

Financial Constraints and Growth Trajectories of Women Entrepreneurs Through the Role of Human Capital in Business Development and Sustainability

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Abstract

Women-owned firms make an important contribution to entrepreneurship and economic development; however, financial restrictions may limit their potential to develop and maintain business operations. Previous literature tends to consider financial access as a binary variable that limits understanding of the cumulative and interactive nature of financial constraints and their impact on various aspects of entrepreneurship. The present study fills this research gap by exploring how and under what conditions financial constraints affect the growth paths of women entrepreneurs in Oman. Quantitative data of 244 women entrepreneurs from Oman was analyzed through quantitative methods. Such analytical techniques as descriptive statistics, Pearson correlations, robust OLS regression, item-level constraint analysis, constraint-count analysis, configuration analysis, and moderation models were used. Due to missing values, the number of observations varied for certain analyses: $N = 74$ for item-level regression, $N = 71$ for constraint-intensity, configuration, and moderation models. Educational attainment had a positive and statistically significant effect on entrepreneurial success ($\beta = 0.20$, $p = .003$), while work experience had a positive yet marginally significant effect ($\beta = 0.13$, $p = .060$). Insufficient collateral ($\beta = -0.252$, $p = .047$) and credit history restrictions ($\beta = -0.269$, $p = .036$) had a significant negative impact on income growth. The strength of constraint had a negative correlation with income growth ($\rho = -0.284$, $p = .014$). The interaction between collateral and credit history had a significant negative effect ($\beta = -0.186$, $p = .028$). Human capital interaction effects were positive but insignificant. The results reveal that financial exclusion is not just an 'either/or' phenomenon but rather a cumulative and configurational one. Policies should target financing constraints and enhance women's entrepreneurs' human capital assets. Research should rely on large samples across longitudinal and country settings to test causality and explore financing alternatives.

Keywords: Women Entrepreneurship, Financial Constraints, Human Capital, Entrepreneurial Growth, Constraint Intensity, Constraint Configuration, Oman.

Introduction

Entrepreneurship by women has emerged as a critical factor in inclusive economic development, employment generation, household welfare, and economic diversification. In spite of this, women-run businesses continue to face many barriers in their path of enterprise development, especially in accessing outside funding. Traditional research tends to view financial access as a binary process—that is, whether or not entrepreneurs receive credit while entrepreneurs may be faced with several constraints in terms of collateral, income, credit score, experience, business plans, and assets simultaneously. These constraints may come together and interact, having varied impacts on enterprise development.

This is particularly relevant in Oman, as the involvement of women in enterprise formation has grown with economic diversification, educational advances, and labor market inclusiveness. But there is a lack of information regarding how current financial constraints impact women entrepreneurs, which constraints have the greatest binding effect, and what makes certain entrepreneurs more resilient than others.

The present study makes three distinct contributions. Firstly, it shifts away from simple dichotomous indicators of financial access, by understanding financial constraints on the basis of intensity, pattern, and bindingness. Secondly, it explores if certain patterns, particularly of collateral constraints and credit history constraints, carry greater significance for entrepreneurial development. Thirdly, it brings in human capital as a capability and as a possible buffer against these financial constraints.

As such, the study aims to achieve four specific objectives:

- (1) To establish whether education, work experience, and age can predict performance in entrepreneurship;
- (2) To investigate the impacts of financial constraints on growth and sustainability;
- (3) To establish the effects of intensity and configuration of constraints on growth; and
- (4) To investigate whether human capital mitigates the negative impacts of financial constraints.

The rest of this paper is divided into the following sections. Section 2 contains the literature review and theory. Section 3 provides the theoretical framework and hypotheses. Section 4 provides the methodology that includes research design, measurement, data collection, and analysis procedure. Section 5 shows the empirical findings. Section 6 provides the discussion and the implications of the findings both theoretically and practically. Section 7 concludes the paper.

Literature Review

Increasingly, women entrepreneurship is viewed as an essential strategy for economic diversification, job creation, and sustainable development. Nonetheless, the access to adequate financial resources is still problematic since the existing literature points out the necessity to analyze barriers to financing beyond the binary framework of access and non-access (Valencia-Arias et al., 2026; Leitch et al., 2018). Moreover, different strategies of financing, expectations regarding growth, and industry conditions may affect the growth prospects of businesses managed by women, while even resource-rich countries encounter problems with institutions and policies related to women entrepreneurship (Yacus et al., 2019; Al-Qahtani et al., 2022). Digital entrepreneurship ecosystem is another factor that affects women entrepreneurship (Huang et al., 2025; Chen & Barcus, 2024).

According to the literature, the development of women entrepreneurs is affected by the wider institutional, social, and capability aspects. There are personal and contextual factors linked to venture success, whereas the existence of patriarchal systems and social constraints can limit entrepreneurship (Kothari, 2017; Onoshakpor et al., 2025). Capability dynamism can enhance entrepreneurship outcomes through its role in responding to changing environments (Nigam & Shatila, 2024). In general, entrepreneurial finance is highly related to firm development, although the way in which it affects development can be different from one firm to another (Fraser et al., 2015; Khamitdkhanovich et al., 2025). Furthermore, institutional constraints can limit entrepreneurial development, especially if entrepreneurs lack key resources (Tunio et al., 2021; Eesley, 2016).

Human capital offers another valuable complementary explanation for differences in entrepreneurial success. Education, experience, and other capabilities are useful in improving entrepreneurial performance and resource

management (Sun & Fong, 2022; Brush et al., 2017). Human capital is also significant in external financing considerations since the financiers may evaluate entrepreneurs based on their knowledge, experience, and capabilities (Pierrakis & Owen, 2023). Social capital, gender roles, networking, empowerment, and cultural capital may also affect women's financing decisions and entrepreneurship process (Wang et al., 2022; Yeröz, 2019; Shastri et al., 2019). Capability and governance approaches stress that human capital plays a role in value creation together with the organizational resources, while social capital may help in extending human capital through relational knowledge and network (Mahoney & Kor, 2015; Seet et al., 2018).

Overall, the findings reveal the importance of finance, human capital, capabilities, and institutions on women's entrepreneurship. Nevertheless, very little research has been done on the combined effect of multiple financial constraints, the types of financial constraints that are most binding, and whether human capital acts as a buffer against such constraints. Research has provided very little evidence regarding Oman specifically. The current paper aims to fill the existing knowledge gap regarding the combined effect of financial constraints and human capital on women entrepreneurs.

Conceptual Framework

This study offers an integrated conceptual framework that seeks to provide a deeper understanding of how financial constraints and human capital affect the growth paths of women-owned businesses. In this framework, financial constraints are not simply defined based on access and non-access to finance but are defined as constraints based on their strength, pattern, and binding nature. Hence, it is hypothesized that financial constraints will affect entrepreneurial growth not only individually but also collectively as accumulated and multiple constraints, especially collateral and credit history constraints.

The first element of the framework is human capital, which is defined mainly in terms of education level and prior work experience. Human capital is expected to improve entrepreneurship performance because of knowledge improvement, decision making, financial awareness, opportunity identification, and management of business assets. Thus,

H1 proposes that human capital has a positive effect on entrepreneurial performance and growth.

The second constraint is that of finances, whereby there will be limitations imposed on the availability of resources needed to expand and sustain their businesses. This includes constraints such as lack of collateral, inadequate funds, lack of assets, poor credit rating, lack of experience, and inability to formulate business plans. Therefore,

H2 proposes a negative relationship between financial constraints and entrepreneurial growth outcomes.

The model will also help differentiate between the intensity and pattern of financial constraints. More constraints operating together could lead to compounding problems, and certain patterns of constraints might generate more hurdles than the constraints themselves. In particular, having collateral and credit history constraints operating together may generate a binding financing constraint. Thus,

H3 proposes that greater financial-constraint intensity and the co-occurrence of binding constraints are negatively associated with entrepreneurial growth.

Lastly, the model suggests that human capital can serve as a moderating capability rather than just being a direct predictor. The education level and previous experience of women entrepreneurs may aid them in overcoming some of their problems related to financing by developing financial skills and capabilities. As a result,

H4 proposes that human capital weakens the negative effect of binding financial constraints on entrepreneurial outcomes.

Therefore, the model embodies Structure-Capability Interaction where financial constraints are structural constraints, while human capital constitutes an adaptive capability that can help build up resilience of the entrepreneurs against the structural constraints. Age, firm size, industry, and location could be included as control variables. This is shown in fig 1.

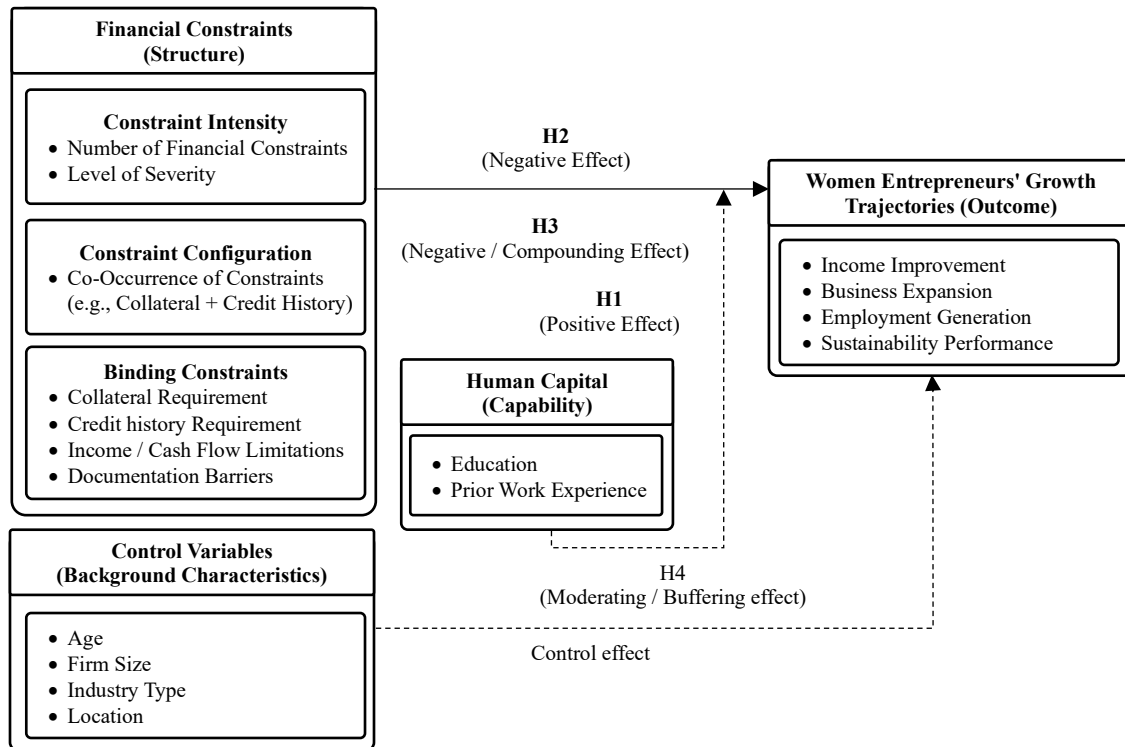


Fig. 1: Conceptual Framework Linking Financial Constraints, Human Capital, and Women Entrepreneurs' Growth Trajectories

Methodology

Research Design

This study relies on data of 244 women entrepreneurs from Oman to investigate the connections between human capital, financial constraints, and entrepreneurial success. An empirical approach has been used by means of descriptive statistics, Pearson correlation, robust OLS regression analysis with HC3 standard errors, item-level constraint analysis, constraint-count analysis, configurational analysis, and moderation analysis. Human capital is defined by means of education and work experience, while financial constraints are considered on the level of individual obstacles, obstacle intensity, and configurations of binding obstacles, including obstacles related to collateral and credit history in particular. Entrepreneurial success is measured via performance, income increase, and sustainability variables. The number of observations was not always the same due to missing values (N = 74 for item-level regression; N = 71 for obstacle intensity, configuration, and moderation analysis).

Study Population and Sampling

The sample size involved 244 female entrepreneurs and women-owned firms in Oman. Information was obtained from female entrepreneurs with varying features and experiences in entrepreneurship. The dataset included different counts of valid cases among the variables due to item missingness. The data analysis therefore took the approach of using the maximum valid cases per variable in descriptive and regression analyses and the minimum valid cases in modeling.

Data Collection

The primary data was collected through a structured questionnaire, which sought to gather information about entrepreneurs' demographics, human capital, financial constraints, performance of their businesses, and sustainability outcomes. The questionnaire gathered information on different types of financing and business constraints, thereby making it possible for financial constraints to be assessed both individually and collectively. Information on education and work experience was also gathered to capture human capital.

Variables and Measurement

The primary explanatory variables used were human capital and financial constraints. Human capital was measured through education level and previous experience, with age controlled for as well. Financial constraints were defined

through the presence of obstacles such as absence of collateral, low income levels, lack of experience, problems with business plan formulation, credit history obstacles, and lack of assets. The intensity of constraints was measured through a constrained index, which was measured based on the total number of constraints faced by an entrepreneur. Constraint configurations were based on the simultaneous occurrence of certain types of constraints, especially those related to credit history and collateral. Growth-related results were measured using business and income improvement metrics, with sustainability being another entrepreneurial result.

Operationalization of Financial Constraints

Constraints in finance have been considered as a formative construct and not as a reflective latent variable. The individual constraints are unique barriers which combine together to make up the entrepreneur's financial disadvantage; thus, removal of one constraint does not mean that the meaning of the other constraints is reduced. The research has looked at the number of constraints as well as the combination of constraints.

Empirical Models

Initially, descriptive statistics and Pearson correlations were used to analyze the distribution of variables and their bivariate associations. The next stage involved OLS regression to analyze the association between human capital and entrepreneurial performance. The Constraint Count model tested whether an increase in the intensity of constraints is associated with growth outcome. Item-level regressions helped to test the impact of each particular financial constraint. Configuration analysis was conducted in order to estimate the impact of combined constraints, especially collateral and credit history constraints. Moderation models with interaction terms included between financial constraints and human capital variables were conducted in order to find out whether education and experience affect the impact of financial constraints. Heteroskedasticity-robust standard errors of HC3 type were used in order to address potential heteroskedasticity issues.

Hypothesis Testing Procedure

The hypothesis H1 was tested through correlation analysis and OLS regression that tested the effects of education and work experience on the performance of the entrepreneurs. The hypothesis H2 was tested using regression analysis which tested the effects of financial constraints on the growth and sustainability of firms. The hypothesis H3 was tested using Constraint Count analysis and configuration analysis which tested the effects of increased levels of constraint intensity and combinations of constraint bundling on performance. The hypothesis H4 was tested through interaction analysis with financial constraints $\times$ education and financial constraints $\times$ work experience.

Results

Descriptive Statistics

The results from the descriptive statistics reveal some level of variability in the characteristics of the respondents provided in table 1. The average age of the participants was 26.8 years (Standard Deviation = 7.7) with the range being from 17 to 57 years. The education variable had an average value of 2.14 (Standard Deviation = 1.04). The minimum and maximum scores were 1 and 4 respectively. Work experience had an average of 1.54 (Standard Deviation = 0.50). Its range was between 1 and 2. The average value for the Entrepreneurial Performance Index was 2.37 (Standard Deviation = 0.52).

Table 1: Descriptive Statistics

Variable	N	Mean	SD	Min	Max
Age	243	26.80	7.70	17	57
Education	244	2.14	1.04	1	4
Work experience	237	1.54	0.50	1	2
Performance Index	214	2.37	0.52	1.33	3.00

Source: Study data.

Human Capital and Entrepreneurial Performance

The relationship between human capital and entrepreneurial performance was first examined using Pearson correlations. Education showed a positive and statistically significant correlation with the Performance Index ($r = .17$, $p < .05$). Work experience was positively related to performance, although the relationship did not reach the conventional .05 significance level ($r = .13$, $p = .06$). Age showed a negligible and statistically insignificant relationship with performance ($r = -.02$, $p = .74$). Table 2 demonstrates the correlations with entrepreneurial performance.

Table 2: Correlations with Entrepreneurial Performance

Predictor	<i>r</i>	<i>p</i>
Age	-0.02	.740
Education	0.17	< .05
Work experience	0.13	.060

Table 3 provide further evidence for the role of education. Education had a positive and statistically significant association with entrepreneurial performance ($B = 0.096$, $SEHC3 = 0.033$, $\beta = .20$, $p = .003$). Work experience remained positive but was not statistically significant at the .05 level ($B = 0.135$, $SEHC3 = 0.072$, $\beta = .13$, $p = .060$). Age was not significant ($B = -0.002$, $SEHC3 = 0.006$, $\beta = -.03$, $p = .736$), and the dataset indicator was also insignificant ($\beta = -.01$, $p = .897$). The model explained 4.6% of the variance in entrepreneurial performance ($R^2 = .046$; adjusted $R^2 = .028$).

Table 3: Multiple Regression Results for Entrepreneurial Performance

Predictor	B	SE (HC3)	Std. β	<i>p</i>
Age	-0.002	0.006	-0.03	.736
Education	0.096	0.033	0.20	.003
Work experience	0.135	0.072	0.13	.060
Dataset indicator	-0.009	0.071	-0.01	.897

Model fit: $R^2 = .046$; Adjusted $R^2 = .028$.

Generally speaking, the hypothesis H1 is partially validated in that education has a positive impact on entrepreneurship while work experience and age fail to prove statistically significant.

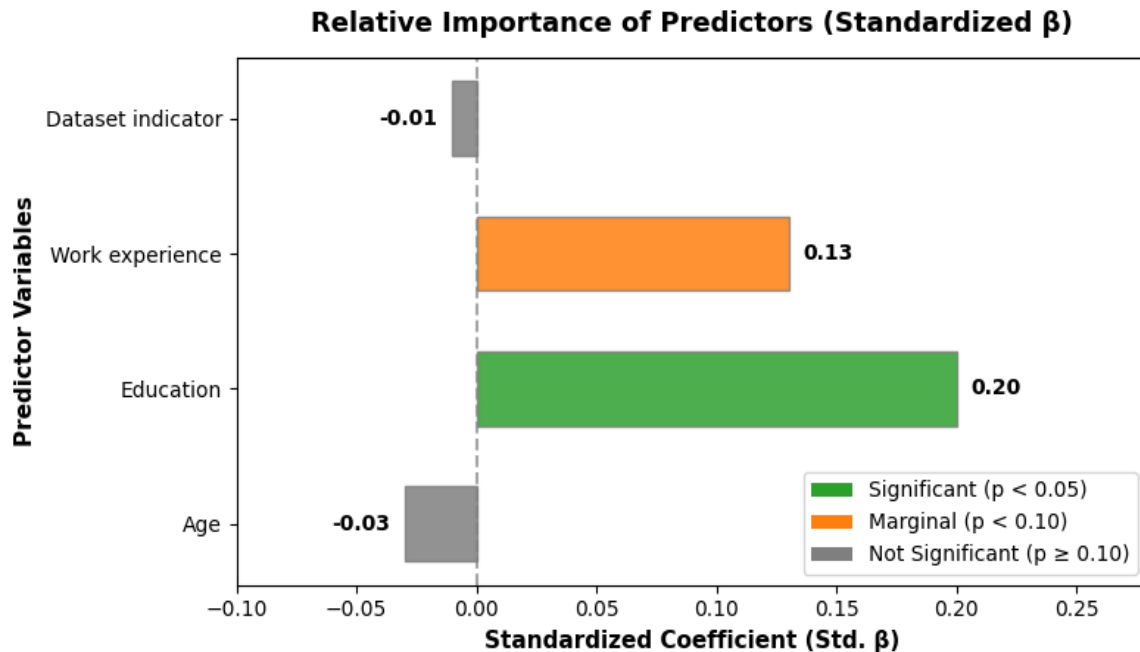


Fig. 2: Relative Importance of Predictors of Entrepreneurial Performance (Standardized β Coefficients)

Fig 2 compares the standardized regression coefficients of the predictors. Education shows the strongest positive and statistically significant effect ($\beta = 0.20$, $p = .003$), followed by work experience with a positive but marginal effect ($\beta = 0.13$, $p = .060$). Age ($\beta = -0.03$, $p = .736$) and the dataset indicator ($\beta = -0.01$, $p = .897$) are not statistically significant. Overall, education emerges as the most influential predictor of entrepreneurial performance.

Financial Constraints and Growth/Sustainability

The financial-constraint analysis identified collateral as the most frequently reported constraint. Lack of collateral was reported by 48.0% of respondents, followed by insufficient income (37.3%), lack of experience (33.3%), business-plan limitations (24.0%), credit-history barriers (14.7%), and lack of fixed assets (13.3%) are shown in table 4.

Table 4: Prevalence of Financial Constraints

Financial constraint	Count	Proportion (%)
Lack of collateral	36	48.0
Insufficient income	28	37.3
Lack of experience	25	33.3
Weak business plan	18	24.0
Credit-history barrier	11	14.7
Lack of fixed assets	10	13.3

At the item level, lack of collateral and credit-history barriers were statistically significant negative predictors of income improvement. The standardized coefficient for lack of collateral was $\beta = -.252$ ($p = .047$), while the coefficient for credit-history barriers was $\beta = -.269$ ($p = .036$) are represented in table 5. The remaining constraints were not statistically significant: fixed assets ($\beta = -.187$, $p = .252$), business plan ($\beta = -.143$, $p = .345$), experience ($\beta = .032$, $p = .799$), and insufficient income ($\beta = -.010$, $p = .932$). The model used 74 observations and explained 17.2% of the variance in income improvement ($R^2 = .172$; adjusted $R^2 = .097$).

Table 5: Item-Level Financial Constraints and Income Improvement

Constraint	Std. β	p
No collateral	−0.252	.047
Credit-history barrier	−0.269	.036
Lack of fixed assets	−0.187	.252
Weak business plan	−0.143	.345
Lack of experience	0.032	.799
Insufficient income	−0.010	.932

N = 74; $R^2 = .172$; Adjusted $R^2 = .097$.

Sustainability. The constraint count model revealed that there was a negative relationship between financial constraint intensity and the sustainability index, even though the explanatory value was quite low ($N=71$; $R^2=.091$; adjusted $R^2=.036$).

Thus, H2 is supported for growth/income improvement, especially for the collateral and credit history constraints, but not for the sustainability objective.

Constraint Intensity and Configuration

The constraint-intensity analysis showed a negative relationship between the number of financial constraints and income improvement. The Constraint Count coefficient was $\beta = -.258$ ($p = .061$), with a bootstrapped 95% confidence interval of $[-.476, -.026]$. The model included age, education, and work experience and explained 17.4% of the variance in income improvement ($R^2 = .174$; adjusted $R^2 = .124$). Work experience was positive and statistically significant ($\beta = .301$, $p = .010$), while age and education were not significant in this specification. Table 6 shows the constraint intensity and income improvement.

Table 6: Constraint Intensity and Income Improvement

Predictor	Std. β	p	Bootstrapped 95% CI
Constraint Count	−0.258	.061	$[-.476, -.026]$
Age	−0.027	.831	—
Education	0.135	.150	—
Work experience	0.301	.010	$[0.074, 0.497]$

N = 71; $R^2 = .174$; Adjusted $R^2 = .124$.

It was also found that Constraint Count had a significant negative correlation with improvement of income ($\rho = -.284$, $p = .014$). The correlation with the sustainability variable was also negative but not statistically significant ($\rho = -.212$, $p = .070$).

The configuration model yielded additional information about the relationship of the joint effect of constrains. It has been found that the interaction of the constrains was negative and statistically significant ($\beta = -.186$, $p = .028$). The configuration model accounted for 25.3% of the variation in improvement of income ($R^2 = .253$; adjusted $R^2 = .129$). Table 7 shows constraint configuration and income improvement.

Table 7: Constraint Configuration and Income Improvement

Term	Std. β	p	Interpretation
Collateral $\times$ Credit History	-0.186	.028	Compounding structural barrier
Work experience	0.248	.056	Buffering capability effect

$N = 71$; $R^2 = .253$; Adjusted $R^2 = .129$.

The model for the sustainability outcome generated an R^2 of .160 and an adjusted R^2 of .020, showing poorer explanatory power compared to the income improvement model. There was no significant relationship between the binary growth perception outcome and Constraint Count.

In summary, H3 finds support for objective income-growth outcomes but especially the joint collateral and credit history configurations. There is less support for sustainability and subjective growth perceptions.

Human Capital $\times$ Financial Constraints and Growth

Moderation analysis tested whether education and previous work experience affect the impact of binding financial constraints on income increase. The model consisted of the following variables: collateral, credit history, their interaction, education, work experience, their interaction, and age as a control variable. The regression model of income increase was estimated using 71 observations and accounted for 22.5 percent of the variance ($R^2 = .225$; adjusted $R^2 = .096$) presented in table 8.

Table 8: Moderation of Binding Financial Constraints on Income Improvement

Term	Std. β	p
Collateral	-0.157	.246
Credit History	-0.106	.586
Collateral $\times$ Credit History	0.014	.938
Collateral $\times$ Education	0.119	.424
Credit History $\times$ Education	0.220	.353
Collateral $\times$ Work Experience	0.143	.439
Credit History $\times$ Work Experience	0.139	.558

$N = 71$; $R^2 = .225$; Adjusted $R^2 = .096$.

All the four interaction terms related to human capital were positive, pointing to a directional buffering relationship, but they were not statistically significant at the .05 level. In this regard, the interaction results show directional rather than statistically strong evidence in support of H4.

However, the predicted value analysis revealed a clear difference in income improvement under collateral constraint. Predicted income improvement for an entrepreneur without any previous work experience is 2.436 without any collateral constraint and 2.055 with the presence of a collateral constraint. On the other hand, predicted income improvement for an entrepreneur with previous work experience is 2.647 and 2.564 respectively.

The model on sustainability moderation performed poorly ($R^2 = .097$; adjusted $R^2 = -.053$). Direction of moderation effects is same as that in the income improvement model.

Thus, H4 is directionally supported, but not statistically supported, by the interaction coefficients shown.

Summary of Hypothesis Testing

Table 9: Summary of Hypothesis Testing

Hypothesis	Relationship	Main Statistical Evidence	Result
H1	Human capital $\rightarrow$ Entrepreneurial performance	Education: $\beta = .20, p = .003$; Work experience: $\beta = .13, p = .060$	Partially supported
H2	Financial constraints $\rightarrow$ Growth/sustainability	Collateral: $\beta = -.252, p = .047$; Credit history: $\beta = -.269, p = .036$	Supported for growth; weaker for sustainability
H3	Constraint intensity/configuration $\rightarrow$ Growth	ConstraintCount: $\rho = -.284, p = .014$; Collateral $\times$ Credit History: $\beta = -.186, p = .028$	Supported
H4	Human capital moderates finance-growth relationship	Interaction coefficients positive but all $p > .05$	Directionally supported, statistically weak

The support for H1 is provided by table 9 in education, while H2 is supported by table 9 in the use of particular binding financial constraints. Both binding intensity and the collateral-credit history combination support H3 in table 9. The

human-capital interaction terms in H4 have a clear positive sign, although the interaction coefficients themselves fail to reach the standard .05 level of significance.

Discussion

The results indicate that there is an effect of financial barriers on the growth of female entrepreneurs by way of individual and aggregate effects. Education is a key determinant of entrepreneurial success, while the effects of collateral and credit barriers are important financial constraints. The inverse relationship between constraint severity and improvement in income, together with the significant interaction between collateral and credit, show that financial barriers can become increasingly constraining where such barriers overlap or coexist. Human capital seems to have a potentially moderating effect, especially where past employment is concerned.

The results have both theoretical and practical significance. From a theoretical standpoint, this supports efforts to move away from binary measures of financial access towards intensity and configuration perspectives. From a practical perspective, financial institutions and policy-makers need to examine different options regarding collateral arrangements, credit-building opportunities, and training for entrepreneurship for women-owned firms.

This research has some limitations. Firstly, the cross-sectional nature of this study makes it difficult to establish causality. Secondly, the size of the complete-case sample used in the regression and moderation models is relatively small. Differences in sample sizes between the analysis are due to missing data. Sustainability was proxied using a composite measure.

Further research should focus on longitudinal and bigger multinational samples, as well as look into other types of human and social capital, and investigate if the use of different financing sources can minimize the effect of financial constraints.

Conclusion

This research explores the effects of financial constraints, human capital, and their interactions on the development paths of woman-owned firms in Oman. The results show that the impact of financial conditions on entrepreneurship does not only depend on the presence of finance, but also on the intensity and nature of financial constraints. Another key variable that emerged from this study is human capital. Higher education is positively correlated with entrepreneurship success ($\beta = 0.20$, $p = .003$), while work experience has a positive but insignificant correlation ($\beta = 0.13$, $p = .060$).

The influence of financial constraints was more evident on growth outcomes. The absence of collateral ($\beta = -0.252$, $p = .047$) and the presence of credit history constraints ($\beta = -0.269$, $p = .036$) significantly predicted the failure to increase income levels. Moreover, the higher degree of financial constraints correlated with worse economic outcomes, being negatively related to income improvement ($\rho = -0.284$, $p = .014$). Finally, the specific combination of collateral and credit history constraints exerted a significant negative impact on growth outcomes ($\beta = -0.186$, $p = .028$).

While the results indicate a positive direction of interaction between human capital variables education and work experience, the interaction coefficients do not attain statistical significance. Hence, the postulated moderating effect of human capital needs to be treated with caution.

Future studies need to conduct large-scale longitudinal studies and consider other types of human and social capital, as well as financing mechanisms across different countries. This way, better insights into the ways institutions and other mechanisms decrease the burden of finances will be obtained.

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