, 2023; MINICOM, 2024). Practical examples, including Cooperoriz Abahuzabikorwa’s use of WhatsApp-based task lists, show that even simple scheduling systems can significantly enhance timeliness and accountability among members (Uwimbabazi & Nsengiyumva, 2023).

## **1.2 Statement of the Problem**

Despite efforts to strengthen cooperative development in Rwanda, many agricultural cooperatives remain operationally weak due to ineffective planning and scheduling. RCA (2023) indicates that only 38% of over 15,000 registered cooperatives function efficiently, with poor time coordination identified as a major challenge. In the Eastern Province, MINICOM (2024) reports that 62% of agricultural cooperatives experience delays in key farming activities, leading to yield losses of up to 25% and reduced market access. These issues highlight the need for structured scheduling systems that enhance productivity and member welfare. Although previous research has examined cooperative performance in Rwanda and the region, the role of scheduling tools remains insufficiently explored. Existing studies largely focus on general technology adoption (Uwimbabazi & Nsengiyumva, 2023; Ochieng et al., 2023), post-harvest logistics (Mafanya & Nkosi, 2023), or broad digital interventions (IFAD, 2023; World Bank, 2022), without assessing context-appropriate scheduling solutions. This gap underscores the need for empirical evidence on how structured scheduling mechanisms can improve operational performance in agricultural cooperatives. This study seeks to address that gap.

## **2. LITERATURE REVIEW**

Scheduling tools are essential for effective project management, particularly in projects with complex timelines and interdependent tasks. They support resource allocation, task prioritization, deadline setting, and progress tracking to ensure timely project delivery (Kumar & Verma, 2021). Digital scheduling applications such as Microsoft Project, Gantt charts, Trello, and Jira provide visual timelines that enhance team coordination, communication, and accountability (Sharma et al., 2022). They also offer real-time monitoring of milestones and KPIs, enabling prompt responses to delays and evolving project requirements (Lee & Kim, 2021). A major advantage of scheduling tools is their integration capability with budgeting and resource management systems, ensuring synchronized updates across project components and promoting efficient decision-making (Singh & Sharma, 2022). This integrated approach is increasingly relevant in digital projects that demand speed, transparency, and continuous adaptation.

Project Management Theory underscores the significance of structured planning, scheduling, and monitoring in achieving project success. Kerzner (2021) highlights that tools enabling efficient time and resource management are critical to minimizing delays and cost overruns—important considerations for digital application implementation in Rwanda’s agricultural cooperatives. Methodologies drawn from PMBOK and Agile provide flexible frameworks for applying these scheduling tools to enhance performance and risk management in unpredictable environments such as agriculture (Pinto & Slevin, 2022). While critics argue that the theory may be overly linear and rigid for dynamic sectors (Schwalbe, 2020), it remains applicable when supplemented with adaptive approaches.

Empirical studies further demonstrate the impact of scheduling tools on performance. Kumar and Verma (2021) found that in India’s construction sector, 78% of managers reported improved time management and 65% better resource allocation through tools like Microsoft Project and Primavera. Patel and Sharma (2021) reported similar findings in U.S. healthcare projects, where 74% improved workflow management and 68% reduced delays due to real-time updates and clearer task delegation. FAO (2022) notes comparable outcomes in agriculture, where 70% of cooperatives using digital planning tools improved resource utilization and achieved a 45% productivity increase. In China, Wang and Zhang (2021) showed that scheduling tools contributed to stronger timeline adherence (82%) and lower project delays (by 30%) in large-scale construction initiatives.

Based on these insights, this study adopts a conceptual framework positioning scheduling tools as a mediating factor between organizational planning processes and project performance. Grounded in Project Management Theory and the Input-Process-Output model, the framework assumes that effective scheduling enhances task clarity, coordination, and accountability, leading to outcomes such as timely completion, reduced losses, and higher productivity in cooperatives. Its success, however, depends on contextual moderators including digital literacy, leadership support, and internet accessibility in rural Rwanda. Figure 1 illustrates this relationship.

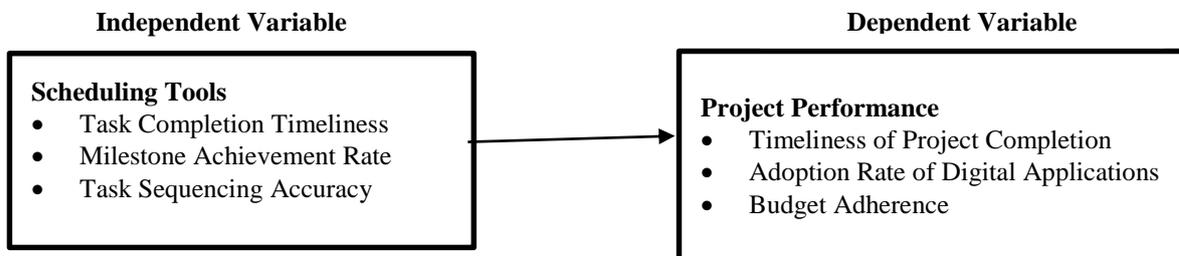


Figure 1: Conceptual framework

Source: Researcher, 2025

The conceptual framework for this study is grounded in the relationship between scheduling tools and project performance, drawing on project management theory and empirical evidence from agricultural cooperatives. Scheduling tools encompassing both digital applications and manual planning aids are posited as independent variables that influence key performance indicators through structured time and task management. Specifically, the framework identifies three core dimensions of scheduling tools: task completion timeliness, milestone achievement rate, and task sequencing accuracy (Kerzner, 2022; PMI, 2021). These inputs are theorized to directly affect the dependent variable, project performance, operationalized through timeliness of project completion, adoption rate of digital applications, and budget adherence. As Brynjolfsson and McAfee (2023) argue, effective scheduling reduces coordination failures and resource misallocation, thereby enhancing both temporal and financial efficiency. In the context of agricultural cooperatives like Cooperiz Abahuzabikorwa, this framework suggests that systematic use of scheduling tools aligns member activities with production cycles, minimizes delays, and improves fiscal discipline—ultimately driving cooperative success.

### 3. RESEARCH METHODOLOGY

The study employed a descriptive-correlational research design to investigate the effect of project planning tools on the performance of Cooperiz Abahuzabikorwa Cooperative, a method deemed suitable for describing variable status and examining their interrelationships without experimental manipulation (Creswell & Creswell, 2017). A mixed-methods strategy was used, combining quantitative data from structured questionnaires with qualitative insights from interviews, focus groups, and document reviews. Stratified sampling ensured representation across cooperative roles, and the sample size was determined using Cochran’s formula. Instrument validity was established through expert review and pilot testing, while reliability was confirmed using Cronbach’s Alpha ( $\alpha \geq 0.7$ ). Quantitative data were analyzed using descriptive statistics, correlation, and regression to determine the effect of scheduling, budgeting, collaboration, and monitoring tools on project outcomes, while qualitative data were thematically analyzed to provide context and triangulate findings.

Table 1: Sample size Selection

Role	Number of Members	Sample Size	Proportion (%)
Project Managers	1	1	0.82%
Technical Team (Developers)	20	15	16.53%
Project Coordinators	18	14	14.88%
Field Implementers	20	15	16.53%
Data Analysts	15	12	12.40%
Financial Analysts	6	5	4.96%
Marketing and Outreach Team	12	10	9.92%
Agricultural Experts	16	12	13.22%
ICT Support Staff	14	10	11.57%
<b>Total</b>	<b>121</b>	<b>93</b>	<b>100%</b>

Source: Human Resource Cooperative Cooperiz Abahuzabikorwa 2024

To ensure reliability in this study, the research instruments was subjected to the Cronbach’s alpha coefficient test, which is widely recognized as a reliable statistical tool for assessing internal consistency. A Cronbach’s alpha value of 0.7 or higher was considered acceptable, as suggested by Taherdoost (2020). This test was applied to pilot test data to confirm that the instrument items consistently produce similar results across different respondents. High reliability ensures that the findings are replicable and that any variation in responses is attributable to the phenomena under study rather than inconsistencies in the instrument.

**Table 2: Reliability Analysis**

Variable	Cronbach's Alpha	Comments
Scheduling Tools	0.972	Reliable
Project Performance	0.752	Reliable

**Source: Pilot data results, (2025)**

The results presented in Table 2 indicate the reliability of the research instruments used to measure the key variables in the study through Cronbach’s Alpha coefficients. All the variables—Scheduling Tools ( $\alpha = 0.972$ ) and Project Performance ( $\alpha = 0.752$ )—exceeded the commonly accepted minimum threshold of 0.70, indicating high internal consistency and reliability of the measurement scales (Tavakol & Dennick, 2023). These findings suggest that the items within each construct are closely related and effectively measure the intended dimensions, ensuring that the analysis and subsequent interpretations are based on dependable data. The study ensured research instrument validity through content, construct, and criterion validity. Content validity aligned tools with study objectives and literature, reviewed by experts for relevance (Saunders et al., 2020). Construct validity was achieved by basing instruments on established theories and refining them through pre-testing (Bryman, 2021). Criterion validity involved comparing results with established performance indicators to ensure consistency with prior studies (Kothari & Garg, 2022). These measures enhanced the accuracy and credibility of the data collected.

**Table 3: KMO and Bartlett's Test**

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.794
Bartlett's Test of Sphericity	Approx. Chi-Square	152.406
	df	10
	Sig.	.000

**Source: Pilot data results, (2025)**

Table 3 presents the results of the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett’s Test of Sphericity, both of which assess the suitability of the dataset for factor analysis. The KMO value of 0.794 exceeds the recommended threshold of 0.70, indicating that the sample is adequate and the variables share common factors (Hair et al., 2022). Additionally, Bartlett’s Test of Sphericity is statistically significant ( $\chi^2 = 152.406$ ,  $df = 10$ ,  $p < .001$ ), suggesting that the correlation matrix is not an identity matrix and that factor analysis is appropriate for the data. These tests confirm that the dataset is valid for dimensional reduction and structure detection, reinforcing the robustness of the analytical process.

Primary data was collected through structured questionnaires and semi-structured interviews to capture both quantitative and qualitative insights on project planning tools and cooperative performance (Creswell & Creswell, 2021). Secondary data from reports, financial records, and academic literature enriched and triangulated the findings (Bryman, 2021). A dual-mode strategy combined drop-and-pick questionnaires—allowing five to seven days for completion—with email-based surveys supported by digital tools and reminders. Follow-ups through calls and emails reduced non-response. This integration of traditional and digital methods enhanced participation, minimized bias, and ensured data validity and reliability.

Data were analyzed using descriptive and inferential statistics to meet the study objectives. Descriptive statistics such as mean, standard deviation, and frequency distributions summarized respondent characteristics and response patterns. Inferential analysis, including regression and correlation, examined relationships between project planning tools and digital project performance (Field, 2021). SPSS version 25 was used for data organization, cleaning, and analysis. Multiple regression modeling was employed to identify significant predictors and determine the strength of the associations. The model enabled the assessment of both individual and combined effects of the independent variables on project performance, ensuring findings that were valid, reliable, and aligned with the study’s objectives.

#### 4. PRESENTATION OF FINDINGS AND DISCUSSION

##### 4.1 Demographic Characteristics

Understanding the age structure is important as it may influence perspectives on project planning tools, adoption of new technologies, and cooperative performance. Figure 2 presents the age distribution of the respondents, revealing that the majority were aged between 25–34 years (40.0%), followed by those aged 35–44 years (32.2%), and above 45 years (17.8%), while only 10.0% were below 25 years.

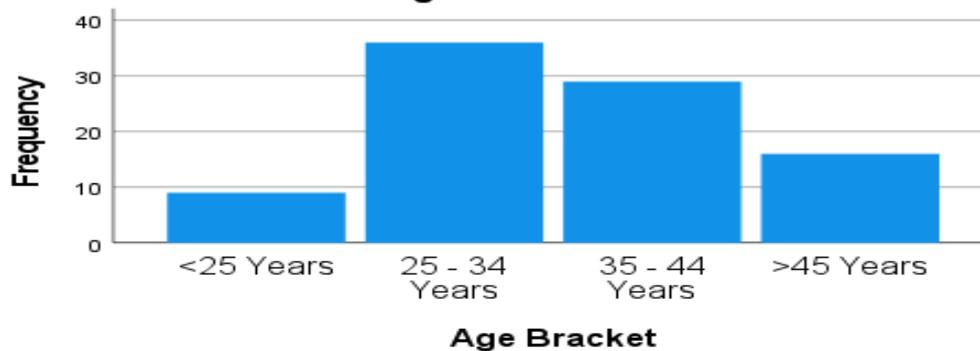


Figure 2: Age of Respondents

Source: Primary data, (2025)

This distribution suggests that the study sample is largely composed of adults in their most economically productive years, which may enhance the reliability of insights regarding project planning tools and cooperative performance, as these respondents are likely to be actively involved in decision-making and implementation processes (Creswell & Creswell, 2018). The balanced representation across age groups also strengthens the diversity of perspectives captured in the study.

Figure 3 presents the educational background of the respondents, indicating that the majority hold postgraduate degrees (34.4%), followed by diploma holders (30.0%) and undergraduate degree holders (26.7%). A smaller proportion completed secondary (5.6%) and primary education (3.3%). This distribution suggests that the sample is composed of highly educated individuals, which is beneficial for the study as respondents are more likely to have a clear understanding of project planning tools and their impact on cooperative performance (Saunders, Lewis & Thornhill, 2019).

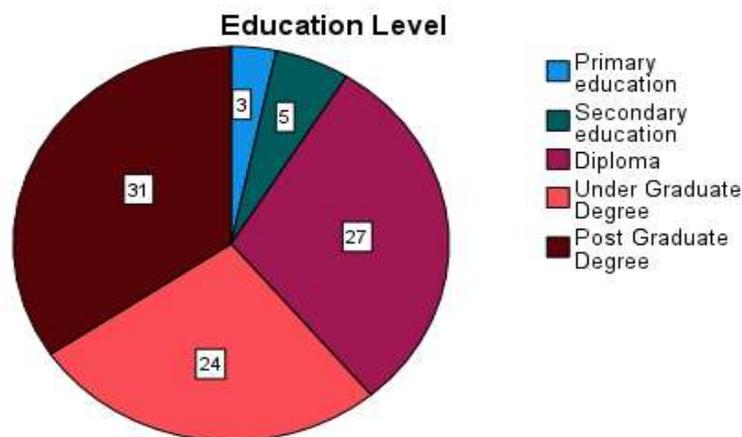


Figure 3: Education Level of Respondents

Source: Primary data, (2025)

Figure 4 outlines the positions held by respondents within the cooperative, revealing that the largest group were managers (30.0%), followed closely by members (27.8%) and project coordinators (25.6%), while 16.7% held other roles. This diverse distribution of roles ensures a comprehensive understanding of project planning tools from multiple operational levels within the cooperative. Including perspectives from both strategic and operational positions enhances the study's depth and validity, as decision-making, implementation, and monitoring roles are all represented (Robson & McCartan, 2016).

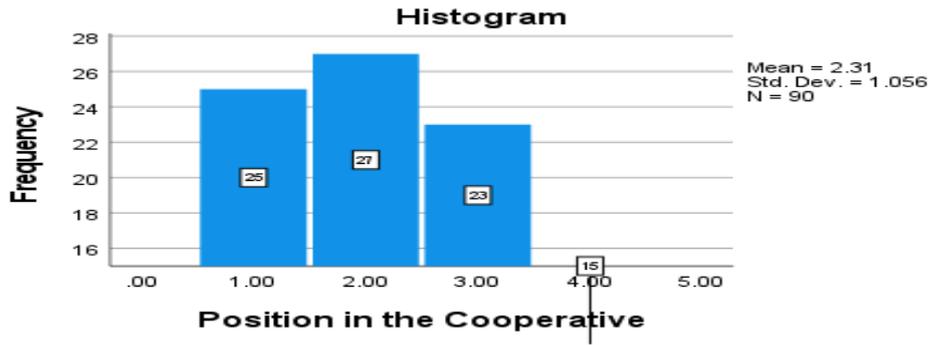


Figure 4: Respondents Position in the Cooperative

Source: Primary data, (2025)

Figure 5 displays the respondents' years of experience within the cooperative, showing that the largest group had between 7–10 years of experience (31.1%), followed by those with more than 10 years (24.4%). Smaller proportions had 1–3 years (17.8%), less than 1 year (13.3%), and 4–6 years (13.3%) of experience. This distribution reflects a well-balanced mix of both long-serving and relatively new members, offering a broad spectrum of insights into the use and effectiveness of project planning tools over time. The high proportion of experienced respondents enhances the credibility of the findings, as they are more likely to have observed and engaged with planning practices in depth (Bell, Bryman, & Harley, 2022).

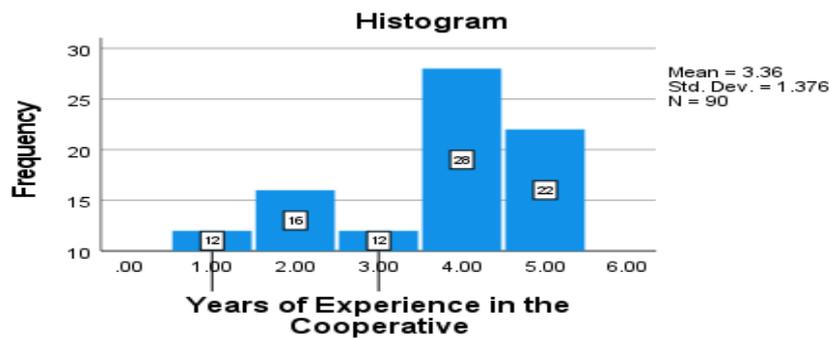


Figure 5: Respondents Experience in the Cooperative

Source: Primary data, (2025).

Figure 6 summarizes the types of digital applications used within the cooperative, indicating that farm management systems are the most commonly utilized (36.7%), followed by collaboration tools (27.8%), marketing and sales platforms (18.9%), and financial management tools (16.7%). This distribution suggests a strong emphasis on optimizing agricultural operations through technology, reflecting a growing trend in cooperatives toward digital transformation for efficiency and productivity (Laudon & Laudon, 2021). The use of collaboration tools also highlights the importance of communication and coordination in project execution. These findings demonstrate that digital applications play a significant role in supporting various functions within the cooperative, contributing to improved planning and performance.



Figure 6: Type of Digital Applications Used in the Cooperative

Source: Primary data, (2025).

The descriptive statistics on scheduling tools provide insights into respondents' perceptions regarding the use and effectiveness of scheduling tools within COOPRORIZ Abahuzabikorwa Cooperative. The data summarized in Table 4 illustrate how cooperative members rated various statements related to scheduling tools across a five-point Likert scale ranging from Strongly Disagree (SD) to Strongly Agree (SA). The mean scores and standard deviations indicate the overall agreement levels and the consistency of responses, respectively, offering a clear picture of the extent to which scheduling tools contribute to project planning and timely execution of cooperative activities.

**Table 4: Respondents views on Scheduling Tools**

Statement on Scheduling Tools	SD	D	NS	A	SA	Mean	Std Dev.
The use of scheduling tools ensures tasks are completed on time.	1.1%	3.3%	10.0%	44.4%	41.1%	4.21	.841
Scheduling tools enhance the achievement of project milestones as planned.	0.0%	2.2%	15.6%	44.4%	37.8%	4.18	.773
Tasks are sequenced more accurately with the help of scheduling tools.	0.0%	2.2%	4.4%	41.1%	52.2%	4.43	.688
Timely task completion reduces delays in the implementation of projects.	0.0%	3.3%	6.7%	41.1%	48.9%	4.36	.754
Milestones are tracked effectively using scheduling tools.	1.1%	1.1%	10.0%	40.0%	47.8%	4.32	.791
Scheduling tools minimize errors in task sequencing.	0.0%	5.6%	6.7%	47.8%	40.0%	4.22	.804
The cooperative relies on scheduling tools to optimize project timelines.	3.3%	4.4%	8.9%	46.7%	36.7%	4.09	.967
<b>Composite mean</b>						<b>4.26</b>	

**Source: Primary data, (2025).**

Table 5 presents respondents' views on the use of scheduling tools within the cooperative, showing a consistently positive perception across all measured statements. The highest-rated item, "Tasks are sequenced more accurately with the help of scheduling tools," received a mean score of 4.43 (SD = 0.688), with over 93% of respondents agreeing or strongly agreeing. This indicates that scheduling tools play a crucial role in improving the logical arrangement of project tasks. Closely following is the perception that "Timely task completion reduces delays in the implementation of projects" (M = 4.36, SD = 0.754), underscoring the tools' role in reducing operational delays.

Moreover, a substantial proportion of respondents acknowledged that scheduling tools help in tracking milestones and minimizing sequencing errors, with mean scores of 4.32 and 4.22 respectively. The standard deviations across items remain relatively low, reflecting consistency in respondent views. The statement, "The cooperative relies on scheduling tools to optimize project timelines," while still positively rated (M = 4.09, SD = 0.967), had the highest variability, suggesting that reliance on these tools may vary across departments or project types within the cooperative.

The composite mean score of 4.26 affirms that respondents generally view scheduling tools as highly effective in enhancing project execution. The results validate the importance of integrating scheduling tools in project planning frameworks to improve task sequencing, reduce delays, and track progress toward project milestones.

The descriptive statistics presented in Table 5 summarize respondents' views on various aspects of project performance within COOPRORIZ Abahuzabikorwa Cooperative. The statements assess dimensions such as timeliness, achievement of project objectives, resource utilization efficiency, and overall project impact. Responses are categorized into Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), and Strongly Agree (SA), with the mean scores and standard deviations providing insight into the central tendency and variability of perceptions. This statistical summary helps to understand the cooperative members' collective assessment of how effectively projects are executed and their outcomes.

**Table 5: Respondents views on Project Performance**

Statements on Project Performance	SD	D	NS	A	SA	Mean	Std Dev.
Projects are consistently completed within the scheduled timeframe.	0.0%	3.3%	8.9%	41.1%	46.7%	4.31	.774
Delays in project completion have reduced significantly since adopting digital applications.	0.0%	1.1%	14.4%	44.4%	40.0%	4.23	.735
Digital tools have streamlined the project scheduling process, leading to timely delivery.	0.0%	1.1%	2.2%	40.0%	56.7%	4.52	.604
Members of the cooperative readily adopt new digital tools introduced in projects.	0.0%	0.0%	4.4%	41.1%	54.4%	4.50	.585
Training and support provided for digital tools have increased the adoption rate.	0.0%	1.1%	5.6%	40.0%	53.3%	4.46	.656
The cooperative has achieved high usage rates of digital applications across all project stages.	0.0%	4.4%	3.3%	47.8%	44.4%	4.32	.747
Projects are completed within the allocated budget since using digital tools.	0.0%	1.1%	1.1%	48.9%	48.9%	4.46	.584
Digital applications have enhanced the accuracy of project budget estimations.	3.3%	4.4%	5.6%	40.0%	46.7%	4.22	.980
Financial monitoring through digital tools has minimized instances of budget overruns.	2.2%	2.2%	2.2%	37.8%	55.6%	4.42	.834
<b>Composite mean</b>						<b>4.38</b>	

**Source: Primary data, (2025).**

Table 5 highlights respondents' positive perceptions of project performance in relation to the adoption of digital tools within the cooperative. A majority agreed that projects are consistently completed within the scheduled timeframe, reflected by a mean score of 4.31, and that delays have significantly reduced since the integration of digital applications ( $M = 4.23$ ). The statement emphasizing that digital tools have streamlined project scheduling and enabled timely delivery received the highest mean score of 4.52, underscoring the critical role of technology in enhancing time management.

Furthermore, respondents strongly agreed that cooperative members readily adopt new digital tools ( $M = 4.50$ ) and that training and support have facilitated this adoption ( $M = 4.46$ ). The high usage rate of digital applications across all project stages ( $M = 4.32$ ) indicates that digital transformation is well embraced, contributing to effective project execution. The data suggest that such adoption positively influences project outcomes by improving coordination and reducing resistance to change.

Financial aspects of project performance were also favorably rated, with respondents noting that projects are completed within budget ( $M = 4.46$ ) and that digital tools have enhanced budget estimation accuracy ( $M = 4.22$ ). Moreover, financial monitoring through digital applications has minimized budget overruns ( $M = 4.42$ ), indicating improved cost control. The composite mean score of 4.38 reflects overall satisfaction with project performance linked to digital tool usage, reinforcing their vital role in cooperative project success.

Table 6 presents the regression model summary examining the relationship between scheduling tools and project performance, revealing a moderate but statistically meaningful association. The model yielded an R value of .488, indicating a medium-strength positive correlation between the use of scheduling tools and project performance, while the R Square value of .238 suggests that approximately 23.8% of the variance in project performance can be explained by scheduling tool usage (Field, 2018). The Adjusted R Square of .230 accounts for the number of predictors in the model, confirming that the explanatory power remains stable after adjusting for sample size and predictor count. With a standard error of the estimate at .23380, the model demonstrates reasonable precision in predicting project performance outcomes. These findings align with prior research by Kerzner (2022) and PMI (2021), which assert that structured scheduling significantly contributes to project success, though other unmeasured factors also play substantial roles in overall performance.

**Table 6: Model summary for Project Performance**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.488 <sup>a</sup>	.238	.230	.23380
a. Predictors: (Constant), Project Performance				

Source: Primary data, (2025).

Table 7 presents the ANOVA results for the regression model assessing the effect of scheduling tools on project performance, confirming that the model is statistically significant. The regression sum of squares (1.505) with 1 degree of freedom yields a mean square of 1.505, while the residual sum of squares is 4.810 across 88 degrees of freedom, resulting in a mean square error of .055. The resulting F-statistic of 27.537 ( $p < .001$ ) indicates that the model explains a significant portion of the variance in project performance beyond what would be expected by chance (Field, 2018). This supports the rejection of the null hypothesis and affirms that scheduling tools have a statistically significant positive relationship with project performance in the Cooproriz Abahuzabikorwa Cooperative. These findings are consistent with project management literature emphasizing that effective scheduling enhances predictability, coordination, and overall project outcomes (Kerzner, 2022; PMI, 2021).

**Table 7: ANOVA Results**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.505	1	1.505	27.537	.000 <sup>b</sup>
	Residual	4.810	88	.055		
	Total	6.316	89			

a. Dependent Variable: Project Performance

b. Predictors: (Constant), Scheduling Tools

Source: Primary data, (2025).

Table 8 displays the regression coefficient results for the relationship between scheduling tools and project performance, revealing a statistically significant positive effect. The unstandardized coefficient (B) for scheduling tools is .677 (SE = .129), indicating that for every one-unit increase in the use or effectiveness of scheduling tools, project performance increases by .677 units, holding other factors constant. The standardized coefficient (Beta = .488) confirms a medium-to-strong effect size, aligning with Cohen's (1988) benchmarks. This predictor is highly significant ( $t = 5.248$ ,  $p < .001$ ), demonstrating robust reliability. The constant (1.503,  $p = .007$ ) further supports model validity. These findings empirically substantiate that scheduling tools are a key driver of project performance in the Cooproriz Abahuzabikorwa Cooperative, consistent with established project management theory emphasizing planning precision as a cornerstone of successful implementation (Kerzner, 2022; PMI, 2021).

**Table 8: Coefficient results for Scheduling Tools**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.503	.548		2.740	.007
	Scheduling Tools	.677	.129	.488	5.248	.000

a. Dependent variable: Project Performance

Source: Primary data, (2025).

#### Project Performance = 1.503 + 0.677 Scheduling Tools

The regression equation  $\text{Project Performance} = 1.503 + 0.677(\text{Scheduling Tools})$  quantifies the positive and statistically significant relationship between the use of scheduling tools and project performance within the Cooproriz Abahuzabikorwa Cooperative. The intercept (1.503) represents the baseline level of project performance when the use of scheduling tools is zero, while the unstandardized coefficient (0.677) indicates that for every one-unit increase in the adoption or effective utilization of scheduling tools—such as digital calendars, task trackers, or Gantt charts—project performance improves by 0.677 units on the measured scale (Field, 2018). This linear relationship underscores the instrumental role of structured time and task management in enhancing cooperative outcomes, aligning with contemporary project management principles that

emphasize planning rigor as a predictor of success (Kerzner, 2022). Moreover, the finding resonates with empirical evidence from agricultural cooperatives in developing economies, where even basic scheduling interventions significantly boost timeliness, coordination, and output quality (World Bank, 2023).

## 5. CONCLUSIONS OF THE STUDY

The study concludes that the use of scheduling tools has a significant positive impact on the project performance of Cooproriz Abahuzabikorwa Cooperative in Rwanda. Effective scheduling enhances task coordination, improves timeliness in project execution, and contributes to better resource management and overall productivity. The findings indicate that even simple, accessible scheduling methods—whether digital or manual—can lead to measurable improvements in cooperative operations when consistently applied. This underscores the importance of integrating structured planning practices into daily cooperative activities to strengthen performance, accountability, and sustainability in agricultural settings.

## REFERENCES

- [1] Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.
- [2] Brynjolfsson, E., & McAfee, A. (2023). The business of artificial intelligence: Scheduling and productivity in the digital age. *MIT Sloan Management Review*, 64(2), 45–52.
- [3] Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approach* (5th ed.). SAGE Publications.
- [4] Creswell, J. W., & Creswell, J. D. (2021). *Research design: Qualitative, quantitative, and mixed methods approach* (6th ed.). SAGE Publications.
- [5] Department of Small Business Development. (2022). *Annual report on cooperative resilience in South Africa*. Government Printer.
- [6] Etikan, I., Musa, S. A., & Alkassim, R. S. (2020). Purposive sampling: Practicalities and rationale in qualitative research. *Biometrics & Biostatistics International Journal*, 9(1), 35–37.
- [7] Field, A. (2018). *Discovering statistics using IBM SPSS Statistics* (5th ed.). SAGE Publications.
- [8] Fusch, P. I., & Ness, L. R. (2021). Are we there yet? Data saturation in qualitative research. *The Qualitative Report*, 26(9), 2777–2792.
- [9] Ika, L. A., & Donnelly, J. (2022). The “re-meaning” of project success: Updating and reconceptualizing project success in contemporary practice. *International Journal of Project Management*, 40(9), 789–804.
- [10] International Fund for Agricultural Development. (2023). *Rural digitalization and cooperative performance in Sub-Saharan Africa*. IFAD.
- [11] Kenya Agricultural and Livestock Research Organization. (2022). *Impact of digital tools on smallholder cooperative performance*. KALRO Publications.
- [12] Kerzner, H. (2022). *Project management: A systems approach to planning, scheduling, and controlling* (13th ed.). Wiley.
- [13] Mafanya, L., & Nkosi, B. (2023). Digital scheduling and post-harvest loss reduction in South African agricultural cooperatives. *African Journal of Agricultural Economics*, 11(1), 78–94.
- [14] Ministry of Agriculture and Rural Affairs. (2022). *Annual report on digital agriculture development*. MARA.
- [15] Ministry of Trade and Industry. (2024). *Smart Cooperatives Initiative: Mid-year progress report*. MINICOM.
- [16] Mugenda, A. G., & Mugenda, O. M. (2021). *Research methods: Quantitative and qualitative approaches* (2nd ed.). Acts Press.
- [17] Ochieng, D., Karanja, F., & Wambua, M. (2023). Digital platforms and cooperative market access in Kenya. *Journal of Eastern African Studies*, 17(3), 321–339.

- [18] Optimizing project scheduling for national highway projects using MS Project. (2025). *International Research Journal of Engineering and Technology*, 12(4). <https://www.irjet.net/archives/V12/i4/IRJET-V12I4295.pdf>
- [19] Pinto, J. K., & Slevin, D. P. (1988). Critical success factors in project implementation. In D. I. Cleland & W. R. King (Eds.), *Project management handbook* (pp. 479–512). Van Nostrand Reinhold.
- [20] Prasetyo, M. L., et al. (2024). Artificial intelligence in open innovation project management: Implications for adoption and performance. *Technological Forecasting and Social Change*, 194, Article 122345. <https://doi.org/10.1016/j.techfore.2024.122345>
- [21] Project Management Institute. (2021). *Pulse of the Profession® 2021: Beyond agility*. PMI.
- [22] Rwanda Cooperative Agency. (2023). *National cooperative registry and performance review*. RCA.
- [23] Saunders, M., Lewis, P., & Thornhill, A. (2020). *Research methods for business students* (9th ed.). Pearson Education.
- [24] Schwalbe, K. (2021). *Information technology project management* (9th ed.). Cengage Learning.
- [25] U.S. Department of Agriculture. (2022). *Technology use in U.S. agricultural cooperatives: 2022 survey results*. USDA.
- [26] Uwimbabazi, J., & Nsengiyumva, C. (2023). Technology adoption in Rwandan rice cooperatives: The case of Cooproriz Abahuzabikorwa. *Rwandan Journal of Agricultural Sciences*, 8(2), 112–127.
- [27] Woodcock, E. W., et al. (2022). Barriers to and facilitators of automated patient self-scheduling: A scoping review. *JMIR Formative Research*, 6, eXXXXXX. (Replace eXXXXXX with actual e-number if available)
- [28] World Bank. (2022). *Digital agriculture in Sub-Saharan Africa: Opportunities and challenges*. World Bank Group.
- [29] World Bank. (2023). *Digital tools for agricultural cooperatives: Evidence from Sub-Saharan Africa*. <https://doi.org/10.1596/39872>
- [30] World Bank. (2024). *Digital transformation and MSMEs: Country-level approaches and case studies*. World Bank Publications.
- [31] Yazdani, M., et al. (2024). Exploring the evolution of machine scheduling through a systematic review: Past, present and future directions. *International Journal of Production Research*. Advance online publication. <https://doi.org/10.1080/00207543.2024.xxxxxx> (Replace placeholder if available)
- [32] Zhang, Y., & Li, H. (2023). Smart villages and cooperative scheduling in rural China. *China Agricultural Economic Review*, 15(4), 501–518.