Effect of Human Capital and Dynamic Capabilities on Competitive Advantage: Mediating Analysis

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

Original Research Article

ABSTRACT

Aim: A better understanding of farm-level competitiveness of agribusiness sector provides the necessary framework for agribusiness farms to compete at domestic and global markets. This study aims to determine the relationships of human capital, dynamic capabilities and competitive advantage in the minor export crop sector in Sri Lanka.
Study Design: Minor export crop farm owners involved in the commercial cultivation of cinnamon, pepper and clove in Sri Lanka were surveyed using a personally-administered, structured questionnaire. The regression-based path analysis was used to test the model.
Results: The results indicate significant relationships between human capital and capabilities of learning and relationship building as well as between human capital and competitive advantage.
Implications: The findings provide useful insights where an understanding of the link between human capital, as a resource, in dynamic capabilities and competitive advantage which allows human capital to be configured appropriately and deployed effectively and efficiently based on dynamic capabilities of the minor export crop farms to achieve competitive advantage.
Original: The study has extended our understanding of the importance of human capital for in relation to dynamic capabilities.

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1. INTRODUCTION

There is no competitive nation has no competitive firms and therefore competitiveness of a nation strongly depends on the competitive advantage of its firms [1]. Because of this, firm-level competitive advantage has so far received the greatest attention of researchers and practitioners [2,3,4]. Along with that, iidentification of the sources of competitive advantage has become a very important area in academic studies.

Premised on the above, competitive advantage of agribusiness has generated much interest in the academic literature [5]. It deserves special attention due to the significant contributions made by the sector in terms of larger share to the total economy in terms of land utilisation, employment opportunities and economic growth. Whilst the sector is recognised as a provider of major livelihood support to many people in developing countries [6], it is timely to place more concern on the sources of competitive advantage in this sector.

A review of literature suggests that there are a handful of studies available on agribusiness firms [7,8,5,9], with different sources of competitive advantage being proposed. Majority of the studies found human capital as source of competitive advantage of agribusiness sector. The results of these studies suggest that unavailability of professional labourers is one of the top constraints impeding competitiveness in agribusiness. Human capital in agribusiness farms differ from other sectors because the majority of labourers consist of family members and cooperating neighbours. Although prior related studies have explored the human capital as the main determinant of competitive advantage at farm level, it is apparent that little attention has been paid to pre-determined functional relationship of human capital and capabilities which enable the farms to gain competitive advantage.

Makadok [10] explains that a firm can create competitive advantage not by selecting suitable resources than rivals, but by integrating them with proper capabilities. In order to understand how human capital correlates with capabilities and competitive advantage, there is a need to carry out conceptual-level investigation on the mediating role of capabilities on human capital and competitive advantage in agribusiness sector. For this purpose, after concerning the expert's opinion, the study focused on two dynamic capabilities, namely organisational learning capability and relationship building capability. The study focuses specifically on the minor export crops sector in Sri Lanka in view of the fact that this sector has since become one of the emerging sectors due to its highest foreign exchange earnings to the country. The major producers of these crops are increasingly feeling the pressure of growing demand versus limited productivity due to constraints in their resources and capabilities because of their family-owned, small-scale nature [11,12], which affect their competitive positions.

2. LITERATURE REVIEW

2.1 Competitive Advantage

Competitive advantage of a firm encompasses its ability to maintain or enlarge its market share [13], profits [14] and is measured against one or more competitors [15,16]. It has a useful scientific purpose which is beneficial to different industries [17], including the agribusiness sector.

The Resource-Based View (RBV) consists of a rich body of related theoretical tools to analyse sources of the competitive advantage at firm level [18,19,20]. Thus, the RBV provides an established theoretical model to examine the relationship between resources and the competitive advantage of firms [21,22].

Kortelainen [23] propose the dynamic RBV approach that focuses on dynamic capabilities of firms, linking resources to competitive advantage. Hence, the RBV can be characterised by two basic maxims: (1) resource endowments are heterogeneously distributed; and (2) capabilities which allow the firm to sustain competitive advantage [24]. Accordingly, a firm needs to possess unique resources and exploit those resources through its capabilities. Makadok [10] clearly mentions that capability-building mechanism affects economic profit only after the acquisition of resources. He emphasises that firms can create competitive advantage not by selecting suitable resources than their rivals, but by integrating them with proper capabilities.

2.2 Human Capital

Prior studies related to the agribusiness sector have identified different resources (land, building, reputation, labour, technology, social capital, physical capital and so on) that act as sources of

competitive advantage. Among various resources, Dlamini [25] suggest that professional labourers or human capital is one of the top constraints impeding competitiveness in agribusiness. Human capital is referred to as the experience, intelligence and training of employees [19,26]. When people possess knowledge and experience, they are able to share their knowledge with others in the firm. Human assets also include skills, intelligence, relationships and trust of and/or amongst employees [27,28]. Such assets play an important role in terms of carrying out and managing the agribusiness processes [29]. However, human capital in agribusiness farms differ from other sectors because the majority of labourers consist of family members and cooperating neighbours. This is applicable to the minor export crop farms too, where more than 70% of the production side of the sector are family-owned smallholders. Having employees who are experienced and dedicated to their work and those who require less supervision are valuable human assets to farm owners due to the need to generate high quality yield [29]. Further, the skills-based qualities of employees are extremely important due to the pressure to increase productivity as a result of increased demand.

Similar to human capital, the study focused on two capabilities; organisational learning and relationship building. The following section discusses each capability, emphasising their important roles to agribusiness farms.

2.3 Organisational Learning Capability

Knowledge is viewed as a resource and human assets play important roles to transform knowledge. Hence, the competitive advantage of firms relies on the knowledge they possess. Such knowledge should be developed through organisational learning [30]. This is the reason why, the dynamic perspective of RBV approach often follows the organisational learning approach [31].

The organisational learning approach emphasises that market-based learning is required to obtain competitive advantage [17]. Hence, organisational learning capability reflects the ability to develop the knowledge that facilitates changes in the market conditions [31]. The dynamic capabilities view that new knowledge needs to be developed for the activities of creating, extending and modifying the routines and resources of firms in response to

changing market conditions [32]. There in, organisational learning is a routine-based activity [33], which encourages employees to question the practices, norms and challenges of firms [31]. Building learning capabilities within an organisation facilitates learning amongst employees through the sharing of their knowledge [34]. This is especially critical for small scale firms that are working in a competitive environment where organisational learning is required to augment their capabilities [35].

The agribusiness sector is increasingly facing competitive challenges due to technological innovation and changes in global economies and climate [36]. As a result, modern-day agriculture is characterised by high-yielding seeds, fertilizers and plant protection [37]. Such challenges demand farmers to capture greater value based on know-how [38] and this leads the farmers to actively search for new information and knowledge. Hence, learning ability is essential for economic survival and the success of the agricultural sector also depends on learning capacity of farms [39]. Since learning capability is important to the success of farms in this dynamic environment, it is vital to determine the effect of learning capability on competitive advantage of the minor export crop farms.

Through skilful and experience employees, farms acquire the value based on know-how and encourage employees to learn by themselves and amongst employees and shar the knowledge [34]. Hence, human capital offers farms to actively search for new information and knowledge. Hence, the following hypotheses ensue:

H1: There is a significant relationship between human capital and organisational learning capability of the minor export crop farms in Sri Lanka.

H2: Organisational learning capabilities significantly mediate the relationship between human capital and competitive advantage.

2.4 Relationship Building Capability

Whilst the RBV theory focuses on the internal resources and capabilities of firms, it also seeks inter-firm relationship as a source of competitive advantage [40]. In fact, academics have suggested that the alliance forming capability of firms provides them with competitive advantage [41] because they can gain access to lacking

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resources and are able to take advantage of new opportunities [42]. For this reason, inter-organisational relationships and competitive advantage of firms have received continuous attention over the last two decades [43].

Collaborative arrangements between or amongst firms in terms of product development and knowledge sharing are a common phenomenon in business today. In fact, it has become more important for firms to act together with customers, competitors, government and other authorised parties. Specifically to the small-scale minor export crop farms, relationship building capability underlies their ability to share information, communication and develop long-term relationships with stakeholders such as with other farms, customers, competitors, government and other authorised parties [31]. The ability to build effective network structure stimulates sustainable competitive advantage through generating relating rent. Ngugi [43] found that relational capabilities are especially crucial for small and medium agricultural product suppliers where relational capabilities influence their value creation and innovation. Agada [44] reveals that capital is often constrained to agricultural production and therefore, organisations should provide shared loan facilities to farmers. At the same time, farmers are encouraged to form groups in order to obtain shared loans from relevant authorities.

Having skilfull and experience employees offer the farms to establish links with its stakeholders. Professional human capital enables farms to get a better understanding of customers, competitors, suppliers and other supporting institutions. The following hypotheses are thus proposed:

H3: There is a significant relationship between human capital and relationship building capability of the minor export crop farms in Sri Lanka.
H4: Relationship building capabilities significantly mediate the relationship between human capital and competitive advantage.

3. METHODOLOGY

The scope of this study included entities who are experienced in the commercial cultivation of the three minor export crops in Sri Lanka. There is total of 26,413 farms in the target population. The sample size was determined at 648 farms, with 216 farms per each crop. In order to obtain the said sample size, proportionate stratified random sampling technique was employed in this study [11,12].

A personally-administered, structured questionnaire was developed to collect data from the farm owners. Acknowledging the literature, measurement items were developed to measure human capital, organisational learning capability, relationship building capability and competitive advantage (Table 1). The structured questionnaire consisted of 34 items, using a five-point Likert scale ranging from strongly disagree to strongly agree.

3.1 Data Analysis

Mediation analysis focuses on the path-analytical approach which introduces the concept of relative indirect, direct and total effect [47,48]. Regression-based path analysis allows for the modelling of multiple interrelated relationships between endogenous and exogenous variables, decomposing correlation into direct, indirect and spurious effects [49]. Hence, the regression-based path analysis is employed to test the mediating effect of hypotheses constructed. The regression-based path analysis follows four steps in order to assess the mediating effects of variables and their significance. Accordingly, the path coefficient between independent and dependent variables has to be significant. Likewise, the path coefficient between independent and mediating variables, as well as between mediating and dependent variables should be significant as well. When the mediating variables are included in the model, the path coefficient between independent and dependent variables should decrease in size and indirect effect should be significant. The study uses bootstrapping at 5,000 times because bootstrapping extensively re-samples from the original sample and corrects the underlying abnormal sampling distribution [50].

4. FINDINGS

Data was collected from the 456 farm owners located in twelve DSDs and 42 villages in Sri Lanka, resulting a 70.4% response rate. The majority of respondents are more than 50 years old, with 10 to 20 years of farming experience, hence enabling them to provide adequate and accurate responses to the study. In addition, the majority of them also reported the use of less than 5 acres of land to cultivate the three crops, signifying the small-scale nature of their businesses.

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Table 1. Measurement Items

Variables	Items	Source
Human Capital (HC)	Experienced employees Educated employees Employees come up with new ideas Trusted employees Employees are dedicated towards work Employees are capable of carrying out their own work	Ismail [28]
Organisational learning capability (OLC)	Employees openly discuss mistakes Employees help each other to learn Employees learn through activities Invest in new ideas of employees Able to devote the commitment of our employees towards the farm goal(s)	Lages [31] Vorhies and Morgan [17]
Relationship building capability (RBC)	Openly communicate with our employees Openly communicate with our customers Maintain close relationship with agricultural supportive institutions (e.g. Agricultural Research Institute, Department of Agriculture, Spice Council) Able to share financial assistance with other farmers (shared loans) Build relationship for identifying market opportunities	Ngugi [43]
Competitive Advantage (CA)	Offer competitive price Able to offer price as low as other farmers Able to offer price lower than other farmers Able to compete based on our product quality Offer products that are highly reliable Offer products that are very durable Offer high quality products to our customers Deliver customer orders on time Provide dependable delivery Deliver the kind of product needed by our customers Deliver product to market quickly Time-to-market lower than industry average Product delivery time is lower than other farmers Able to expand our customer base than other farmers Able to expand our supplier base than other farmers Able to access financial resources than other farmers Able to obtain human resources than other farmers Able to access capital goods than other farmers	Awwad [46] Newbert [45]

4.1 Assessing the Goodness of Data

Factor analysis was applied for data reduction and purification of the items under each variable of the study. According to Malhotra [51], KMO measure which is 0.50 or higher indicates the appropriateness of factor analysis. The results in Table 2. show that the KMO measure of the variables were greater than 0.50 (p<0.05), indicating the appropriateness of factor analysis. The reliability of individual items was also assessed by examining their internal consistency values through computing the construct reliability (<0.90), average variance extracted (AVE) (<0.50) and Cronbach's Alpha values (<0.70) [52,53]. The results in Table 2. show that the construct reliability, AVE and alpha values were above the suggested cut-off values, implying adequate reliability of the items.

The study also considered the computed AVE to test discriminant validity. It is recommended that

the AVE should be higher than the corresponding inter-construct squared correlations [52,53]. The results of this study supported the discriminant validity of each of the variables as the AVE values were far greater than the corresponding inter-construct squared correlations. Additionally, the AVE values were greater than the corresponding correlations between the variables, indicating that there is no multicollinearity issue in the conceptual model. Hence, all the variables are suitable for model testing.

Table 3 shows the descriptive statistics and inter-correlational values between the variables. There were significant correlations between the variables at 0.05 level. None of the correlation coefficients was above 0.85, indicating the absence of multicollinearity in the model.

4.2 Hypotheses Testing

There are four assumptions that need to be fulfilled, such as: (1) all of the variables are measured on a continuous scale; (2) all of the variables follow a normal distribution; (3) relations associated with one observation are not correlated with the relations of any other observation; and (4) relationships amongst variables are assumed to be linear 1. All the assumptions were adhered to, in the study.

Table 4 shows the results of regression-based path analysis on the relationships human capital, organisational learning capability and competitive advantage. In here, Table 4 shows the results of the three models which depict the relationships

of HC, OLC and CA. It also shows the mediating effects of OLC on the relationship between HC and CA. Following the assumptions, first, the path coefficient between the independent variable (human capital) and the dependent variable (competitive advantage) has to be significant (model 3). Second, path coefficient between the independent and mediating variable (organisational learning capability) (model 1), as well as between the mediating and dependent variables (model 2) should also be significant. Third, when the mediating variables are included in the model, the path coefficient should decrease in size (model 2) and indirect effect should be significant (Indirect effect of X on Y). Hence, all of the assumptions were fulfilled.

As shown in Table 4, HC was a significant predictor for both OLC and CA (model 1 and model 3), and OLC was a significant predictor of CA (model 2). Thus, H1 was supported. In model 2, OLC was a significant mediator on the relationship between HC and CA ($p = .000$, $p < 0.001$). Further, the measure of the indirect effect of OLC on HA and CA showed a value of 0.2436, which was significantly greater than zero at 95% confidence interval (zero value was not counted in between lower level confidence interval and upper level confidence interval, .1934 - .3031). Hence, the result confirms the mediating effect of OLC, and H2 was supported.

The study also examined the mediating effect of relationship building capability on the relationship between human capital and competitive advantage. The outcome is shown in Table 5.

Table 2. Assessment of the measures

Variable	KMO measure	Bartlett's test of Sphericity	AVE	Construct reliability	Cronbach's alpha
HC	.705	0.000	.65	.943	.866
OLC	.730	0.000	.63	.939	.808
RBC	.709	0.000	.60	.930	.791
CA	.857	0.000	.61	.978	.857

Table 3. Descriptive statistics and correlation analysis between variables

Variable	Mean	SD	HC	OLC	RBC
HC	3.59	0.82			
OLC	3.13	0.86	.45[*]		
RBC	3.37	0.88	.40[*]	.34[*]	
CA	3.34	0.77	.48[*]	.30[*]	.37[*]

* Correlation is significant at the 0.05 level (2-tailed)

Table 4. Mediating analysis of OLC on HC and CA

			Outcome: OLC				
			Model summary				
	R	R-sq	MSE	F	df1	df2	p
	.6258	.3916	.4504	292.2483	1.0000	454.0000	.0000
			Model 1				
	coeff	se	t	p	LLCI	ULCI	
constant	.7839	.1407	5.5709	.0000	.5074	1.0604	
HC	.6535	.0382	17.0953	.0000	.5784	.7286	
			Outcome: CA				
			Model summary				
	R	R-sq	MSE	F	df1	df2	p
	.8544	.7301	.1625	612.5514	2.0000	453.0000	.0000
			Model 2				
	coeff	se	t	p	LLCI	ULCI	
constant	.3744	.0874	4.2851	.0000	.2027	.5460	
OLC	.3728	.0282	13.2260	.0000	.3174	.4282	
HC	.5004	.0294	16.9997	.0000	.4426	.5583	
			Outcome: CA				
			Model summary				
	R	R-sq	MSE	F	df1	df2	p
	.7911	.6258	.2247	759.2934	1.0000	454.0000	.0000
			Model 3				
	coeff	se	t	p	LLCI	ULCI	
constant	.6666	.0994	6.7064	.0000	.4713	.8620	
HC	.7441	.0270	27.5553	.0000	.6910	.7971	
			Total, direct, and indirect effects				
			Total effect of X on Y				
	Effect	SE	t	p	LLCI	ULCI	
	.7441	.0270	27.5553	.0000	.6910	.7971	
			Direct effect of X on Y				
	Effect	SE	t	p	LLCI	ULCI	
	.5004	.0294	16.9997	.0000	.4426	.5583	
			Indirect effect of X on Y				
	Effect	Boot SE	BootLLCI	BootULCI			
OLC	.2436	.0282	.1934	.3031			
			Normal theory tests for indirect effect				
	Effect	se	Z	p			
	.2436	.0233	10.4496	.0000			

As shown in Table 5, HC was a significant predictor for both RBC and CA (model 1 and model 3), and that RBC was a significant predictor of CA (model 2). Thus, H3 was supported. In model 2, RBC was a significant mediator on the relationship between HC and CA (p = .000, p < 0.001). Further, the measure of the indirect effect of RBC on HC and CA showed a value of 0.3214, which was significantly greater than zero at 95% confidence interval (zero value was not counted in between lower level confidence interval and upper level confidence interval, .2629 - 03844). Hence, the result confirms the mediating effect of RBC, and H4 was supported.

5. DISCUSSION

The results of the regression-based path analysis demonstrated that human capital of farms can wield significant effect on both the dynamic capabilities (organisational learning capability and relationship building capability) on competitive advantage. Human capital cannot be isolated from agribusiness [2] due to their strong connection with the sector as evident from the beta value obtained (Tables 4 and 5). Accordingly, employees who are experienced and dedicated to their work and those who require less supervision are valuable assets to farm owners due to the need to generate high

Table 5. Mediating analysis of RBC on HC and CA

			Outcome: RBC				
			Model summary				
	R	**R-sq**	**MSE**	**F**	**df1**	**df2**	**p**
	.6731	.4531	.4270	376 1443	1.0000	454.0000	.0000
			Model 1				
	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**	
constant	.7776	.1370	5.6751	.0000	.5083	1.0469	
HC	.7219	.0372	19.3944	.0000	.6488	.7951	
			Outcome: Cad				
			Model summary				
	R	**R-sq**	**MSE**	**F**	**df1**	**df2**	**p**
	.8757	.7668	.1404	744.7023	2.0000	453.0000	.0000
			Model 2				
	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**	
constant	.3204	.0813	3.9407	.0001	.1606	.4801	
RBC	.4453	.0269	16.5477	.0000	.3924	.4981	
HC	.4226	.0289	14.6448	.0000	.3659	.4793	
			Outcome: Cad				
			Model summary				
	R	**R-sq**	**MSE**	**F**	**df1**	**df2**	**p**
	.7911	.6258	.2247	759.2934	1.0000	454.0000	.0000
			Model 3				
	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**	
constant	.6666	.0994	6.7064	.0000	.4713	.8620	
HC	.7441	.0270	27.5553	.0000	.6910	.7971	
			Total, direct, and indirect effects				
			Total effect of X on Y				
	Effect	**SE**	**t**	**p**	**LLCI**	**ULCI**	
	.7441	.0270	27.5553	.0000	.6910	.7971	
			Direct effect of X on Y				
	Effect	**SE**	**t**	**p**	**LLCI**	**ULCI**	
	.4226	.0289	14.6448	.0000	.3659	.4793	
			Indirect effect of X on Y				
	Effect	**Boot SE**	**BootLLCI**	**BootULCI**			
RBC	.3214	.0308	.2629	.3844			
			Normal theory tests for indirect effect				
	Effect	**se**	**Z**	**p**			
	.3214	.0256	12.5786	.0000			

quality yield [29]. Furthermore, the level of productivity and innovation can be enhanced through trusted employees [27,28].

Competitiveness of firms relies on knowledge which should be developed through organisational learning mechanism [30] as learning is critical to the success of firms in this dynamic environment in their quest to adapt and survive [54]. The findings of this study echo the ideas of Amarakoon [32], Gaytán [38], Lages [31], Nieuwenhuis [39], Sirmon [54] and Wong [30] where organizational learning capability is a vital factor leading to the competitiveness of the

minor export crop farms. According to the mediation analysis result, human capital is highly associated with organisational learning capability (Table 4). This suggests that the farm owners should also leverage on their human capital by encouraging learning amongst their employees through training and development, providing them with decision-making authority and allowing them to apply new ideas on routine-based farm activities, which include purchasing decisions and cultivation methods. An incentive plan needs to be developed around these efforts to build trust and team-work, which eventually leads to better work, productivity and quality of yields,

generate innovation, commitment, as well as promote ethical practices amongst the farm employees.

Inter-organizational relationships and competitive advantage of firms have received continuous attention over the last two decades [43]. The significant relationship between relationship-building capability and competitive advantage as reflected in Table 5 demanded that the farm owners enhance their ability in forming relationships with their employees, other farms, trade partners, customers, as well as governmental and agricultural institutions [44,43]. This is because the ability to build an effective network structure stimulates competitive advantage through the generation of rent [41]. Likewise, the result in Table 5 suggests that the farm owners should consider building inter-organizational relationships through skilfull and experience employees. As a matter of fact, collaborative arrangements between and/or amongst farms in terms of product development and knowledge sharing are a common phenomenon in business today [42].

Besides experienced farmers who have been playing the initiator role to encourage learning to other farmers, a co-operative spirit needs to be developed amongst all farm owners in the respective crops to inculcate a learning culture within the farms. The Spice Council and the Agricultural Department can also play an equally important role to facilitate learning and networking ability by providing training, incentives and facilities.

6. CONCLUSION

From the theoretical perspective, this study has extended our understanding of the applicability of RBV and the dynamic capability theory [55] to the minor export crops sector. It has addressed the gaps in the literature regarding the roles and relationships between human capital, organisational learning capability, relationship building capability and competitive advantage. The findings show that human capital is indeed a resource that should be exploited by the small-sized, family-owned minor export crop farms through both the capabilities for greater competitive advantage. At the same time, the study has also addressed the limitation in the literature regarding the association between human capital and capabilities. The mediating role of the two capabilities on the relationship between human capital and competitive

advantage has also been investigated through data collected from a fair representation of farm owners representing the three minor export crops. As such, it makes significant contributions to knowledge from this standpoint.

It is hoped that this research provides the impetus for more studies to be conducted in the future. The valid and reliable constructs used in designing this study can be utilised by other researchers. However, this study is set in the context of the three crops, and hence the ability to generalise the reported results to other types of minor crops remains restricted. Further research is needed to cover the other minor export crops.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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