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Portfolio Fit, Technology Capability Adoption and SMEs' Performance: Evidence from Mbarara City, Uganda

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ABSTRACT: The main objective of this study was to examine the influence of portfolio fit of business support services on technology capability adoption, management practice adoption and performance of small and medium enterprises (SMEs) in Mbarara City, Uganda. The researcher adopted a cross sectional survey design and collected primary data from 120 supported SMEs selected through stratified random sampling, and partial least squares structural equation modelling (PLS SEM) with 5,000 bootstrap subsamples was employed to test the hypotheses. The findings of the study revealed that firms had received an average of 3.2 services, yet only 22.5 percent received a main service that corresponded to their most binding constraint and 42.5 percent were not assessed before support. Portfolio fit exerted a strong total effect on performance ($\beta = 0.747$, $p < 0.001$), approximately 71 percent of which was transmitted through technology capability adoption and management practice adoption. Firm readiness enhanced adoption directly but did not moderate the effect of portfolio fit, while delivery quality, although rated highest by respondents, had no significant effect on adoption. The study concludes that business support improves SME performance when it corresponds to a diagnosed constraint and is converted into routinised technologies and practices. It recommends that support providers diagnose the binding constraint before selecting services, combine services around that diagnosis and evaluate programmes by the sustained use of technologies and practices rather than by reach or beneficiary satisfaction. The study contributes firm level evidence from a regional Ugandan city that previous studies have largely overlooked.

KEYWORDS: Business support services, Portfolio fit, Technology capability adoption, Management practices, SME performance

1. INTRODUCTION

Business support services are intended to help existing businesses to overcome barriers to investment, learning, formalization, innovation, and to enter new markets. These services include finance, management training, consulting, mentoring, incubation, technology advice, standards, and export promotion. However, SMEs have a key role as a target for such interventions because of their significant contribution to both employment and output and their particular vulnerability to lack of liquidity and poor records, and lack of specialized skills and heavy demands on owner managers. But nearly always business support gets it wrong, not, in all cases, by virtue of it not existing but by virtue of either the support that does exist not addressing either the problem of the firm or the firm not being in a position to take advantage of that support when it does exist. Williams et al. (2025) reviewed 48 evaluations of support programmes in sub Saharan Africa and found positive average effects on firm performance, employment and labour productivity, with success depending on technical expertise, access to finance and an enabling policy environment.

This concern is particularly pertinent in Uganda. Uganda's Fourth National Development Plan (NDP IV) is the first of three five year plans under the Tenfold Growth Strategy, which aims to expand the economy from approximately USD 50 billion to USD 500 billion by 2040. Programme 4 of the strategy, science, technology, ICT and innovation, is designed to add value across the agro industrial, tourism and mineral anchors, and its Track 10 seeks to enhance the capacity of the traditional economy to apply science, technology and ICT. Existing SMEs are therefore central to the programme. However, micro, small and medium enterprises constitute about 90 percent of the private sector and many cease operations within their first years. Consequently, technology support that does not result in sustained use within the firm is unlikely to contribute meaningfully to the growth target. Bakashaba et al. (2024a) found that financial literacy and access to digital finance jointly explained 45.7 percent of the variation in the performance of SMEs in Mbarara City, which indicates that digital capability already shapes business outcomes in the study area.

Empirical evidence on business support remains encouraging but inconclusive. Cravo and Piza (2019) established that interventions improve several firm outcomes on average, although the magnitude and durability of the gains vary across programmes and evaluation designs. Bruhn et al. (2018) demonstrated that consulting improved productivity among Mexican SMEs, while Brooks et al. (2018) found that mentoring influenced profits through channels distinct from classroom training, and training has been shown to alter business practices even where its effects on profits are modest (McKenzie, 2021). In a similar vein, Konte and Tetteh (2023) reported that mobile money raises firm productivity in Africa, and external knowledge has yielded better innovation outcomes where firms possessed the capabilities required to utilise it (Medase & Abdul Basit,

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2020). Digital value chains may also widen market access for East African firms while increasing the control of lead firms over local producers (Foster et al., 2018). Recent evidence from East Africa points in the same direction: Mushi (2024) found that digital marketing strategies were significantly associated with SME performance in Mbeya City, Tanzania, while Utonga et al. (2026) reported that digital technology adoption significantly improved the performance of SMEs in the Tanzanian fruit juice processing industry. Notwithstanding this evidence, two gaps persist. Studies typically examine finance, training, technology or networks in isolation, although firms frequently face several interrelated constraints. In addition, much of the Ugandan evidence, such as Kato and Tsoka (2020), relies on secondary records or programme reports that do not observe developments within the firm after support ends. Programme evaluations consequently record attendance, disbursement or the number of firms reached, but seldom ascertain whether the support corresponded to the firm's problem, whether managers modified a practice, or whether the modification was sustained.

The main objective of this study was to examine the influence of portfolio fit of business support services on technology capability adoption and performance of SMEs in Mbarara City. Portfolio fit refers to the degree to which the services a firm receives correspond to its diagnosed constraint, are combined where necessary and are delivered in an appropriate sequence. The study specifically examined whether portfolio fit enhances performance through technology capability adoption and management practice adoption, and whether firm readiness and delivery quality strengthen these relationships. The researcher utilised primary data from 120 supported SMEs in Mbarara City, the principal commercial centre of Western Uganda, where dairy, agro processing, trade and services predominate and where access to technology and advisory services differs from Kampala, the setting of most previous studies.

The study makes three contributions. First, it shifts the analytical focus from whether a particular type of support is effective to whether the support fits the recipient firm, and it proposes a twelve item measure of portfolio fit. Second, it traces the effect of fit through staged technology adoption, distinguishing exposure, adoption and routinisation, thereby extending the absorptive capacity perspective advanced by Zahra and George (2002) to programme evaluation. Third, it provides firm level evidence to inform the design and evaluation of enterprise support under the Tenfold Growth Strategy. The remainder of the paper reviews the literature and develops the hypotheses, describes the methodology, presents the results and discusses their implications.

2. LITERATURE REVIEW

2.1 Business support and the problem of fit

Business support is premised on the assumption that firms underperform because of specific constraints, such as shortages of liquidity, knowledge, production capability, managerial skill, technology, standards or market information, and that external assistance can alleviate them. Cravo and Piza (2019) report positive average effects of support on firm outcomes, but with considerable heterogeneity that programme design features only partly explain. One possible source of this heterogeneity is the correspondence between the constraint and the service. A loan may generate repayment pressure for a firm that lacks reliable records or cash flow planning, a digital system may remain unused where work processes are undefined, and buyer meetings offer limited benefit when products or standards are not ready. Bruhn et al. (2018) provide experimental evidence consistent with this argument, demonstrating that consulting tailored to the firm's own problems raised productivity and employment among Mexican SMEs. Similarly, Brooks et al. (2018) found that mentoring responsive to the owner's circumstances produced larger profit gains than generic classroom training in Kenya. More recent experimental evidence from Côte d'Ivoire shows that a consulting programme on business management practices increased employment formalisation among micro, small and medium enterprises (Fietz et al., 2026). Eister and Msimango-Galawe (2024) likewise found that general entrepreneurial training was more effective for opportunity driven entrepreneurs, whereas task specific training better suited necessity driven entrepreneurs, which implies that the value of support depends on the firm to which it is matched.

This study conceptualises the quality of this correspondence as portfolio fit, which comprises four dimensions: whether the firm's constraint was diagnosed before support, whether the services matched that constraint and the firm's sector and stage of growth, whether services were combined where a single service was insufficient, and whether they were delivered in an appropriate sequence and lasted long enough to be applied. Portfolio fit is therefore expected to enhance performance directly, since well matched support alleviates the constraint that inhibits the firm.

H1: Portfolio fit of business support services has a significant positive relationship with the performance of SMEs.

2.2 Adoption as the route from support to performance

Support influences performance only to the extent that it changes firm behaviour. The framework therefore distinguishes exposure, where a firm receives finance, information or instruction; adoption, where managers modify a decision or practice; and routinisation, where the new practice is applied consistently enough to affect cost, quality, sales or growth. Two forms of change are relevant. Technology capability adoption encompasses digital record keeping, digital payments, online marketing and selling, point of sale and stock systems, electronic tax receipting and improved production technology. Konte and Tetteh (2023) posit that mobile money and digital financial tools raise firm productivity, and external knowledge has been found to support innovation among firms in sub Saharan Africa (Medase & Abdul Basit, 2020). Deku et al. (2024) similarly established that the adoption of digital marketing positively affects the business performance of SMEs in Ghana, and digital diffusion has been identified as a significant trigger of innovation among SMEs (Hassan et al., 2024). Management practice adoption encompasses marketing, buying and stock control, record keeping and financial planning. McKenzie and Woodruff (2017) demonstrate that these practices can be measured in small firms and that they predict survival and growth. McKenzie (2021) further argues that training improves such practices, although its effects on profits are often modest when take up is low.

Well fitted support is expected to increase both forms of adoption, since firms are more inclined to utilise a tool or practice that addresses the problem they actually face. Adoption is in turn expected to enhance performance, such that a substantial part of the effect of fit is transmitted through it.

H2: Portfolio fit has a significant positive relationship with technology capability adoption and management practice adoption.

H3: Technology capability adoption mediates the relationship between portfolio fit and firm performance.

H4: Management practice adoption mediates the relationship between portfolio fit and firm performance.

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2.3 Firm readiness and delivery quality

Zahra and George (2002) contend that firms respond differently to the same knowledge because each must recognise its value, assimilate it and apply it commercially. Empirical studies support this view: absorptive capacity has been found to strengthen the link between foreign business knowledge and innovativeness among Ghanaian exporting firms (Boateng et al., 2023), and Hassan et al. (2024) report that absorptive capacity moderates the effect of digital diffusion on product innovation in SMEs. Accordingly, firms that already search for new ideas, maintain basic records, have committed owners with time to apply support, and possess their own funds and devices should convert well fitted support into adoption more readily. Delivery quality, defined as the competence of those delivering support together with its practicality, punctuality, responsiveness and convenience, may similarly strengthen the effect of fit, since even an appropriately selected service may be wasted if it is poorly delivered.

H5: Firm readiness and programme delivery quality positively moderate the relationship between portfolio fit and capability adoption.

Firm age, size, sector, the owner's gender and the owner's education were included as control variables on performance. Firm size was included because it moderates the effect of business resources on SME performance (Rampyapedi & Adetunji, 2024). Figure 1 in Section 4 presents the estimated model.

3. DATA AND METHODOLOGY

3.1 Research design, population and sample

The researcher adopted a cross sectional survey design. The target population comprised SMEs in Mbarara City that had operated for at least two years, employed between 5 and 100 people and had received at least one form of finance, training, advisory, technology, incubation or market access support in the preceding five years. The sampling frame was constructed from beneficiary registers of support providers operating in the city, including government agencies, private sector bodies, financial institutions and university and private incubation hubs. The firm constituted the unit of analysis, while the owner or principal decision making manager was the unit of inquiry.

The minimum sample size was determined using the inverse square root method, which Kock and Hadaya (2018) propose for PLS SEM as $(2.486 / p)^2$, where p is the smallest path coefficient expected to be significant at the 5 percent level with 80 percent power. Taking 0.27 as the smallest meaningful path coefficient, in line with the moderate effects reported for business support (Cravo & Piza, 2019), yielded a minimum of 85 firms. The researcher targeted 120 firms, selected through stratified random sampling with strata defined by the main type of support received. Firms that declined or could not be reached were replaced from a reserve list within the same stratum. All 120 interviews were completed, all firms satisfied the screening criteria and the dataset contained no missing values.

3.2 Data collection and measures

The researcher designed a structured questionnaire in KoboToolbox, which trained research assistants administered face to face at the firms' premises using smartphones. Content validity was reviewed by experts in entrepreneurship and finance, and the instrument was pretested on supported SMEs in Kampala, outside the study area. Unless otherwise stated, rated items employed a five point Likert scale (1 = strongly disagree to 5 = strongly agree).

Portfolio fit was measured with twelve items covering diagnosis (three items), match (three), combination (three) and timing (three). Technology capability adoption was measured on a four stage scale (0 = not exposed, 1 = exposed but not used, 2 = adopted, used occasionally or for under six months, 3 = routinised, used weekly for six months or more) for nine technologies. Management practice adoption was measured with the 26 practice index of McKenzie and Woodruff (2017), recorded for the period before support and at the time of the survey and summarised as the share of practices used in four areas (marketing, buying and stock control, record keeping, financial planning), together with three items on the retention of new practices. Firm readiness (eight items) referred to the period just before support, and delivery quality had six items. Firm performance was a higher order construct with three dimensions: operating performance (five items on unit cost, quality, delivery speed, new products and new customers), competitive performance (three items on sales growth, profit and market share relative to competitors) and business outcomes (four items on the change in monthly sales, profit, regular customers and employees since the year before support, 1 = fallen a lot to 5 = risen a lot).

3.3 Data analysis

The researcher employed descriptive statistics, Welch t tests and one way analysis of variance to describe the support received. PLS SEM was employed to test the hypotheses because it accommodates moderate samples, mediation analysis and non normal data (Hair et al., 2019). Recent methodological guidance also supports its use for complex models involving higher order constructs and conditional mediation (Sarstedt & Liu, 2024). The model was estimated using the path weighting scheme on standardised indicators, and firm performance was specified through the two stage approach for higher order constructs, following Sarstedt et al. (2019) and Hair et al. (2024). Reliability was assessed using Cronbach's alpha and composite reliability (threshold 0.7), convergent validity using outer loadings and average variance extracted (AVE, threshold 0.5), and discriminant validity using the Fornell and Larcker criterion (Fornell & Larcker, 1981) and the heterotrait monotrait ratio (HTMT) (Henseler et al., 2015), interpreted in line with the updated recommendations of Ringle et al. (2023). Bootstrapping with 5,000 subsamples generated standard errors and 95 percent percentile confidence intervals. Following Zhao et al. (2010), mediation was established on the basis of the significance of the indirect effects, while moderation was tested through the two stage approach using interaction terms of standardised latent scores. Effect sizes (f^2) were interpreted against the thresholds of 0.02, 0.15 and 0.35 (Cohen, 1988), and predictive relevance was assessed through a ten fold cross validated Q^2. Firm age, firm size (logarithm of full time equivalent employees before support), manufacturing sector, female ownership and owner education were entered as control variables. As a robustness check, the main paths were estimated again through ordinary least squares with robust standard errors, using the full technology stage index and the change in the practices index as alternative mediators. As Podsakoff et al. (2003) advise, common method bias was addressed procedurally, by separating the predictor and outcome sections and assuring anonymity, and was examined statistically using Harman's single factor test.

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4. RESULTS AND DISCUSSION

4.1 Sample profile and support received

The findings of the study revealed that nearly half of the respondents were owner managers (49.2 percent) and a third were owners, implying that most responses came from those who made decisions regarding the support (Table 1). Trade (27.5 percent) and dairy (26.7 percent) constituted the largest sectors. Just over half of the firms (51.7 percent) reported annual sales below UGX 100 million, women owned a third of the firms and a further 18.3 percent were jointly owned. The firms had operated for approximately 11 years on average (standard deviation 5.2).

Table 1. Profile of respondents and firms (n = 120)

Variable and category	Frequency	Percent
Respondent's role		
Owner	40	33.3
Owner manager	59	49.2
Hired manager	21	17.5
Main sector		
Dairy	32	26.7
Other agro processing	10	8.3
Other manufacturing	8	6.7
Trade	33	27.5
Hospitality	17	14.2
Services	15	12.5
Other	5	4.2
Sales in last 12 months (UGX)		
Below 50m	29	24.2
50m to 100m	33	27.5
100m to 360m	30	25.0
360m to 1bn	20	16.7
Above 1bn	8	6.7
Gender of principal owner		
Male	58	48.3
Female	40	33.3
Joint	22	18.3
Education of principal owner		
Primary or none	10	8.3
Secondary	34	28.3
Certificate or diploma	38	31.7
Degree	35	29.2
Postgraduate	3	2.5

Source: Authors' survey data, Mbarara City (n = 120)

Support was seldom received in isolation. Firms had utilised an average of 3.2 of the ten services, and only seven firms had received a single service. Technical or skills training was the most prevalent service (40.8 percent), followed by business or management training and incubation (37.5 percent each), whereas digital and ICT support was the least prevalent (24.2 percent). This proportion is notably low, given that digital capability is the focus of Programme 4. The most frequent combinations were finance with training (36.7 percent of firms), training with technology (30.8 percent) and finance with technology (25.0 percent), and 65.0 percent of firms received two or more services within six months of each other.

However, these packages were rarely based on an assessment of the firm. Only 18.3 percent of firms were formally assessed before support, 39.2 percent had an informal discussion with the provider and 42.5 percent received no assessment. Capital was the constraint most frequently rated as most binding (25.0 percent), followed by records and cash flow (19.2 percent), markets or customers (16.7 percent), management skills (13.3 percent) and technology (12.5 percent). A main service was classified as matched when it addressed the stated constraint directly, for example finance for capital, or trade fairs and buyer linkages for markets. As Table 2 indicates, only 27 firms (22.5 percent) received a matched main service. The mismatch was most pronounced for market constraints, where only one of the 20 affected firms received market access support as its main service.

Table 2. Match between the most binding constraint and the main support received

Constraint rated most binding	Firms	Main support matched	% matched
Capital	30	5	16.7
Records and cash flow	23	9	39.1
Management skills	16	7	43.8
Production	8	1	12.5
Technology	15	4	26.7

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Constraint rated most binding	Firms	Main support matched	% matched
Standards or quality	5	0	0.0
Markets or customers	20	1	5.0
Other	3	0	0.0
Total	**120**	**27**	**22.5**

Note: Matched services: finance for capital; business training, advisory or digital support for records and cash flow; business training, advisory or incubation for management skills; technical training or production technology for production; digital or production technology for technology; standards support for standards; trade fairs or buyer linkages for markets.

Source: Authors' survey data, Mbarara City (n = 120)

Matching was associated with superior outcomes. Firms with a matched main service reported higher portfolio fit (3.66 against 3.22, t = 2.45, p = 0.018) and higher performance (3.71 against 3.40, t = 2.59, p = 0.013), and firms that received services concurrently reported higher fit (3.52 against 2.95, p < 0.001) and performance (3.58 against 3.27, p = 0.003). By contrast, neither fit (F = 0.44, p = 0.910) nor performance (F = 0.62, p = 0.776) differed by type of main support. Consequently, what a firm received appeared less important than whether it fitted the firm's problem. Adoption remained shallow. Mobile money merchant codes were the only technology that most firms used routinely (50.0 percent). Only 15.0 percent maintained digital records routinely, 9.2 percent used electronic tax receipting (EFRIS), 7.5 percent used a point of sale or stock system and 5.0 percent sold online. Many firms had been exposed to these tools without utilising them; for instance, 52 firms had been introduced to point of sale or stock systems but did not use them. The average firm used 4.6 of the nine technologies at least occasionally but only 1.7 routinely. Management practices improved considerably, with the average share of the 26 practices in use rising from 33.4 percent before support to 50.6 percent at the time of the survey (paired t = 8.80, p < 0.001), and the largest gain recorded in buying and stock control (29.7 to 51.4 percent).

4.2 Measurement model

Table 3 reports the measurement model. Loadings for portfolio fit, delivery quality and firm readiness exceeded 0.69, and alpha (0.887 to 0.934), composite reliability (0.911 to 0.943) and AVE (0.580 to 0.630) met the thresholds. The mobile money item (TC2) was removed from technology capability adoption because it had the lowest loading (0.63) and lowered the AVE below 0.5 (0.489); its near universal use meant it did not discriminate between firms. The remaining constructs met the reliability and AVE thresholds. The three performance dimensions had acceptable composite reliability (0.763 to 0.802) but alpha below 0.7, and combined as a higher order construct they gave a reliable measure (alpha 0.832, AVE 0.751).

Table 3. Outer loadings, reliability and convergent validity

Construct	Indicators and outer loadings	Alpha	CR	AVE
Portfolio fit	PFD1 0.81, PFD2 0.75, PFD3 0.79, PFM1 0.74, PFM2 0.78, PFM3 0.69, PFC1 0.77, PFC2 0.77, PFC3 0.77, PFT1 0.74, PFT2 0.74, PFT3 0.78	0.934	0.943	0.580
Delivery quality	DQ1 0.74, DQ2 0.75, DQ3 0.79, DQ4 0.86, DQ5 0.78, DQ6 0.83	0.887	0.911	0.630
Firm readiness	FR1 0.76, FR2 0.74, FR3 0.79, FR4 0.74, FR5 0.78, FR6 0.79, FR7 0.78, FR8 0.76	0.899	0.919	0.588
Technology capability adoption	TC1 0.78, TC3 0.71, TC4 0.68, TC5 0.65, TC6 0.70, TC7 0.66, TC8 0.74, TC9 0.76	0.860	0.891	0.508
Management practice adoption	MPR1 0.68, MPR2 0.65, MPR3 0.67, MK index 0.80, BS index 0.65, RK index 0.80, FP index 0.87	0.744	0.891	0.541
Firm performance (higher order)	Operating performance 0.88, Competitive performance 0.88, Business outcomes 0.84	0.832	0.900	0.751

Note: CR = composite reliability; AVE = average variance extracted. MK, BS, RK and FP are the shares of marketing, buying and stock, record keeping and financial planning practices used at the time of the survey.

Source: PLS SEM estimates from authors' survey data, Mbarara City (n = 120)

Table 4. Discriminant validity

Construct	PF	DQ	FR	TCA	MPA	PERF
Portfolio fit	**0.761**	*0.148*	*0.124*	*0.812*	*0.875*	*0.882*
Delivery quality	-0.127	**0.794**	*0.120*	*0.153*	*0.196*	*0.199*
Firm readiness	0.078	0.046	**0.767**	*0.632*	*0.537*	*0.464*
Technology capability adoption	0.734	-0.092	0.559	**0.712**	*1.008*	*1.012*
Management practice adoption	0.790	-0.168	0.475	0.867	**0.735**	*1.019*
Firm performance	0.784	-0.197	0.406	0.858	0.865	**0.866**

Note: Bold diagonal = square root of AVE; below diagonal = latent correlations; above diagonal (italics) = HTMT.

Source: PLS SEM estimates from authors' survey data, Mbarara City (n = 120)

Discriminant validity was mixed (Table 4). Portfolio fit, delivery quality and firm readiness were distinct from each other and from the other constructs. Technology capability adoption, management practice adoption and firm performance were not empirically distinct: their correlations (0.858 to 0.867) exceeded the square roots of their AVEs and their HTMT ratios were slightly above 1 (1.008 to 1.019). The same pattern appeared with alternative indicators, so it reflects the data rather than one measurement choice. It may be due to the fact that these firms, taking up new tools, taking up new practices and doing better simply happened together as one package of change. Or it may be that having the same person

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answer all three sections pushed the answers closer together. Whichever it is, the separate estimates for the two mediators should be interpreted with caution. Harman's test showed that the first factor explained 29.5 percent of the variance, below the 50 percent threshold, and delivery quality was only weakly correlated with fit (r = -0.127) and performance (r = -0.197), so a general response tendency is unlikely to explain the results.

4.3 Structural model

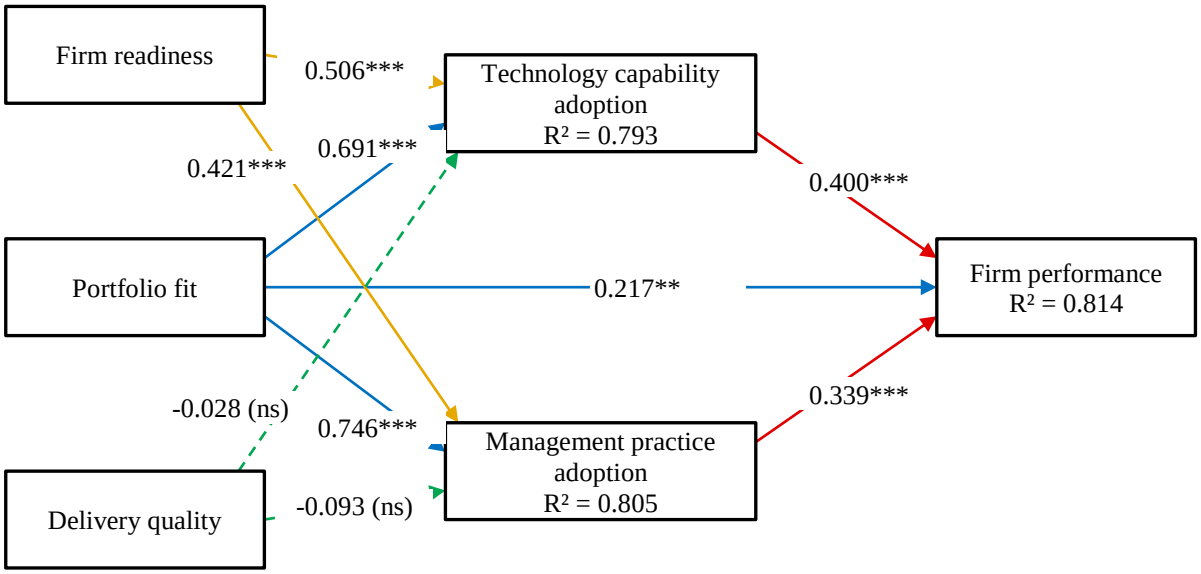
Inner variance inflation factors were close to 1 for the predictors of the mediators and 2.83 to 5.27 for the predictors of performance, the highest being management practice adoption, which is consistent with the overlap noted above. Table 5 and Figure 1 present the direct effects.

Table 5. Direct effects

Path	β	SE	t	p	95% CI	f²
Portfolio fit → Firm performance	0.217	0.073	2.97	0.003	[0.071, 0.358]	0.089
Portfolio fit → Technology capability adoption	0.691	0.043	16.12	< 0.001	[0.597, 0.765]	2.259
Portfolio fit → Management practice adoption	0.746	0.039	19.10	< 0.001	[0.659, 0.814]	2.780
Technology capability adoption → Firm performance	0.400	0.076	5.26	< 0.001	[0.248, 0.551]	0.203
Management practice adoption → Firm performance	0.339	0.096	3.54	< 0.001	[0.156, 0.531]	0.117
Firm readiness → Technology capability adoption	0.506	0.047	10.67	< 0.001	[0.414, 0.602]	1.229
Firm readiness → Management practice adoption	0.421	0.051	8.32	< 0.001	[0.319, 0.519]	0.898
Delivery quality → Technology capability adoption	-0.028	0.046	-0.61	0.540	[-0.116, 0.062]	0.004
Delivery quality → Management practice adoption	-0.093	0.047	-2.00	0.045	[-0.182, 0.002]	0.044
Firm age → Performance (control)	-0.011	0.041	-0.28	0.782	[-0.089, 0.072]	0.001
Firm size → Performance (control)	-0.007	0.047	-0.14	0.887	[-0.098, 0.086]	0.000
Manufacturing → Performance (control)	0.035	0.041	0.84	0.399	[-0.048, 0.112]	0.006
Female owner → Performance (control)	-0.013	0.043	-0.31	0.757	[-0.098, 0.069]	0.001
Owner education → Performance (control)	0.005	0.042	0.13	0.898	[-0.072, 0.088]	0.000

Note: 5,000 bootstrap subsamples, percentile intervals. R²: technology capability adoption 0.793, management practice adoption 0.805, firm performance 0.814. Q²: 0.779, 0.795, 0.725.

Source: PLS SEM estimates from authors' survey data, Mbarara City (n = 120)



Blue: paths from portfolio fit; red: paths to firm performance; yellow: paths from firm readiness; green: paths from delivery quality. Solid arrows: significant paths; broken arrows: not significant (ns). *** p < 0.001, ** p < 0.01. Interaction terms were not significant; control variables are not shown.

Figure 1. Estimated structural model

Source: PLS SEM estimates from authors' survey data, Mbarara City (n = 120)

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Portfolio fit exerted large positive effects on technology capability adoption (β = 0.691, p < 0.001, f^2 = 2.26) and management practice adoption (β = 0.746, p < 0.001, f^2 = 2.78), thereby supporting H2. This implies that firms which reported that their support had been diagnosed, matched, combined and well timed had progressed further towards routine technology use and applied more management practices. Firm readiness similarly enhanced technology adoption (β = 0.506, p < 0.001) and practice adoption (β = 0.421, p < 0.001), and since readiness was virtually uncorrelated with fit (r = 0.078), the two effects were additive. Delivery quality had no significant effect on technology adoption (β = -0.028, p = 0.540), and its small negative coefficient on practice adoption (β = -0.093) had a bootstrap confidence interval that included zero.

Both mediators enhanced performance, with technology capability adoption yielding β = 0.400 (p < 0.001, f^2 = 0.20) and management practice adoption yielding β = 0.339 (p < 0.001, f^2 = 0.12). Portfolio fit retained a smaller direct effect (β = 0.217, p = 0.003), and its total effect was large (β = 0.747, p < 0.001), which supports H1. None of the control variables was significant, indicating that the results did not depend on firm age, size, sector, owner gender or education. The model explained between 79.3 and 81.4 percent of the variance in the endogenous constructs, and the cross validated Q^2 values were well above zero, although part of this explanatory power reflects the overlap among the mediators and performance.

4.4 Mediation and moderation

Table 6. Indirect, total and interaction effects

Effect	β	SE	t	p	95% CI
PF → TCA → PERF	0.277	0.052	5.31	< 0.001	[0.171, 0.376]
PF → MPA → PERF	0.253	0.074	3.42	< 0.001	[0.113, 0.404]
Total indirect effect	0.530	0.057	9.34	< 0.001	[0.423, 0.645]
Direct effect	0.217	0.073	2.97	0.003	[0.071, 0.358]
Total effect	0.747	0.041	18.24	< 0.001	[0.657, 0.819]
PF × FR → TCA	-0.029	0.043	-0.67	0.502	[-0.123, 0.044]
PF × DQ → TCA	-0.040	0.047	-0.84	0.403	[-0.122, 0.067]
PF × FR → MPA	0.002	0.040	0.05	0.960	[-0.078, 0.079]
PF × DQ → MPA	0.058	0.047	1.25	0.213	[-0.043, 0.140]

Note: PF = portfolio fit; TCA = technology capability adoption; MPA = management practice adoption; PERF = firm performance; FR = firm readiness; DQ = delivery quality. Rows 6 to 9 are interaction terms from the two stage moderation models. Variance accounted for = 70.9%.

Source: PLS SEM estimates from authors' survey data, Mbarara City (n = 120)

Both indirect effects were positive and significant (Table 6): β = 0.277 through technology capability adoption (95 percent CI [0.171, 0.376]) and β = 0.253 through management practice adoption (95 percent CI [0.113, 0.404]), supporting H3 and H4. With a significant direct effect of the same sign, mediation was complementary (Zhao et al., 2010), and the two routes together carried 70.9 percent of the total effect of fit. For moderation, the fourth objective asked whether readiness and delivery quality made fit more powerful. None of the four interaction terms was significant (all p > 0.20), and adding them raised R^2 by less than 0.004, so H5 was not supported.

4.5 Robustness

Ordinary least squares estimates with robust standard errors confirmed the technology route: fit (β = 0.700) and readiness (β = 0.501) raised the full nine item technology stage index, and the index was the strongest predictor of performance (β = 0.624, p < 0.001). Fit also predicted the change in practices since support (β = 0.782, p < 0.001), whereas readiness did not (β = 0.020, p = 0.741), because readiness was closely tied to the practices firms already had before support (r = 0.71). Once the technology index was included, the change in practices added nothing to performance (p = 0.996), so the practice route depends on the level and retention of practices rather than on the gain since support. Table 7 summarises the outcome of each hypothesis test.

Table 7. Summary of hypothesis tests

No.	Hypothesis	Evidence	Decision
H1	Portfolio fit → performance	Total β = 0.747; direct β = 0.217	Supported
H2	Portfolio fit → technology and practice adoption	β = 0.691 and 0.746	Supported
H3	Mediation through technology adoption	Indirect β = 0.277	Supported (partial)
H4	Mediation through practice adoption	Indirect β = 0.253	Supported (partial, less robust)
H5	Moderation by readiness and delivery quality	Interactions not significant	Not supported

Source: PLS SEM estimates from authors' survey data, Mbarara City (n = 120)

4.6 Discussion of findings

The findings of the study revealed that supported SMEs in Mbarara City had utilised several services each, often in broad combinations, which is consistent with the view that small firms face several interrelated constraints simultaneously. However, most packages were assembled without a diagnosis, and fewer than one firm in four received a main service corresponding to its most binding constraint, with the gap widest for market constraints. Cravo and Piza (2019) observed that the average effects of business support vary considerably across programmes, and the present findings offer one explanation for that variation. The finding is also consistent with evidence that technical expertise, access to finance and supportive policies determine whether support programmes succeed in sub Saharan Africa (Williams et al., 2025).

The findings further indicated that portfolio fit exerted a large effect on performance, whereas the type of support had none. This finding concurs with Bruhn et al. (2018), who established that consulting tailored to the firm raises productivity and profits, and with Brooks et al. (2018), who found that mentoring responsive to the owner's circumstances outperforms generic instruction. It is further consistent with Eister and Msimango-

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Galawe (2024), who found that the effect of training on entrepreneurial self-efficacy depended on whether its content matched the type of entrepreneur.

Approximately 71 percent of the effect of portfolio fit was transmitted through adoption, which supports the distinction between exposure, adoption and routinisation. Exposure to digital records, stock systems and EFRIS was widespread, but routine use was not, and it was routine use that predicted performance. The technology route proved more robust, since it held under alternative measures and was the strongest predictor of performance in every specification. This result corroborates the assertion of Konte and Tetteh (2023) that digital financial tools enhance productivity where firms are able to utilise them. Similar results have been reported for SMEs in Tanzania (Mushi, 2024; Utonga et al., 2026), and Bakashaba et al. (2024b) found that access to digital finance partly mediates the effect of financial literacy on SME performance in Mbarara City. The practice route was also supported, which agrees with prior evidence that training and advice change small firm practices (McKenzie, 2021; McKenzie & Woodruff, 2017). However, the gain in practices did not add to performance once technology use was controlled. A likely explanation is that the practices that improved most, such as recording sales and monitoring stock, were increasingly performed through digital tools, so that the two routes overlapped.

Firm readiness enhanced adoption directly but did not moderate the effect of fit. This result partly supports Zahra and George (2002), who argue that firms must be able to recognise and apply external knowledge, but it qualifies the expectation that readiness conditions the value of support. The result also differs from Boateng et al. (2023), who found that absorptive capacity strengthened the link between external knowledge and innovativeness, which suggests that readiness may condition the absorption of knowledge more than the uptake of tools and routines. Fit and readiness appear to operate through separate channels, with fit associated with improvement after support and readiness with the capabilities firms already possessed. Low readiness is therefore not a justification for excluding firms from well fitted support; rather, it constitutes a further constraint that can be diagnosed and addressed. Delivery quality, rated highest by respondents, had no effect on adoption once fit was controlled. This matters for evaluation, simply because satisfaction with delivery is among the indicators programmes collect most frequently, and high satisfaction can coexist with a poor match between support and need.

4.7 Implications for policy and practice

Based on these findings, the researcher proposes a four stage portfolio fit framework for support under Programme 4 of the Tenfold Growth Strategy. Providers should first diagnose the binding constraint through a brief structured assessment of records, operations and markets; second, select the smallest combination of services that addresses it and plan their sequence, for example records and cash flow training before a loan, or process definition before a digital system; third, address readiness within the package by scheduling support around owner time and establishing basic records; as Eister and Msimango-Galawe (2024) recommend, training content should also be differentiated by the type of entrepreneur; and fourth, evaluate success by the technologies and practices firms continue to use at follow up. Satisfaction with delivery should not stand in for results, digital and ICT support should be expanded, and support for point of sale, stock management and EFRIS should last long enough for firms to reach routine use. For results frameworks under Track 10, the exposure, adoption and routinisation scale and the business practices index provide practical indicators to replace counts of firms reached, people trained and funds disbursed.

4.8 Limitations of the study

The study was subject to several limitations. It was cross sectional and relied on the recall of the period before support, so it identifies associations rather than causal effects, and no comparison group of unsupported firms was available. All constructs were reported by a single respondent per firm; although Harman's test did not indicate a dominant factor, adoption and performance overlapped empirically, which constrains the separate interpretation of the two mediators. Performance was self reported rather than derived from financial records, the sample was drawn from beneficiary registers in one city, and provider type was not available for analysis.

5. CONCLUSION

The main objective of this study was to examine the influence of portfolio fit of business support services on technology capability adoption and performance of SMEs in Mbarara City. The findings of the study revealed that most firms received several services, but few received a main service that corresponded to their most binding constraint, and most were not assessed before support. Portfolio fit exerted a strong total effect on performance, approximately 71 percent of which was transmitted through the technologies and practices firms subsequently adopted, while firm readiness enhanced adoption directly and delivery quality did not. The researcher therefore concludes that the effectiveness of business support depends on its correspondence with the firm's diagnosed constraint and on its conversion into routinised practice. The study contributes a tested portfolio fit framework and a twelve item measure of portfolio fit, and it shows that the technology route is the more robust channel through which well fitted support improves performance. As a policy recommendation, agencies implementing Programme 4 of the Tenfold Growth Strategy should require a structured diagnosis before support is offered, combine services around the diagnosed constraint and replace counts of firms reached with measures of routinised technology and practice use. Future research should track supported firms over time, compare supported and unsupported firms or randomise the diagnosis step, utilise administrative performance data such as EFRIS or mobile money records, and test the framework in other regional cities.

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Conflict of Interest

The researcher declares no financial or personal relationships that could inappropriately influence this research.

Data Availability

The data and analysis code that support the findings of this study are available on request The questionnaire is also available as supplementary material.

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