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Unobserved heterogeneity of dynamic capability and sustainable performance of dairy microfirms

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Background: Scholars have examined populations within firms and found that managers and employees exhibit similar characteristics in the relationship between dynamic capability drivers and sustainable performance. However, the unobserved relationship between dynamic capability drivers and sustainable performance in the context of dairy microfirms is less investigated.

Aim: The main motive is to examine the unobserved connection in the relationship between dynamic capability drivers and sustainable performance in dairy microfirms in Tanzania. Illustrating the knowledge-based view (KBV), this study determines that valuable competencies impact dairy microfirms' sustainable performance.

Setting: The 300 participants in this study were employees and managers of dairy microfirms in three regions of Tanzania: Tanga, Arusha, and Kilimanjaro.

Method: A unique unit segment technique – response-based unit segmentation-partial least squares (REBUS-PLS) path modelling – is used to uncover latent classes to meet the research objective.

Results: Our findings reveal that the aggregate model hypotheses were significant. Furthermore, the paper illuminates potential unobserved variations between managers and employees concerning the dynamic capability drivers and sustainable performance of dairy microfirms in Tanzania.

Conclusion: The potential unobserved differences between managers and employees provide an alternative explanation for the relationship between dynamic capability drivers and sustainable performance. This helps avoid the 'competency trap' and explains how to improve the dynamic capabilities of dairy microfirms.

Contribution: Homogeneous behaviour among managers and employees strongly suggests collectivist work to improve sustainable performance. We contribute empirically by demonstrating the underlying dynamic capability drivers of managers and employees in heterogeneous segments to explain sustainable performance.

Keywords: dynamic capability drivers; sustainable performance; knowledge sharing; sensing capability; agility; REBUS-PLS; managers; and employees.

Introduction

This study analysed the unobserved connection between knowledge sharing, sensing capability, agility, and sustainable performance by examining dairy microfirms in Tanzania. This unobserved link should receive more attention. The literature has demonstrated the relationship between dynamic capability drivers and sustainable performance while illustrating that populations have homogeneous attributes. Focusing only on the aggregate level and similarity in a population can narrow our understanding of how dynamic capabilities develop and evolve. Nevertheless, the literature has explicated these relationships through homogeneity in observed units, finding that managers and employees exhibit similar characteristics (Lewin & Volberda 2003; Glover et al. 2013). Our study contributes to the literature by accurately interpreting the relationship between sensing capability, knowledge sharing, agility, and sustainable performance while uncovering potential unobserved heterogeneity. In this sense, we contribute two premises to the empirical literature. First, our proposed research model establishes unobserved solid and weak relationships between knowledge sharing, sensing capability, agility and sustainable performance, which are valuable competencies. Second, the article contributes to our understanding of the knowledge-based view (KBV) by illustrating relationships between dynamic capability drivers and sustainable performance in dairy microfirms.

For years, the empirical literature has illustrated that managers and employees have similar characteristics (Schilke, Hu & Helfat 2018). This perspective might lead to a risk of making incorrect predictions about the natural linkage between the dynamic capability drivers and sustainable performance of dairy microfirms. Interestingly, managers and employees are integrated into building the capability framework for the firm (Teece 2019). Undoubtedly, managers and employees are involved in capability building, creating, integrating and reconfiguring firms' resources to achieve sustainable performance (Zimuto & Maritz 2019; Beske et al. 2013). Indeed, managers and employees can alter the resource base of a dairy microfirm when taking advantage of opportunities, which is vital for a firm to learn and evolve (Barney & Clark 2007; Biden et al. 2020). Otherwise, it is easy to engineer an inadequate sustainable performance measurement and cause an unnecessary crisis for the firm (Blignaut 1999; Sadi 2014; Kirdar 2017; Pappa, Illiopoulos & Massouras 2019). Our article seeks to rekindle the discussion on how heterogeneity within a population can define dynamic capability drivers and sustainable performance, using KBV as a theoretical lens.

Against this backdrop, studies of dynamic capability highlight the significance of having a solid resource base and investing in tangible and human resources, which are necessary for a dairy microfirm to build a competitive advantage. The KBV literature suggests that the firm must invest in knowledge resources and strongly modify, extend and build firm resources to gain a competitive advantage (Zollo & Winter 2002). Therefore, managers' and employees' knowledge is an asset to the dairy microfirm and is essential for moulding sensing capabilities, agility, and sustainable performance. If knowledge assets are not thoroughly examined, the ability of dairy microfirms to validate resources and use them to build capabilities, forms, and practices might be limited. At the same time, the argument that managers and employees present similar characteristics in examining relationships between sensing capability, knowledge sharing, agility, and sustainable performance needs further scrutiny.

This issue does not end with knowledge sharing, which is widely regarded as a process capability (Grant 1996). It can compromise the adaptive capability of the dairy microfirm, which is described by the level of sensing capability and agility (Kaur 2019). Thus, the KBV highlights that knowledge sharing and agility, as firm' resources, are also critical determinants for developing firms' competitive advantage (Barney & Clark 2007). Capturing unobserved relationships between knowledge sharing, sensing capability, agility, and sustainable performance is important to enhance productivity and resource allocation. Our article informs policymakers and stakeholders of dairy microfirms about the importance of generating efficiency and appropriability. Fewer empirical studies have investigated this direction.

Our article aims to fill the knowledge gap that has received little attention in dynamic capability scholarship. The main motive is to examine the unobserved connection in ascertaining the relationships between dynamic capability drivers and sustainable performance in dairy microfirms in Tanzania. We propose using the classical response-based unit segmentation-partial least squares (REBUS-PLS) path modelling method to achieve this objective. The technique works well with non-normal data (Trinchera 2007; Zanin 2013). Through latent classes, the study builds new bridges to relationships between knowledge sharing, sensing capability, agility, and sustainable performance. Specifically, we fuse the above connections in a single framework.

The study is structured into the following parts: first is the literature review and hypothesis development. Second, we use a theoretical and empirical literature review to build our proposed research model and methods. Third is the results section, and finally, we present a discussion of the results, suggested limitations and future research directions, managerial contributions, and conclusions.

Literature review and hypothesis development

Dynamic capability drivers and theory

Dynamic capability is the capacity of an organisation to purposefully create, extend, or modify its resource base (Helfat et al. 2007:5). In this vein, it is important to argue that dynamic capability drivers are a subset of the elements within a dynamic capability framework (Teece, Peteratd & Leih 2016). For a dairy microfirm, the significance of having a solid dynamic framework is to embrace the strengths and extend the business process to shape the environment in its favour. What constitutes the core building blocks for dynamic capability frameworks? Dynamic capability frameworks embrace three pillars: process, path, and strategy. It is fair to argue that these three blocks extend the resource-based view (RBV) (Barney & Clark 2007; Daft et al.2020). Therefore, strengthening the capability framework will help managers convert inputs to outputs. However, this process is determined by the capacity to integrate, modify, and extend resources to develop dynamic capability. Altogether, it depends on the level of knowledge sharing, sensing capability and agility of individuals within firms to apply resources to profoundly influence sustainable performance.

The above definition of dynamic capability is drawn from the RBV perspective; thus, there is a need to distinguish between resources and dynamic capability. Dairy microfirm resources refer to numerous financial, physical, social, and individual assets (Wilson 2000; Zollo & Winter 2002). In comparison, a dynamic capability is the attribute that the dairy microfirm uses to exploit resources and set objectives to sustain competitiveness. The literature on the KBV, an outgrowth of the RBV (Grant 1996; Nickerson & Zenger 2004), defines knowledge capabilities as the solid recipe for joining resources and the capability to create a dairy microfirm with substantial value. In addition to knowledge capabilities, dairy microfirms could use other resources, such as sensing and agility, to critically examine their capabilities (Achtenhagen, Melin & Naldi 2013; Beske et al.2013). Thus, managers and employees play a crucial role in combining resources and capabilities to provide dairy microfirms with a novel competitive advantage.

Producing the dynamic capability of a dairy microfirm depends on the human capital that can define both the resources and capability and lay out robust strategies to improve performance. In that case, understanding the patterns of the employees within a firm is a matter of concern because it sheds light on the perspective of dairy microfirm resilience and capability to orchestrate resources internally. The employees within a firm are explicitly crucial to demonstrating its social sustainability (Jongeneel & Slangen 2013; Blignaut 1999). To this end, as mentioned above, dynamic capability could be defined through the tripartite approach that explains how dynamic capability frameworks capitalise on the three building blocks – the interplay of resources, knowledge, and the capability of verifying a suitable environmental fit. For this article, drawing upon Barney and Clark (2007), we propose managers and employees as firm resources to test how dynamic capability impacts the sustainable performance of dairy microfirms.

Sensing capability

Sensing capability is the recognition of market and technological opportunities and the mobilisation of the requisite resources (Ridder 2013:6–7). In a recent contribution to sensing capability research, Teece (2019:6–7) argues that sensing capability is a proxy for exploration. Sensing capability belongs to the knowledge base dynamic capability, which also defines the dynamic capability framework. In this vein, sensing capability is the first-order dynamic capability driver (Zimuto & Maritz 2019). The KBV literature posits that the opportunism-based view of individuals within a firm could improve its sustainable performance (Conner & Prahalad 1996). The sensing capability process of a dairy microfirm can take numerous forms of opportunism to shape the sustainable performance of the firm. For example, Ridder (2013) finds the ability of dairy microfirms to sense changing customer needs and wants, as well as their ecosystem, is profoundly vital in establishing sustainable performance. The two studies urge managers and employees to develop unique sensing capabilities and identities that are coherent and plausible in scanning the internal and external business environment.

Establishing a sensing blanket of internal properties can decisively calibrate firm investment choices. Understanding these internal properties requires a set of sensing facets that reduce causal ambiguity and further enhance the sustainable performance of the firm (Caraveli & Traill 1998; Henriksen, Lampe & Sharp 2012). In short, it is essential to note that sensing capability is critical in the manifestation of a firm's resources, typically explorations and opportunity identification. Overall, sensing capability is a crucial recipe for highlighting dairy microfirm opportunities and investment decisions; the dairy microfirm uses its assets to exploit the preferred choices once an opportunity is stressed. In summary, a dairy microfirm's sensing capability is vital for exploiting opportunities and shaping internal resources while sustaining performance. Thus, the article hypothesises the following:

> **H1:** Sensing capability has strong positive significant effects on sustainable performance.

Agility

Agility is a firm's constant ability to effectively change its course of action to sustain its competitive advantage (Weber & Tarba 2014:6). In a similar context, agility has been termed a higher-order construct for dynamic capabilities (Kaur 2022; Teece et al. 2016:14). From the KBV perspective, scholars have associated agility with sensing or seizing capabilities (Lewin & Volberda 2003; Nickerson & Zenger 2004). Thus, agility is attached to determining new markets and customers. Managers and employees could gather intelligence on competitors' strategies to access their markets and customers. Following the definition mentioned above, dairy microfirms can create capability exploiting agility because it creates evolutionary fitness elements that significantly reduce such negative behaviours. A dairy microfirm's agility is divided into two clusters: flexibility in the market and technology (Jongeneel & Slangen 2013; Biden et al. 2020). Reconfiguring resources to develop agility in either the market or technology depends heavily on the sensing capabilities of dairy microfirms. Thus, managers and employees can orchestrate, create and extend resources to match the requirements of the two clusters.

Dairy microfirms must dive deep to develop market or technology agility and generate a higher level of flexibility. Managers and employees might exploit both clusters in elevating the firm's process capabilities. For example, process capabilities could result from the degree to which dairy microfirms respond to a customer's query. Regarding technology, agility mainly concerns managers' and employees' sensing capabilities to implicitly access new technology to sustain quality and evaluate technical changes. Managers and employees should urge the encapsulation of sensing methods and agility to improve efficiency for dairy microfirms (Breu et al. 2002; Holotiuk, Beimborn & Jentsch 2018; Ridwandono & Subriadi 2019). It has been suggested that agility and sensing should be combined to enhance the process capabilities of managers and employees and promote sustainable performance. The KBV literature has contended that flexibility for managers and employees should operate in parallel with information sharing to broaden dynamic capability in improving product quality, services, and distribution structures (Bindra, Srivastava & Sharm 2020). Thus, the article hypothesises the following:

> **H2:** Sensing capability ($H2_{a1}$) and agility ($H2_{b1}$) have strong positive significant effects on sustainable performance.

Knowledge sharing

Knowledge sharing refers to experienced professionals exchanging knowledge with less experienced professionals (Fink & Disterer 2006:387). Knowledge sharing is part of the typology of knowledge process capabilities. The literature suggests that knowledge sharing is a 'first-order dynamic capability'. Knowledge process capabilities enable dairy microfirms to have a seamless flow of information between managers and employees (Carneiro 2000; Clegg 2003; Kirdar 2017). Establishing the habit of knowledge sharing between managers and employees within a firm is crucial since it drives dairy microfirms to make reasonable decisions. Of course, knowledge sharing as part of the typology of knowledge process capabilities leads to the smooth flow of information within the dairy microfirm, thus leveraging sales reports, experience and transaction records. Knowledge process capabilities formulated within peer groups are essential to improve flexibility for managers and employees. The KBV literature has contended that a firm might gain a competitive advantage by capitalising on knowledge resources, such as decision-making and a culture of knowledge sharing (Müller 2020; Daft et al. 2020). The theory suggests that knowledge sharing is the bottom line for a firm to create value and generate a competitive advantage.

The creation of knowledge sharing requires solid protocols to improve sustainable performance. Dairy microfirms must create awareness among managers and employees about the importance of confidentiality. Doing so will result in knowledge sharing protecting capabilities that yield sustainable performance in this regard. Therefore, the knowledge process capabilities built through knowledge sharing described above are the appropriate typology for knowledge management for the dairy microfirm. Knowledge sharing between managers and employees can also be elucidated as asset specificity, providing a view of individual capabilities and identities. The two groups are the potential workforce with a unique ramification in proposing suitable knowledge process capabilities (Bwabo, Zhiqiang, & Mingxing 2022; Jongeneel & Slangen 2013; Schilke et al. 2018; Williamson 1996). A solid connection between knowledge sharing and sustainable performance does exist: employees and managers must be flexible in demonstrating the safety and traceability of dairy products. Knowledge sharing in this spirit is essential for both dairy microfirms' agility and sustainable performance. Thus, we hypothesise the following:

> **H3:** Knowledge sharing ($H3_{a2}$) and agility ($H3_{b1}$) have a strong positive significant effect on sustainable performance.

Sustainable performance

The essence of sustainable performance is the so-called sustainability. It is worth explaining sustainability through a triple-bottom-line (TBL) approach. The empirical literature describes the TBL in three dimensions – social, economic, and environmental. Therefore, the measurement of the sustainable performance of the dairy microfirm sector can take numerous forms in explaining sustainability. The demonstrated TBL approach uses the following indicators: efficiency, flexibility, responsiveness, and product quality (Bourlakis et al. 2014). In this article, we adopt a sustainable performance measurement based on product quality indicators. Because the study's representative samples are managers and employees, product quality indicators are useful in deeply analysing the sustainable performance of dairy microfirms in Tanzania.

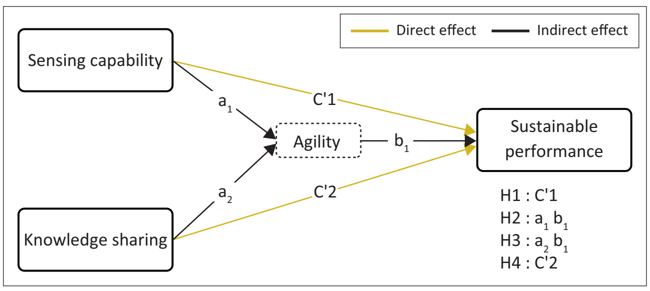
The sustainable performance of dairy microfirms has become a primary concern for various researchers. For example, in a recent contribution from Pappa et al. (2019:146), who note that the 'ongoing crisis in the dairy sector needs immediate attention', the researchers analyse the sustainability of the dairy sector with a keen focus on various factors such as innovation capacity and relationship sustainability. Because of growing concern about the dairy industry, dairy microfirms must consistently flourish with efficiency, flexibility, and appropriate product indicators to enhance sustainability (Drescher & Maurer 1999). Indeed, managers and employees should embrace advanced skill sets for establishing sustainable performance tools such as product indicators. This raises the issue of 'dynamic capacity' for the two groups of dairy microfirms that perform managerial functions. Along these lines, the KBV literature has described the importance of knowledge management initiatives by capitalising on knowledge sharing to build a TBL approach (Fleischer 2014; Heller & Keoleian 2003). Some scholars have gone further and debated whether there is a possibility of converting sustainability to an organisation's dynamic capability (Liboni et al. 2016). Before considering the debate from that angle, it is worth illustrating the relationship between knowledge sharing and sustainable performance. Thus, we hypothesise the following:

> **H4:** Knowledge sharing has strong positive significant effects on sustainable performance.

Methods

Sample and sampling procedure

The study tested the hypotheses mentioned above (H1–H4) through a questionnaire survey distributed in three regions on the Tanzanian mainland. Figure 1 provides the road map. The samples were the employees and managers of the dairy microfirms in three regions: Tanga, Arusha, and Kilimanjaro. The respondents were full-time and part-time employees and managers of dairy microfirms. An initial pilot study was



H, hypotheses; C, class.

FIGURE 1: The proposed research model.

performed to test the reliability and validity of the construct indicators before conducting a full-field survey and distributing the questionnaire to managers and employees of dairy microfirms. The questionnaire responses were rated on a seven-point Likert scale, from strongly disagree to agree. A seven-point Likert scale was used because it outperformed lower scales in terms of reliability, validity, and sensitivity (Lewis & Erdinç 2017). The article used a drop-and-collection process for the questionnaire survey due to the COVID-19 pandemic. To ensure validity and comparability during the pandemic, we went as far as to offer online support via several phone conferences.

We made minor changes to the original version of the questionnaire survey because of initially observed weaknesses. For example, we dropped technical and challenging questions that might adversely affect the texture and tone of the questionnaire. This process was critical to enhancing the questionnaire survey's clarity for the respondents. We created a dual version of the questionnaire with the help of language experts – first, the questionnaire was created in English, and a second draft was then developed in Swahili. We merged the two standardised versions to mine the data extensively. The study distributed 450 questionnaire surveys in the three regions to ensure the adequacy of the survey respondents. Ultimately, only 300 questionnaires were completed. Therefore, 67% of the field questionnaires were returned, which is an adequate response rate for any research project (Kaur 2019).

Table 1 presents the descriptive analysis of the 300 employees and managers from the 120 dairy microfirms in northern Tanzania. A descriptive analysis of the sociodemographic variables was performed. Moreover, we defined the distribution of the data points through mean, standard deviation, kurtosis, trimmed mean, and standard errors. The REBUS-PLS path modelling does not depend on the Gaussian function. Nevertheless, a descriptive analysis of the sociodemographic variables is essential to understand the pattern distribution of individuals. The results indicated that variable distribution through the data points was independent and identical and presented true variability from the sample population. Moreover, Table 1 confirms that the distributed data are normal because the kurtosis and trimmed mean values are within the thresholds of -/+, the negative and positive value signalling the normality of the data set (Bishop 2006).

TABLE 1: Descriptive analysis.

Variable	Employees (n = 164)					Managers (n = 136)				
	Mean	SD	Kurt.	Trim	SE	Mean	SD	Kurt.	Trim	SE
Firm size	2.14	0.79	-1.35	2.17	0.05	1.88	0.91	-1.77	1.86	0.14
Experience	20.59	10.95	-1.17	21.20	0.68	12.14	7.57	-1.35	12.06	1.15
Sex	1.82	0.39	0.66	1.89	0.02	1.81	0.39	0.44	1.89	0.06
Age	35.77	5.64	-0.36	35.48	0.35	39.65	4.95	-0.88	39.49	0.76
Education level	2.68	1.58	-1.79	2.60	0.10	1.77	1.02	0.37	1.60	0.16
Marital status	2.27	0.49	-0.59	2.24	0.03	2.09	0.29	5.45	2.00	0.04

SD, Standard deviation; Kurt., Kurtosis; Trim, Trimmed mean; SE, Standard error.

Response-based unit segmentation-partial least squares path modelling

The article used REBUS-PLS path modelling to uncover the two latent classes. The method is essential to evaluate unobserved heterogeneity at the structural and measurement levels. As mentioned earlier, REBUS-PLS path modelling has no distribution assumptions on latent or observed variables. In that respect, this article uses the classical dimension reduction methods based on the communality residuals of the aggregate model to predict latent class models to posit possible heterogeneity (Fosso-Wamba et al. 2017; Zanin 2013).

Thus, REBUS-PLS path modelling measures the structural and measurement model benefiting residuals. The intuition behind REBUS-PLS is to examine whether local models' performance surpasses the global model regarding the structural and measurement model to reveal the potential unobserved heterogeneity between the dynamic capability drivers and sustainable performance (Trinchera 2007). To adequately shed light on the remnants of unobserved heterogeneity between the structural and measurement models, REBUS-PLS path modelling assesses the units on a distance basis. It typically focuses on the closeness measure's residuals. In this regard, the study-defined closeness measure lies on the pseudo-goodness of fit (GoF) index. The intention is to predict parameters for the latent class of the structure and measurement model to see if they fit better than the global model.

Indeed, the established global model was used to reveal the possible number of classes through hierarchical cluster analysis obtained from derived residuals. Therefore, the article started by unravelling the aggregate model considering the sample population as homogeneous. Then, the study measured the hierarchical cluster analysis built on the residual to reveal the number of latent classes (k). The constructed REBUS-PLS path modelling encompasses the study to generate latent classes – Reb-class one (k_1) and Reb-class two (k_2).

Measures

The study used R programming language (version 4.1.1) to test the proposed research model (see Figure 1). It is helpful to draw the initial patterns in the data sets while testing the proposed research model. Indeed, the study visualises possible anomalies before downstream analysis. Ironically, the study uses the 'useful' built-in R programming language to visualise the abnormality from the data sets (version 1.2.6) (Lander 2018). The study went deep and debugged the initial analysis to eliminate outliers from the data set using an unsupervised technique – principal components analysis (PCA). Principal components analysis is useful for variance estimations and evaluating internal consistency indexes, such as Dillon-Goldstein's rho and the eigenvalues correlation matrix (Wiley & Wiley 2019). Therefore, the study trimmed down the outliers from the survey questionnaire and retained manifest variables with adequate factor loadings that fit the proposed research model. We used the remaining manifest variables to generate three indexes to measure block unidimensionality: Dillon-Goldstein's rho, Cronbach's alpha, and eigenvalues.

Table 2 presents the block homogeneity for the aggregate and latent class models that provide a sense of how the latent constructs explain the internal consistency of aggregate and latent class models by describing three indexes: Dillon-Goldstein's rho, Cronbach's alpha, and eigenvalues. The Dillon-Goldstein's rho and Cronbach's alpha scores in each latent construct are above the thresholds of 0.7, suggesting that the blocks are homogeneous (Henseler, Ringle & Sarstedt 2015). In addition, the article reveals the eigenvalue correlation matrix. Table 2 presents eigenvalue scored points for aggregate and latent class models; the first value is above 1, and the second is below 1. Therefore, our blocks are considered unidimensional in this regard, and we therefore argue that the data fit a well-predicted aggregate and the latent class models.

The R programming language has a unique plspm package that is the workhorse for REBUS-PLS path modelling. After describing the internal consistency in Table 2, the study unpacked the plspm package (Version 0.4.9) (Sanchez, Trinchera & Russolillo 2015) in R to carry out REBUS-PLS path modelling. Doing so is critical to estimate the measurement residuals and validate REBUS-PLS path modelling (Sanchez 2013; Trinchera 2007; Zanin 2013). Then, the REBUS-PLS path model was built, resulting in two classes (k = *two*) (see Figure 2): Class 1 (k_1, units = 154) and Class 2 (k_2, units = 146). Structural and measurement models for the two classes were validated through bootstrapping. The study estimated 95% confidence intervals (CIs) obtained by bootstrapping with 10 000 subsamples. Then, the efficacy of the detected latent classes was scrutinised through permutation testing.

It is worth mentioning that the article collected data through multiple waves to eliminate the common method variance (CMV) effect – data collection through numerous waves to control the CMV is essential to enhance the indicator reliability and validity of the analysis (Dijkstra 2015). Therefore, in the first wave, between April and May 2021, we collected data on the antecedent variable – knowledge sharing and sensing capability. In the second wave, between June and July 2021, we collected data about agility from managers and employees. In the last wave, at the end of July and August 2021, we completed data collection with sustainable performance as the consequent variable.

Findings

Measurement model summary for aggregate and latent class models

Figure 3 presents the manifest variables for the aggregate model and latent classes. The factor loadings for the aggregate model exceeded the stringent cut-off point of > 0.7 (Lamberti, Banet & Sanchez 2016). Surprisingly, some manifest variables in Class 1 have lower factor loadings than the aggregate

TABLE 2: Block unidimensionality.

Construct	Aggregate model (n = 300)				Class one (n = 154)				Class two (n = 146)			
	C. alpha	DG.rho	eig.1st	eig.2nd	C.alpha	DG.rho	eig.1st	eig.2nd	C.alpha	DG.rho	eig.1st	eig.2nd
Knowledge	0.846	0.897	2.74	0.617	0.862	0.906	2.83	0.515	0.826	0.885	2.63	0.721
Sensing	0.862	0.907	2.84	0.574	0.698	0.817	2.14	0.836	0.792	0.866	2.48	0.706
Agility	0.821	0.882	2.61	0.709	0.786	0.868	2.55	0.893	0.669	0.803	2.05	0.960
Sustainable	0.870	0.911	2.88	0.503	0.705	0.821	2.21	0.958	0.818	0.883	2.64	0.812

C. alpha, Cronbach's alpha; DG.rho, Dillon-Goldstein's rho; eig.1st, first eigenvalues of the correlation matrix; eig.2nd, second eigenvalues correlation matrix.

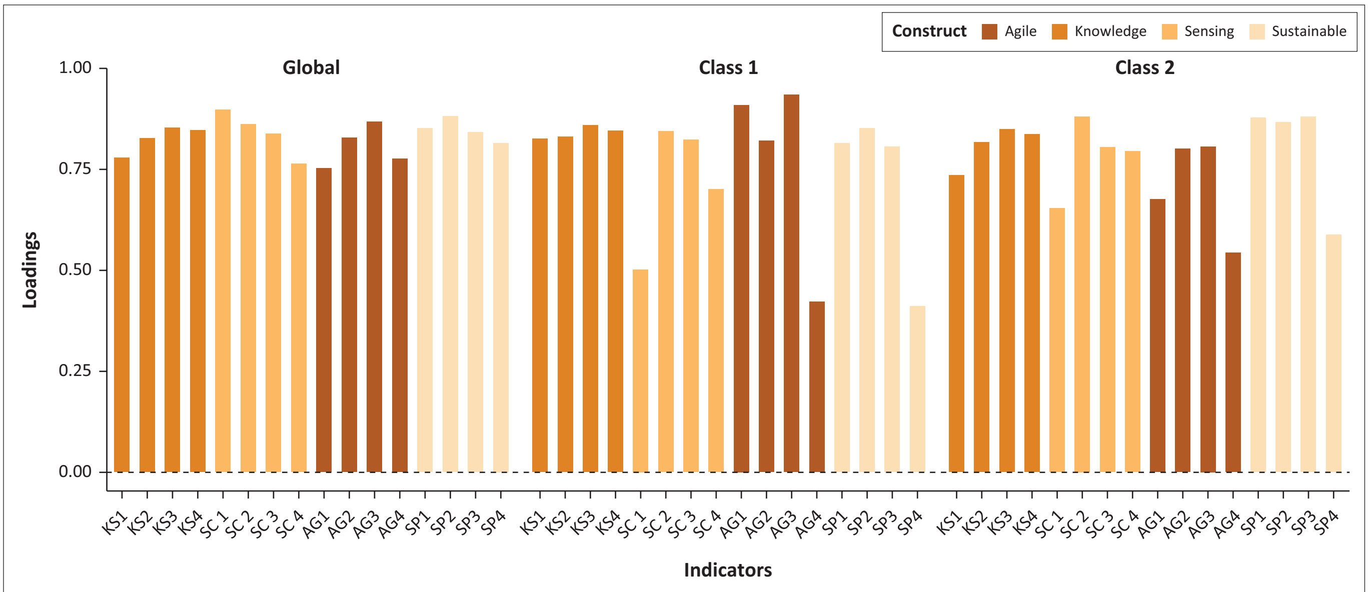


FIGURE 2: Measurement model summary.

model and Class 2. Arguably, latent Class 1 signalled the presence of unobserved heterogeneity in the measurement model summary following lower loading scores than those in the aggregate model. The above factor loading scores demonstrated sufficient discriminant validity.

Aggregate model

Figure 4 shows the internal quality indexes of the aggregate model. The study exercised convergent validity sufficiently, given that the block communality, average variance extracted (AVE), and mean redundancy indexes for the aggregate model were above the necessary cut-off point of 0.5 (Tenenhaus & Vinzi 2005). After confirming convergent validity, the path coefficients and 95% CI were presented to test the hypotheses of the aggregate models. The study confirmed (H1) that sensing capability positively affects sustainable performance (β = 0.536, CI 95%: 0.354, 0.718). The findings also confirmed the hypothesis ($H2_{a1}$) that sensing capability strongly impacts agility (β = 0.535, CI 95%: 0.381, 0.686). The study found a significant path linking knowledge sharing and agility with a medium beta value (β = 0.396, CI 95%: 0.240, 0.549). The study found that the relationship between agility and sustainable performance had a weaker beta value (β = 0.079, CI 95%: –0.074, 0.234). However, the CI at 0.025% contained zero. Therefore, the study confirmed the association between knowledge sharing and sustainable performance (β = 0.339, CI 95%: 0.150, 0.546), further supporting $H3_{a2}$. However, it failed to prove ($H3_{b1}$) that agility has a strong positive significant effect on sustainable performance. We further confirmed (H4) that knowledge sharing has a solid positive considerable impact on sustainable performance (β = 0.339, CI 95%: 0.150, 0.546). Regarding the predictive relevance, the GoF index for an aggregate model is 0.66, which is satisfactory. At the same time, the explanatory power of the aggregate model shows that agility and sustainable performance have coefficient determinations (R^2) of 0.73 and 0.76.

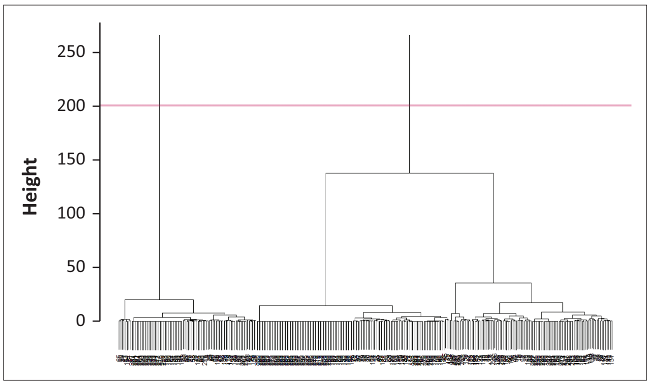


FIGURE 3: The cluster dendrogram.

Response-based unit segmentation-partial least squares path modelling (latent classes)

Figure 2 presents a cluster dendrogram suggesting the two latent classes' model (k = 2). Of course, this is the third step of REBUS-PLS path modelling, and the study detailed the steps in a previous section. In Figure 4, the study estimated the internal quality indexes of the two latent classes above. The study validates the convergent validity of the two latent classes through AVE compared to the aggregate models. The AVE exceeds the stringent cut-off point of 0.05 (Trinchera 2007). Thus, it is worth examining the structure summary for each class.

Class 1

Class 1 has 51.33% (n = 154) of the total population sample from the aggregate model. The path between knowledge sharing and agility has a minimum beta value of 0.490. The value exceeded the aggregate model score. The link between knowledge sharing and sustainable performance has a moderate beta value of 0.253. It has a lower value than the

Paths	Aggregate model				Latent classes Rate of unit:0.003 Group Quality Index (GQI):0.80 Group Quality Improvement Index = 21%							
	β		CI 0.025%	CI 0.975%	Class 1 (n = 154), 51.33%				Class 2 (n = 146), 48.66%			
					β				β			
Knowledge → Agility	0.396 (0.078)		0.240	0.549	0.490				0.324			
Knowledge → Sustainable	0.339 (0.101)		0.150	0.546	0.253				0.194			
Sensing Agility	0.535 (0.077)		0.381	0.686	0.503				0.627			
Sensing → Sustainable	0.536 (0.092)		0.354	0.718	0.291				0.568			
Agility → Sustainable	0.079 (0.078)		-0.074	0.234	0.425				0.199			
Internal Quality Indexes	R^2	B.Co	M.Re	AVE	R^2	B.Co	M.Re	AVE	R^2	B.Co	M.Re	AVE
Knowledge sharing	0.000	0.684	0.000	0.684	0.000	0.706	0.000	0.706	0.000	0.658	0.000	0.658
Sensing capability	0.000	0.709	0.000	0.709	0.000	0.533	0.000	0.533	0.000	0.620	0.000	0.620
Agility	0.730	0.652	0.541	0.652	0.792	0.637	0.569	0.637	0.768	0.512	0.445	0.512
Sustainable performance	0.763	0.719	0.621	0.719	0.765	0.551	0.477	0.551	0.779	0.659	0.579	0.659
GoF	0.66				0.77				0.76			
Effect sizes					*Agility; f_1 = 0.54*				*Agility; f_2 = 0.28*			
					Sustainable performance f_1 = 0.01				*Sustainable performance f_2 = 0.13*			

Note: The figure in the parentheses represents the standard error.

CI, Confidence interval; R^2, Coefficient of determination; B.Co, Block communality; AVE, Average variance extracted; M.Re, Mean redundancy; GoF, Pseudo-goodness of fit measure; f, effect sizes.

FIGURE 4: Path coefficients for aggregate and latent classes yielded by response-based unit segmentation-partial least squares.

aggregate model. The path between sensing capability and agility has the most critical beta value, $\beta = 0.503$, in contrast to previous paths, but similar to the aggregate model. The connections between sensing capability and sustainable performance have the lowest beta value, $\beta = 0.291$. This path beta value is significantly smaller than that in the aggregate model. The path connected to agility and sustainable performance has a substantial beta value of 0.425. This beta value is tangible compared to the aggregate model.

The study utilises explanatory power to reveal the effect sizes. Class 1 has reliable explanatory power (R^2), for agility (0.79) and sustainable performance ($R^2 = 0.76$). Thus, Class 1 has an effect size (f_1 of 0.54 for agility, regarded as vital, and 0.01 for sustainable performance, considered weak. The predictive relevance of Class 1, the GoF improvement index in Class 1, is 0.77, which is larger than the aggregate model score.

Class 2

Class 2 has 48.66% ($n = 146$) of the total population sample from the aggregate model. The relationship between knowledge sharing and sustainable performance has a weak beta value: $\beta = 0.194$. It illustrates a fragile relationship compared to the aggregate model. The relationship between agility and sustainable performance in Class 2 has a moderate beta value: $\beta = 0.324$. The relationship between sensing capability and agility has a more substantial positive beta value: $\beta = 0.627$. It surpasses the aggregate model as well as Class 1. The path linking sensing capability and sustainable performance has a moderate positive beta value: $\beta = 0.568$. Finally, the path that connects agility and sustainable performance shows a positive lower beta value: $\beta = 0.199$. This path exhibits a lower coefficient than the aggregate model. Interestingly, it is weaker than Class 1.

For the predictive relevance of Class 2, the class has a GoF improvement index of 0.76. This score is slightly lower than that of Class 1 but more extensive than an aggregate model. Regarding explanatory power, Table 3 shows coefficient determinations (R^2) of 0.76 for agility and 0.77 for sustainable performance. Following coefficient determination scores, Class 2 has an effect size (f_2) of 0.28 for agility, a solid effect size, and 0.13 for sustainable performance, which is moderate (Chin, Marcolin & Newsted 2003).

In summary, the latent classes estimated, as a result of the REBUS-PLS path modelling, highlight an alternative explanation of the structure and measurement model summary of the relationship between dynamic capability drivers and sustainable performance. The aggregate model alone cannot address these new relationships fused in a single proposed research model.

Group quality improvement index

The GQI is an 'average class-specific index' (Trinchera 2007:198). Our study details the improved GQI after reformulating the above GoF from the aggregate model. Presenting the GQI, the study sheds new light on the structure and validity of the latent classes to claim the possibility of unobserved heterogeneity. The GoF value obtained from the global model was 0.66, and the GQI due to REBUS-PLS path modelling was 0.80. The study analysed the GoF scores and revealed a significant improvement in GQI of approximately 21%. In this sense, the latent class models performed better than the aggregate model. Therefore, the study confirms that the claimed latent classes are valid.

TABLE 3: Latent class structural validation for the two classes.

Paths	Class 1	Class 2	Diff. abs	*P*-value	Sig.05
Knowledge → Agility	0.490	0.324	0.166	0.0099	yes
Knowledge → Sustainable	0.253	0.194	0.059	0.0099	yes
Sensing → Agility	0.502	0.627	0.124	0.0099	yes
Sensing → Sustainable	0.290	0.568	0.277	0.0099	yes
Agility → Sustainable	0.425	0.199	0.225	0.0099	yes
GoF	0.703	0.703	0.001	0.0099	yes

Note: Measurement validation for two classes available upon request.
GoF, pseudo-goodness of fit measure; Diff.abs, differences in path coefficients; Sig., significance.

Table 3 shows the path coefficient difference between latent classes (Class 1 = k_1 and Class 2 = k_2). The study performed permutation testing at the structural level for the two classes. Interestingly, the two latent classes have significant coefficient values ($P < 0.05$). Thus, the findings further confirmed that unobserved heterogeneity exists between managers and employees.

Discussion of the results

In this study, we examined the unobserved connection in ascertaining the relationship between dynamic capability drivers and sustainable performance in dairy microfirms in Tanzania. Therefore, the study chronicles findings at the aggregate level, which assumes that the observed units of managers and employees have homogeneous behaviour – a collectivist approach. Then, the results present the heterogeneous behaviours detected between managers and employees accustomed to latent class models. Specifically, our discussion focuses on detected observed connections – knowledge sharing, sensing capability, agility, and sustainable performance. We discuss how these dairy microfirms shape dynamic capabilities to improve sustainable performance while utilising the detected unobserved connection. This line of research has been less investigated in the literature. Thus, our article forcefully provides scientific evidence that an existing unobserved connection could further explain the relationships between dynamic capabilities and sustainable performance. The article presents it at two levels, at the aggregate level, and then constrains the detected latent classes.

The study presents the aggregate model findings in Table 3 in parallel to the proposed research model (Figure 1). Thus, the formulated hypotheses have been tested at the aggregate level as an initial step to examine the unobserved heterogeneity. Hypothesis H1 confirms a positive relationship between sensing capability and sustainable performance.

Thus, it demonstrates that the sensing facets are crucial to highlighting dairy microfirm opportunities and investment decisions in the industry. These findings are consistent with those of Caraveli and Traill (1998), and Henriksen et al. (2012). Hypothesis $H2_{a1}$ proposes that sensing capability strongly impacts agility. This result means that explorations and innovations in science and technology should have been mediated by marketing intelligence to improve the internal dynamic capabilities strategy of dairy microfirms (Kelly et al. 2020). The study further confirms that knowledge sharing and agility positively influence sustainable performance. In this sense, knowledge sharing about product innovation and its flexibility in internal dairy microfirm resources is essential to improve the sustainable performance of dairy microfirms (Bwabo et al. 2022; Ridder 2013; Beske et al. 2013).

The findings confirm that knowledge sharing ($H3_{a2}$) has a strong positive significant effect on sustainable performance. Knowledge sharing for managers and employees is the key to solidifying the sustainable performance of dairy microfirms in Tanzania (Müller 2020). Thus, incorporating knowledge sharing between managers and employees can potentially affect dairy microfirms' ability to build agility and significantly reduce negative behaviours. Nevertheless, the findings fail to confirm ($H3_{b1}$) that agility has a strong positive significant effect on sustainable performance. This demonstrates that dairy microfirms' operational adjustment and market capitalisation do not sustain the firms. The findings also confirm (H4) direct effects between knowledge sharing and sustainable performance. This illustrates that working reports and experience sharing are significant efficiency indicators for dairy microfirms in Tanzania. These results are in line with Bourlakis et al. (2014).

The uncovered unobserved connection using REBUS-PLS path modelling confirms that the detected classes are distinct and separate. The study starts by revealing the evidence of unobserved links using the cluster dendrogram (see Figure 3). Class 1 (n = 154) is this unobserved respondent class. Our findings confirm a direct and positive significant link to the relationship between knowledge sharing, sensing capability, and agility on sustainable performance. Thus, it supports H1, H2, H3, and H4. At the same time, in Class 2 (n = 146), these unobserved respondent sets echo the former class. The class highlights the significant positive relationship between knowledge sharing, sensing capability, and agility in sustainable performance. Therefore, Class 2 confirms H1, H2, H3, and H4. The results are in line with those of Caraveli and Traill (1998).

The above study findings suggest that substantial differences exist between managers and employees who are capable of creating new knowledge as well as helping dairy microfirms with unique strategies. Therefore, the study thesis is that it is worth exposing the unobserved relationships between knowledge sharing, sensing capability, agility, and sustainable performance – these are valuable competencies that create dynamic capabilities for dairy microfirms. From this perspective, managers and employees could exploit differences in knowledge sharing and sensing ability to build a higher-order dynamic capability: agility. Thus, the study argues that unobserved heterogeneity in valuable competencies is an offshoot of the sustainable performance of the dairy microfirm in Tanzania.

The detected unobserved heterogeneity could be used as unique resources in the domain of individual capabilities of dairy microfirms. Our findings align with the KBV analogy (Nickerson & Zenger 2004; Felin & Hesterly 2007). For example, the theory posits that the difference regarding the stock of knowledge between managers and employees spearheads first-order dynamic capabilities. In that vein, the detected difference in valuable competencies is a double-edged sword for dairy microfirms in Tanzania. The first is allocating resources to lower and higher drivers due to detected differences between managers and employees to invaluable competencies (Lewin & Volberda 2003; Schlecht 2012; Kaur 2019). Second, the unobserved difference enhances the understanding of the areas that need immediate attention for capability building to effectuate dairy microfirm performance. Exploiting resources in this way is pivotal for building knowledge-based dynamic capabilities for managers and employees of the dairy microfirms in Tanzania.

Overall, the findings demonstrated the importance of distinguishing resources and dynamic capability to impact dairy microfirms' sustainable performance while considering unobserved heterogeneity. To this end, the discovered significant differences in valuable competencies are vital for a dairy microfirm because they highlight how to piece together distinctive resources while considering the induvial differences. Integrating dairy microfirm resources to create practical competencies through unobserved differences is essential for developing dynamic capabilities and sustainable performance. In that vein, top management can use the heterogeneous relationship to mould competency values between managers and employees to fundamentally improve sustainable performance. It is supported by KBV literature (Bamel et al. 2021).

Suggested limitations and future research directions

The study has numerous limitations – first, the COVID-19 pandemic. The local government imposed numerous restrictions to control the spread of the virus. These restrictions fundamentally affected the pace of the pilot survey and the entire data collection process. As a result, data collection from dairy microfirms scattered across three regions was compromised by adherence to the COVID-19 rules. This led to a significant delay in obtaining a sufficient sample size from the three geographic locations. It took a longer time to complete the pilot survey and data collection because of the COVID-19 pandemic disruptions. Second, the study covers only dairy microfirms. It is vital to consider larger dairy firms to expand the generalisability of the findings.

Future research could validate the existing unobserved connections by comparing two methods, REBUS-PLS path modelling and PLS-PATHMOX. The former presents unobserved links using a structure and measurement summary, while the latter uses social demographic variables such as age and gender. Comparing the two methods might elicit a new managerial function of handling heterogeneity, and it can broadly explain the relationship between dynamic capability drivers and sustainable performance.

Managerial contributions

The study debunks the unobserved connection between managers and employees in ascertaining the relationship between sensing capability, knowledge sharing, agility, and sustainable performance. Thus, the findings will help managers and employees leverage unobserved connections and allocate equitable resources for knowledge creation to enhance the different dynamic capabilities of dairy microfirms. The article highlights the significance of investing in intangible assets to enable the population within – managers and employees – to improve the sustainable performance of the firm. Furthermore, the study helps managers and employees connect knowledge sharing as a lower-order dynamic capability and sensing capability, as well as agility, which is considered a higher-order dynamic capability. Thus, combining lower to higher dynamic capability drivers is helpful to dairy microfirm stakeholders, which could fundamentally develop resilience and managerial mutations to enhance dairy microfirm sustainability. The results could prompt dairy microfirm owners to improve equitable resource-sharing strategies for managers and employees that are pervasive and essential in effectuating capability-building ethics, which could improve dairy microfirm sustainability in Tanzania.

Conclusion

We tested the proposed research model that encompasses higher and lower dynamic capability drivers and the extent to which they influence the sustainable performance of dairy microfirms in Tanzania. Conclusively, the study confirmed the existence of an unobserved connection in the relationship between dynamic capability drivers and sustainable performance in dairy microfirms in Tanzania. Therefore, the article makes theoretical contributions at two levels while exploiting the KBV as the influential theoretical lens. First, the study fleshes out the aggregate model; then, it reveals the unobserved connection using latent class models.

The study typically concludes by proposing ensemble strategies for managers and employees to handle the unobserved connection to enable the positive effects of dynamic capability drivers on sustainable performance. In this process, the internal working environment could be further improved with robust knowledge creation capabilities, which is a cautionary tale in addressing the unobserved connection between managers and employees of dairy microfirms. Arguably, the multilevel competency between managers and employees influences the sustainable performance of dairy microfirms in Tanzania.

To this end, this article has addressed some commonalities between managers and employees related to interactions between firms and customers, brand names, knowledge exchange, and distribution systems, despite exercising these similarities in dynamic capabilities regarding the key attributes of dairy microfirms (Helfat et al. 2007). The study findings reveal that unobserved connections determine valuable competencies; for this reason, we argue that the dynamic capabilities of dairy microfirms could emerge from multiple paths (equifinality).

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

The authors M.H.B., M.Z. and L.M. made unique contributions to accomplish the writing of the article.

Ethical considerations

Ethical clearance to conduct this study was obtained from the Commission of Science and Technology (COSTECH) and Moshi Co-operative University (MoCU) (NO. FA.195/132/01/122 and FA.228/276/03).

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Data availability

The data that support the findings of this study are available from the corresponding author, M.H.B., upon reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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