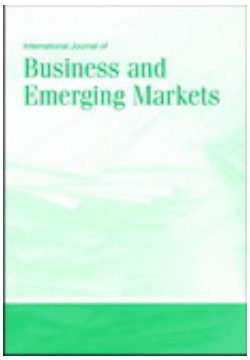

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Towards the development of an inventory for the resource orchestration construct

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Abstract: The present study aimed to enrich knowledge production by developing and validating a tool for measuring the resource orchestration construct. Resource orchestration theory is increasingly staking its claim in management literature as an emergent theory for explaining how corporate strategy is translated into organisational outcomes. However, the lack of applicability and empirical validity is one of its most glaring shortcomings. As such, while the theory has inspired a growing body of research, knowledge production has been fraught with limited comparability due to a dearth of empirically validated measurement tools. We embarked on this task by critically reviewing extant literature on the definition, conceptualisation, dimensionalisation and measurement of the construct as an essential first step. We also examined conceptual models used in prior research. We then outlined our methodology to develop an inventory for the resource orchestration construct. We concluded the study by presenting and discussing our analysis of data. Lastly, we proposed future research trajectories. This paper proposed empirically validated resource orchestration inventory as a novel contribution to knowledge.

Keywords: construct; inventory; instrument validity; measurement; resource orchestration.

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1 Introduction

Unpacking the concept of resource orchestration requires first defining the word resource within the context of a corporate entity. According to Arrighetti et al. (2018), resources are assets or inputs an organisation deploys to ensure growth, prosperity, and continuity. This approach is also supported by Gao et al. (2017), Jones and Comfort (2020) and Chukwuemeka and Onuoha (2018). However, on the one hand, Akaeze (2016), Ali et al. (2017) and Gupta and Sebastian (2017) believe that not all resources have the same weight to an organisation's survival. On the other hand, Masood et al. (2019) and Tracey et al. (2017) distinguish different resource classes and classify them into tangible and intangible resources. The definition of resources encompasses a wide array of inputs, including both tangible and intangible resources, alliances (Ahuja and Chan, 2017), corporate image (Almeida and Coelho, 2017) and competencies (Su and Linderman, 2016).

Recent management literature has accentuated the role of such resources as they are seen to provide organisations with the capacity to absorb shocks (Karacay, 2017; Omar et al., 2020). As such, resources are critical for organisational continuity by enabling them to handle disruptive events promptly.

The literature on resource orchestration management suggests that resources do not just happen. Instead, they result from a carefully crafted strategy that firms deploy by benefiting from potential growth opportunities (Nguyen et al., 2019). This has led to the identification of resource orchestration as a generic concept, which focuses on managerial actions aimed at effectively employing resources by carefully allocating available resources, converting them to capabilities, and generating value through leveraging those capabilities (Berseck, 2018).

This offers resource orchestration the potential to explain inter-organisational resilience differential, highlighting the indirect influence of managerial action in firm resource orchestration (Furnival et al., 2019).

The resource orchestration construct finds its anchorage in resource orchestration theory (ROT) which has naturally evolved from the resource-based view (RBV) advanced by Helfat et al. (2009) and Furnival et al. (2019). The theory proposes a taxonomy of firm resources and classifies them into two categories: dynamic resources and superordinate resources that create value (Chadwick et al., 2015). The basic premise of ROT is that superordinate resources are a differentiating factor in the competitive advantage equation since superior performance does not come from possessing valuable, rare, inimitable and non-transferable (VRIN) resources but from their orchestration (Leiva, 2018). As a result, ROT is increasingly staking its claim in management literature as an emergent theory for explaining how corporate strategy is translated into organisational outcomes (Bittencourt et al., 2021; Hughes, 2018; Carnes et al., 2017). However, the lack of applicability and empirical validity has been identified in the literature as one of the most glaring shortcomings of ROT (Peuscher, 2016). As such,

while the theory has inspired a growing body of research (Asiaei et al., 2021; Badrinarayanan et al., 2019; Chadwick et al., 2015; Khaleel and Ak-Ubadi, 2022), knowledge production has been fraught with limited comparability due to a dearth of empirically validated measurement tools (Carnes et al., 2017).

One of the pioneering attempts at developing and validating items for the resource orchestration (RO) construct was by Jenkins (2017), who proposed an inventory specific for application in supply chain management research. The study developed 13 items that measured supply chain resource acquisition (four items), supply chain resource bundling (four items) and supply chain leveraging (five items). All the items had high factor loadings, average variance extracted, and alpha coefficients, signalling high instrument validity. However, the utility of the inventory for evaluating RO in non-supply chain management firms is limited.

Later, Choi et al. (2020) used a simple 5-item inventory on a 7-point scale for measuring RO capability in a study on its interaction with entrepreneurial orientation, environmental dynamics and firm performance. They adopted the same scale from previous studies, testing their construct validities using confirmatory factor analysis and affirming the empirical robustness of their sample comparative fit indices. The dimensions of RO reviewed in the study were: resource portfolio, resource bundling, and resource leveraging. However, the tool's efficacy for advancing research is questionable since it did not explore the entire dimensional spectrum of the RO construct.

The present study aimed to enrich knowledge by developing and validating a tool for measuring the RO construct. We embark on this task by critically reviewing extant literature on the definition, conceptualisation, dimensionalisation and measurement of the construct as an essential first step. We also examine conceptual models used in prior research. We then outline the methodology we deployed to develop an inventory for the RO construct. We concluded the study by presenting and discussing our analysis of data. Lastly, we proposed future research trajectories.

While several previous works presented fragmented tools for measuring various aspects of the construct, this paper represents a novel attempt to present a wholistic list of empirically validated inventory that can be used to measure the construct more comprehensively. The tools were validated with theory-grade metrics and combined four fundamental first-order constructs: resource slacking, resource structuring, resource bundling, and resource leveraging.

2 Literature review

2.1 Definition of resource orchestration

A resource is an input factor contributing to an organisation's value creation (Gao et al., 2017; Jones and Comfort, 2020). The broad spectrum of factor inputs included in the definition of the term resource encompasses both material and non-material assets (Almeida and Coelho, 2017). In further unpacking the meaning of resource, defining it using its namesake 'capital' in non-narrow terms is helpful. In economics, capital refers to anything that can create value. Anything here literally means everything tangible or intangible, natural or intellectual, human or non-human, actual or potential, manifest or latent, passive or active, as long as it can be leveraged to generate wealth (Butkova, 2020). To illustrate the broad range of resources included in this definition, we count

input factors such as psychological capital, reputational capital, social capital and informational capital, and the more obvious ones such as financial and natural capital.

The term orchestration has its roots in classical music. However, within the business context, the term finds its meaning at its confluence with resources, wherein the focus turns to the effective selection, configuration, and deployment of input factors at the organisation's disposal to create value (Sirmon et al., 2011). It is also about "deciding when, where and how to assign individuals to teams and tasks" (Boon et al., 2018). According to Berseck (2018), RO follows a four-step process: structuring the portfolio of resources, bundling them into capabilities, leveraging those capabilities, and configuring and continuously synchronising each activity. Therefore RO, as a managerial tool, helps to evaluate how the utilisation of human and material resources can give an edge over competitors, enable growth, and yield success (Ahuja and Chan, 2017).

2.2 Conceptualisation of resource orchestration

Several attempts have been made to develop conceptual models to advance the theory and application of RO in management research (Ahuja and Chan, 2017; Andersén, 2021; Peuscher, 2016). Of the existing models, the one developed by Sirmon et al. (2011) has predominated the literature. Sirmon et al. (2011) proposed a model classifying RO into resource management and asset orchestration. In the model, resource management is classified into three sub-dimensions, namely, structuring (indicated by acquiring, accumulating, and divesting), bundling (indicated by stabilising, enriching and pioneering), and leveraging (indicated by mobilising, coordinating, and deploying). Asset orchestration is sub-classified into asset search/selection and configuration in the model. Their synthesis provided a comprehensive visual model of RO construct that can form a basis for empirical enquiry. However, they did not develop a measurement tool to compare these studies.

Later, Peuscher (2016) developed indicators for applying RO in business, entailing the delineation of performance indicators of ROT to guide implementation. Peuscher's model comprised horizontal and vertical integration. According to Peuscher (2016), horizontal integration comprises cross-functional teams, information symmetry within firms, inter-firm resource portfolio management, and shared innovations. In contrast, vertical integration included cross-hierarchy teams, senior-level managers, mid-level managers, and information symmetry. The synchronisation measures of RO practices included integration between breadth and depth and coordination between teams and departments. However, Peuscher's model fell short of developing and validating an inventory for evaluating the implementation framework.

Building on Sirmon et al. (2011), Ahuja and Chan (2017) developed a conceptual model for investigating RO for IT-enabled innovation. They used an example of an existing firm to illustrate how RO dimensions (leveraging, structuring, and bundling) can be carried out to realise improved firm performance. Leveraging was further sub-classified into mobilising, coordinating, and deploying. Indicators were identified for each dimension. In total, there were 13 indicators and five dimensions. However, measurement items for these dimensions were neither developed nor validated.

Ahmed et al. (2021a) adopted an integrative literature review methodology to conceptualise RO within the purview of organisational resilience. They argued that a firm's ability to orchestrate a blend of static and dynamic resources generates sustained value and contributes to resilience in a dynamic environment. The study proposed a

dynamic RO model to generate and maintain value as a policy tool. The study presented a clear link between organisational resilience and RO through resource creation, orchestration, and management capabilities. It further proposed that the source of organisational resilience arises from management actions in blending and orchestrating existing resources and not from the mere availability of resources. Hence, RO through managerial actions was projected in their study as one of the elements that distinguish between resilient organisations and non-resilient ones. However, they did not propose measurement tools for analysing the RO construct.

Andersén (2021) also proposed a conceptual model for analysing RO concerning competitive advantage in family firms. Andersén identified three RO facets as the consolidation process (idea sharing, cooperation and commitment, and conflict avoidance), integration process (search/selection of assets, configuration/deployment of assets, structuring resource management, bundling resource management, and leveraging resource management), and entrepreneurial (brave to take risks, innovative and proactive). However, the lack of elaboration on measurements of the proposed variables represented a principal shortcoming of this model. Hence, the practical utility of the conceptual model is in doubt.

2.3 Dimensional field of resource orchestration

A broad range of RO dimensions has been proposed in extant literature (Ahuja and Chan, 2017; Berseck, 2018; Carnes et al., 2017). However, they all pay homage to Sirmon et al. (2011), who first put forward a comprehensive account of the RO construct. Rouwmaat (2012) extended the works of Sirmon et al. (2011) by re-dimensionalising RO into five sub-dimensions, including acquiring, accumulating, divesting, governing, and modelling. His model decomposed bundling into stabilising, enriching, and pioneering. Leveraging had four sub-facets: mobilisation, coordination, deployment and innovation. Koentjoro and Eliyana (2015) added asset identification, planning, deployment, enrichment, and value creation.

Siregar (2017) dimensionalised RO into portfolio management, resource bundling and building marketing. Each of these dimensions was divided into three indicators. The portfolio management indicators included acquiring, accumulating, and divesting; the indicators of resource bundling comprised stabilising, enriching, and pioneering; and the indicators of build marketing were mobilising, coordination and utilising. These dimensions are primarily a replication of the pioneering effort of Sirmon et al. (2011). However, their indicators were measured, and the tools' validity was not demonstrated. A curious finding from path analysis using structural equation modelling was that RO had a negative and statistically insignificant effect on competitive strategy. This finding goes against the grain of mainstream literature that reports a positive association between RO and competitiveness. In the absence of a validated and explicit measurement tool, it is easy to speculate that the empirical results lack accuracy.

Berseck (2018) presented three core resource capabilities: structuring, bundling, and leveraging. Structuring comprises acquisition capabilities by identifying core competencies, accumulation capabilities through knowledge management, and divesting capabilities by repositioning the core competencies. Bundling constitutes stabilising, enriching, and pioneering. Leveraging includes mobilising, coordinating, and deploying. Divestment entails selling off or existing some of the firm's resources (Peuscher, 2016).

Target resources for divestment are less valued and have low potential value, and the firm generates higher-valued resources that promise a higher return on investment (Peuscher, 2016). Divesting activities include staff layoffs, selling off specific assets, divesting certain non-core aspects, and outsourcing business functions.

The second dimension of RO is bundling, which refers to integrating resources within the firm's resources portfolio (Berseck, 2018). Therefore, each capability a firm has is a unique combination of resources that allows it to take value-creating action for itself and its stakeholders (Boss, 2014). Bundling involves stabilising, enriching, and pioneering (Hitt et al., 2020).

The third dimension is resource leveraging, which involves coordinating human resources while deploying is about utilising (Berseck, 2018). Leveraging involves mobilising, coordinating, and deploying (Ahuja and Chan, 2017; Hitt et al., 2020). The mobilisation process elucidates the method of requisite discerning skills and forming competency arrangements suitable for market opportunities, while the coordinating and deploying processes accentuate the implementation of a selected leveraging scheme competently and expeditiously (Wang et al., 2019). Moreover, an organisation can thrive through leveraging processes by timely adjusting and applying strategies in an unstable environment. The enriching process entails enhancing firm capacity through learning and skill development. It also entails improving asset use through innovation (Boss, 2014).

Another defining feature of RO is stabilising. According to Boss (2014), the stabilising function of RO focuses on keeping the overall skill repository up to date through skill-enhancement training and development processes. It also relates to asset value preservation through replacement investment and exploring new uses of the company's assets. Finally, pioneering entails creating new capabilities for the firm. These capabilities may be created from existing resources or require new resources (Boss, 2014). These processes help organisations orchestrate assets, build strategic flexibility, and avoid core rigidities (Wang et al., 2019). Pioneering entails an element of innovation as it involves a firm's constant search for new products, relationships, and markets to expand its scope and growth.

2.4 Measurement of resource orchestration in empirical literature

Resource orchestration has traditionally been a contingent measure of an organisation's capability to recalibrate or reallocate resources to survive disruptive operational environments. According to Utoyo et al. (2020), a disruptive operational environment pressures firms to proactively seize opportunities and maintain competitive advantage.

We adopted the integrative review framework formulated by Toronto and Remington (2020). This framework describes the stepwise process of implementing the integrative technique on comparable extractive research. Using this approach, we synthesised the literature to gauge the state of knowledge, discover the inherent gaps, and inform future research areas relative to the subject of this research. Our review of the extant literature revealed many empirical studies anchored on the RO concept. The research stream can be broadly classified into studies that are based on a literature review (Ahmed et al., 2021a; Badrinarayanan et al., 2019; Koentjoro and Eliyana, 2015; Li and Jia, 2018; Peuscher, 2016; Teixeira et al., 2019) and those that utilise primary research approach (Ahuja and Chan, 2017; Berseck, 2018; Boss, 2014; Carnes et al., 2017; Chadwick et al., 2015; Jenkins, 2017; Lanza et al., 2016; Rouwmaat, 2012). Dipstick analysis of both research streams points to a surprising dearth of empirically validated tools for measuring RO.

However, three noteworthy exceptions warrant further scrutiny. These are Carnes et al. (2017), Choi et al. (2020) and Jenkins (2017).

In their study of RO in growth and maturity-stage firms, Carnes et al. (2017) utilised ten RO actions and strategies to measure RO construct on a 5-point scale from low to high. Carnes et al. (2017) focused on the importance of RO dimensions in predicting innovation across a firm's lifecycle. The ten actions drew inspiration from scholarly literature with a bias on resource structuring and bundling, which integrated entrepreneurial stratagems. The definitions contain a rich menu of indicators from which items can readily be developed. However, while they provided a detailed definition of each RO dimension and impliedly pointed towards potential indicators, they neither generated direct measurement items nor performed reliability and validity analysis.

The shortcomings of the tool utilised by Carnes et al. (2017) were partially mitigated in the work of Jenkins (2017), who arguably provided the first-ever documented inventory of RO thus far. However, Jenkin's inventory exclusively measures supply chain RO as supply chain and logistics were constant themes reflective of each item. In a way, the items allow room for adaptation in other sectors. However, the items connote a distinct sectoral context defined by its theories and practice ethos with limited transferability. This is implied, for instance, in the thematic focus of the items on logistics competency, logistics equipment effectiveness, source material effectiveness, logistics facilities and infrastructure, supply chain capability and purchasing capability. Thus, an adequate adaptation would not be possible without spending laborious effort on item modification.

Choi et al. (2020) measured RO using a five-item scale encompassing the three central dimensions that underpin the construct. This included acquiring and introducing essential resources and capabilities that improve competitiveness and responsiveness to competitive environments by reassembling and integrating existing resources and new capabilities. However, in line with the RO construct's comprehensiveness (five dimensions and 15 indicators), as illustrated in the works of Sirmon et al. (2011), such an overly simplistic measurement tool raises concerns over its robustness in representing the multidimensionality spectrum of RO as envisioned by ROT. It suggests that, on average, each dimension was represented by a single item. It is instructive to note that predictive validity is increased with an increase in the number of items (Diamantopoulos et al., 2012). Furthermore, to arrest the richness of the multidimensionality of the construct, a larger quantity of items is required (Robinson, 2018).

Rouwmaat (2012) proposed a framework for evaluating RO composed of five sub-dimensions: procurement, aggregation, divestment, administration, and business model. Three indicators represented bundling: stabilising, augmenting, and pioneering. Leveraging was represented by four indicators: mobilisation, coordination, implementation, and creativity. Koentjoro and Eliyana (2015) expanded upon this conceptualisation of RO and added, besides the five components mentioned by Rouwmaat (2012), asset discovery and selection, configuration and implementation, and advancement and proactivity.

3 Methodology

A 20-item inventory for measuring the RO construct was developed following the works of Hughes et al. (2015), Bhaskar (2018), Berseck (2018) and D'Oria et al. (2021). The 20 items represented four RO primary dimensions: resource slacking, resource structuring, resource bundling, and resource leveraging. Firstly, resource slacking comprised available slack, recoverable slack, and potential slack, and it was measured using six items. Secondly, resource structuring comprised acquiring, accumulating, and divesting, and it was measured using six items. Thirdly, resource bundling comprised enriching and pioneering, and it was measured using four items. Lastly, resource leveraging comprised fertilising and deploying, and it was measured using four items.

The inventory was tested on a stratified sample of 270 senior-management staff of 12 Kenyan listed banks. The sample was drawn from 1,789 senior bank executives, including C-suite executives and operational managers. The sample was proportionately stratified to ensure equitable representation based on the stratum size.

Reliability of the inventory was evaluated statistically by computing Cronbach's alpha (Dempster and Hanna, 2015). High reliability was signified by alpha coefficients of 0.7 and above (Taber, 2018). Cronbach's alpha was used to measure the reliability of the construct. Table 1 reports the liability matrix of the four constructs.

Table 1 Construct reliability matrix

Second order construct	*First order constructs*	*Cronbach's alpha ≥ 0.7*	*Composite reliability ≥ 0.7*	*AVE ≥ 0.5*
Resource orchestration		0.936	0.952	0.560
	Resource slacking	0.933	0.948	0.751
	Resource structuring	0.756	0.791	0.507
	Resource bundling	0.920	0.944	0.807
	Resource leveraging	0.868	0.910	0.717

Table 1 shows that Cronbach's alphas were above 0.7, indicative of the standard reliability threshold, as Sarstedt et al. (2019) suggested. This also applies to the composite reliability metric, which measures the construct reliability.

According to Souza et al. (2017), a research instrument's validity means its ability to serve its intended measurement purpose. The present study measures the degree to which the measurement represents latent constructs. According to Shirali et al. (2018), there are four sub-types of instrument validity. These are face validity, content validity, construct validity, and criterion validity. In this study, all four validity thresholds were passed.

4 Data analysis

Inferential analysis was carried out using structural equations modelling wherein PLS estimates were used to test the research hypotheses. The list of statistical tools employed in this research and their corresponding purposes are summarised in Table 2.

Table 2 List of statistical tools used in the study

Statistical tool	*Function*
Standardised root means square residual	Model fit indices
Kurtosis and skewness	Test of univariate normality
Breuch-pagan/Cook-Weisberg test	Heteroscedasticity
Variance inflation factor	Multicollinearity
Kaiser-Meyer Olkin's Bartlett's	Exploratory factor analysis
Factor loadings and p-values	Confirmatory factor analysis
Cronbach's alpha	Composite reliability
AVE metrics	Discriminant and convergent validity tests
Structural equation modelling (SEM)	Inferential analysis

A normality test is done to determine the extent to which the data follow a normal distribution pattern (Paul and Zhang, 2010). Normality tests are detected by the kurtosis and skewness patterns that the dataset may reveal. Kurtosis indicates flattening of the distribution, while skewness is a sign of data asymmetry and, therefore, a deviation from a normal distribution. Econometric theory suggests that skewness and kurtosis values within the range of plus or minus three standard deviations from the mean are generally considered normal (Qu et al., 2020). This study measured skewness and kurtosis for the second and first-order constructs. The results indicated that skewness and kurtosis fell within plus/minus three standard deviations from the mean for all the constructs reported, as shown in Table 3.

Table 3 Test of univariate normality

Constructs	*Skewness*	*Stndrd. error*	*Kurtosis*	*Stndrd. error*
Resource orchestration	–0.528	–0.681	0.179	0.662
Slack resources	–0.905	0.179	0.870	0.356
Structuring	–1.322	0.179	1.831	0.356
Bundling	–0.633	0.179	–0.264	0.356
Leveraging	–0.972	0.179	1.089	0.356

4.1 Exploratory factor analysis

Factor analysis encompasses two mutually complementing techniques: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). While EFA utilises statistical methods to examine the interrelations among many variables, CFA examines the characteristics and magnitude of the structures suggested by EFA (Watson, 2017). Hence, EFA must be conducted first as an exploratory tool, while CFA is carried out subsequently for confirmation purposes.

Exploratory factor analysis (EFA) entails the examination of the correlation matrix, communalities, and factor analysis through the utilisation of principal components analysis (PCA) (García-Gil et al., 2018). To ascertain whether PCA is suitable, the investigators must apply the Kaiser-Meyer Olkin (KMO) test of sampling adequacy and Bartlett's test of sphericity to assess the homogeneity of variances and the equality of

variances, respectively (Shrestha, 2021). Subsequently, communalities must be investigated to determine how much variation in the initial variables is depicted by the extracted factors (Schreiber, 2021). According to Shrestha (2021), communalities values lower than 0.5 should be disregarded as they provide minimal explanatory power.

In this study, an EFA was executed using PCA to reduce the number of factors used to measure the variables. Mustafa et al. (2020) argued that the test characteristics for EFA should encompass a KMO statistic that surpasses 0.5, factor loadings of more than 0.5, communalities of more than 0.5, and a statistically significant Bartlett's test of sphericity (p-value < 0.05). Watkins (2018), on the other hand, proposed that any factor items with factor loadings beneath 0.5 should be removed. The factor analysis for RO results, presented in Table 4, indicated a KMO statistic of 0.931, a significant Bartlett's test of sphericity (p-value < 0.05), and factor loadings and communalities of more than 0.5. The 20 factors measuring RO accounted for 74.892% of the total variance in the data, and all factors were retained as their items had factor loadings higher than 0.5, with the least factor loading being 0.574 for Potential Slack1.

Table 4 Exploratory factor analysis for resource orchestration

KMO: 0.931, Bartlett's (df): χ^2 = 3,213.323 (d.f. = 190), Sig.: 0, cumulative: 74.892%					
Indicator	*Loading*	*Communality*	*Indicator*	*Loading*	*Communality*
Available slack 1	0.976	0.736	Divesting 1	0.798	0.666
Available slack 2	0.935	0.829	Divesting 2	0.701	0.658
Recoverable slack 1	0.93	0.836	Enriching 1	0.984	0.776
Recoverable slack 2	0.745	0.632	Enriching 2	0.901	0.775
Potential slack 1	0.574	0.671	Pioneering 1	0.95	0.814
Potential slack 2	0.597	0.663	Pioneering 2	0.663	0.771
Acquiring 1	0.616	0.598	Fertilisation 1	0.815	0.739
Acquiring 2	0.816	0.748	Fertilisation 2	0.75	0.703
Accumulating 1	0.709	0.509	Deploying 1	0.665	0.554
Accumulating 2	0.868	0.74	Deploying 2	0.673	0.644

4.2 Confirmatory factor analysis

The validity of confirmatory factor analysis is evaluated through the factor loadings and p-values. Factor loadings assess the relationship between an item (question-statement) and the construct; theory posits that these loadings should be at least 0.50 and statistically noteworthy (Kock, 2019; Hair et al., 2021). Within this study, the sample means, standard deviations, and t-statistics were not reported, as the satisfaction of factor loadings and p-values were sufficient for factor validation (Kock, 2019). The confirmatory factor loadings for RO are provided in Table 5.

The table demonstrates that all item loadings for RO surpassed 0.50 and were statistically significant (p < 0.05). Consequently, all 20 indicators of RO were verified as legitimate elements for the construct of RO and its four subsections: slack resources, resource structuring, resource bundling, and resource leveraging.

Table 5 Confirmatory factor loadings for resource orchestration

Factor	*Loading*	*p-value*	*Factor*	*Loading*	*p-value*
Available slack 1	0.834	0.000	Acquiring 1	0.720	0.000
Available slack 2	0.917	0.000	Acquiring 2	0.551	0.000
Recoverable slack 1	0.936	0.000	Accumulating 1	0.754	0.000
Recoverable slack 2	0.824	0.000	Accumulating 2	0.456	0.000
Potential slack 1	0.833	0.000	Divesting 1	0.839	0.000
Potential slack 2	0.851	0.000	Divesting 2	0.859	0.000
Enriching 1	0.882	0.000	Fertilisation 1	0.836	0.000
Enriching 2	0.900	0.000	Fertilisation 2	0.863	0.000
Pioneering 1	0.926	0.000	Deploying 1	0.814	0.000
Pioneering 2	0.885	0.000	Deploying 2	0.873	0.000

5 Discussion and conclusions

The study empirically tested and validated ten factors of RO using 20 Likert-scale items. The ten factors represent four RO dimensions, namely: resource slacking (six items), resource structuring (six items), resource bundling (four items) and resource leveraging (four items). The item quantity is in keeping with the minimum four items per scale threshold, yielding high convergent validity in CFA (Robinson, 2018). Accordingly, the factors were validated with high scores of EFA and CFA, as shown in Table 6. This compares favourably with the supply chain RO tool developed and validated by Jenkins (2017), which reported high CFAs. Based on the empirical results and the statistical power produced, the study proposes the inventory for measuring RO using 20 questionnaire items reported in the fifth column in Table 6.

The EFA and CFA scores affirm the conceptual model that Sirmon et al. (2011) proposed earlier. A unique contribution of this research is the introduction and validation of resource slacking as a distinct RO dimension. We argue that resource slacking is an essential enabler of an organisation's dynamic capability that does not just happen. Literature suggests that available, recoverable and potential slack are a function of judicious crafting and deployment of strategy to stage the agility necessary to respond to adverse and favourable environmental shocks at short notice (Nguyen et al., 2019). Available slack is reflected in liquidity adequacy and positive relationships with creditors. Recoverable slack manifests in highly liquid working capital. For instance, accounts receivables and inventories should be readily convertible into cash with minimum loss in terms of time and financial discount. Potential slack is observable in the ease of access to industry-specific financial resources and a cash injection from firm owners.

While the items are specific to banks, each item is a generic measure of the corresponding factors and can be expanded using a similar pattern that allows customisation into other research contexts. Unlike the supply chain, the RO scale developed by Jenkins (2017), which has 12 out of 13 (92%) of the items centred explicitly on logistics and supply-chain-related practices, the large majority (13 out of 20 representing 65%) of the proposed RO inventory are generic items that are directly

adaptable in any other context. The remaining seven items (5, 8, 11, 13, 17, 19 and 20) are easily adaptable to non-bank organisations while specific to banks. For example, the items can be modified by replacing the word 'bank' with 'organisation' or 'company' without losing the intended meaning. The unique item is item 11, which may either be replaced with the statement, "selling no valuable equipment and facilities" (Carnes et al., 2017) or dropped without necessarily running the risk of materially compromising the validity of the inventory.

Table 6 Resource orchestration inventory

Indicator	*Code*	*EFA*	*CFA*		*Inventory (5-Likert-scale)*
Available slack 1	AS1	0.976	0.834	1	We have enough liquidity
Available slack 2	AS2	0.935	0.917	2	We maintain good relations with our lenders
Recoverable slack 1	RS1	0.93	0.936	3	We have a liquidity-friendly working capital
Recoverable slack 2	RS2	0.745	0.824	4	Attracting customers is a policy priority
Potential slack 1	PS1	0.574	0.833	5	Interbank financial resources are easily accessible
Potential slack 2	P2	0.597	0.851	6	We enjoy financial support from shareholders
Acquiring 1	ACQ1	0.616	0.882	7	We prioritise the acquisition of new capabilities
Acquiring 2	ACQ2	0.816	0.9	8	We are a rigid bank
Accumulating 1	ACC1	0.709	0.926	9	We have sustainable financial resources
Accumulating 2	ACC2	0.868	0.885	10	We cannot survive another shock similar to COVID-19
Divesting 1	D1	0.798	0.72	11	We maintain a healthy loan book
Divesting 2	D2	0.701	0.551	12	We have high-quality assets
Enriching 1	EN1	0.984	0.754	13	Ideas are easily shared across the bank
Enriching 2	EN2	0.901	0.456	14	We brainstorm new ideas
Pioneering 1	P1	0.95	0.839	15	New ideas are celebrated
Pioneering 2	P2	0.663	0.859	16	We are capable of developing new product lines
Fertilisation 1	F1	0.815	0.836	17	Our bank is an open learning environment
Fertilisation 2	F2	0.75	0.863	18	New policies are widely discussed internally
Deploying 1	DP1	0.665	0.814	19	We outsource non-core banking services
Deploying 2	DP2	0.673	0.873	20	Our core banking resources are efficiently used

Scores of the proposed RO inventory range from 1 indicating 'strongly disagree' to 5 indicating 'strongly agree'. Before running the analysis or generating composite indices, items 8 and 10 must be reverse-scored. At the data interpretation stage, lower scores on the 5-point scale indicate low RO. Conversely, the higher the score, the higher the RO in the organisation.

6 Contribution to knowledge

The study empirically tested and validated ten factors of RO using 20 Likert-scale questions with theory-grade EFA and CFA. In light of the empirical findings, coupled with the resultant explanatory power of the statistics, the study proposes a seed inventory for measuring RO using 20 questionnaire seedlings. While the questions are customised to the research sample, each is a generic measure of the corresponding factors and can be expanded using a similar pattern that allows customisation into other research contexts.

From the empirical metrics, the research established that resource leveraging was ranked first, followed by slack resources, resource structuring, and resource bundling. The rankings of the RO dimensions point toward a potential theoretical proposition around the pecking order, or a prioritisation, of RO metrics. At the apex of the hierarchy is resource leveraging and resource slack, indicating that slack and leveraging take precedence in the firm resource management priority scale, implying that the focus of management should be directed towards the deployment and coordination of immediately available resources. Hence, available slack resources such as liquidity cushion, undrawn revolving credit lines, and shareholder loans should be tapped into as they provide the first line of defence against disruptive shocks, acting as jump-starting powers that activate for navigating through disruption.

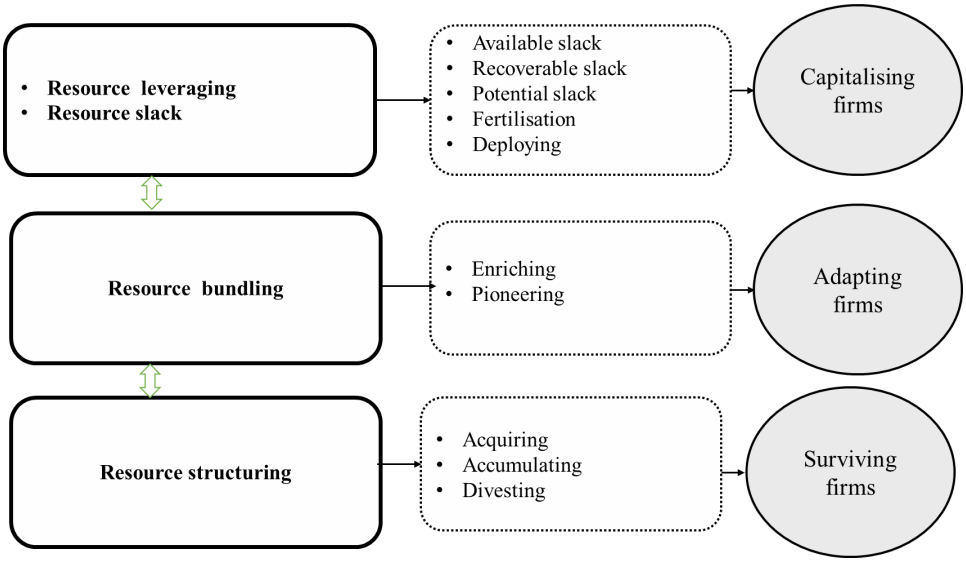
The second in the pecking order hierarchy is resource bundling, measured by resource enriching and resource pioneering, signifying that firm management should focus on adding value to existing resources at the organisation's disposal by discovering innovative ways to employ the assets at hand through enriching and pioneering. This approach increases asset productivity and reduces the asset's relative cost. This includes, for instance, adding more responsibilities for the core staff, deploying financial resources in higher return investments, and expanding the product offering through innovative use of existing assets. Enriching and pioneering represent the second line of defence for firms as they present opportunities to preserve resilience without resorting to other costly options such as asset restructuring.

The last option in the pecking order rank is resource structuring through acquisitions, accumulation, and divestment of resources. This option entails divesting burden assets, retrenching non-core staff, sealing off loss-making operations, and consolidating ownership and operations with a profit-making entity through mergers and acquisitions. Structuring and restructuring represent the last line of defence before the liquidation, and it should, therefore, in theory, be triggered when all other existing viable orchestration strategies have failed.

Based on the empirical findings and the above discussion, this study proposes a resource pecking order as an empirically validated conceptual model to guide research into RO and inform policy and practice.

This conceptual model is presented in Figure 1. The dual direction of arrows indicates an iterative process where organisations can reverse from restructuring to bundling and from bundling to leveraging based on an assessment of the market and information flow.

Figure 1 Resource pecking order (see online version for colours)



Source: Author (2023)

The model integrates the pecking order of RO with a corresponding firm robustness or resilience level. According to Ahmed et al. (2021b), firms that enter the crisis phase being highly prepared in terms of resource accumulation are likely to emerge with a high level of resilience, while firms that enter the crisis phase with low levels of slack resources are likely to emerge weak or in survival mode. Ahmed et al. (2021a) use the terms upper-echelon, mid-echelon, and lower-echelon organisations to classify firms in terms of their post-crisis transformational resilience. Lower-echelon organisations content by achieving the minimum resilience required for survival through being adaptive. In contrast, upper-echelon organisations prosper and flourish by capitalising on disruption. Intuitively, mid-echelon organisations lie between the extremes and operate at an average market profile. Therefore, managers could use the pecking order model as a decision tool to favour a specific class of resources and make deliberate plans to accumulate these resources over time. Unlike RBV, the resources accumulated under ROT do not have to be VRIN as long as their accumulation provides firms with adequate resources to see them through challenging times.

7 Implications for managerial practice

The study demonstrated a robust empirical path for RO, implying that effective RO constitutes the cornerstone for effective organisational resource management, highlighting the critical role of effective resource structuring, bundling, and leveraging firm resources in achieving firm growth objectives. The study also demonstrated that

slack resources are critical for the firm during normal operations and belt-tightening moments. The implication for the research sample is that portfolio quality should not be compromised, as disruptive shocks can trigger a fiscal squeeze that leaves low-quality asset firms vulnerable to shocks. Resource structuring is at the heart of such a strategy for maintaining a healthy asset book.

Similarly, this research demonstrated that resource structuring represents a salient strategy for value preservation; in contrast with common perception, resource structuring tools, such as mergers, acquisitions, and asset disposal, may be situationally relevant for firms to adopt in some circumstances. The findings also demonstrated that bundling new initiatives through pioneering and fertilisation positively impacts firm resource optimisation.

The research findings revealed the critical role of accumulating slack resources as the first line of recourse for efficient resource management. However, it was evident that the resource type and its temporal dimension are critical for corporate policies more than just slack resources. In this respect, the finding means organisations should always ensure they have excess resources to cater for unforeseen disruption. Leveraging occurs only when the organisation has some form of resources. Resource-void organisations can leverage on nothing. Therefore, building solid net worth and good reputational assets help firms obtain resources during challenging times because stakeholder risk appetite is reduced with uncertainties characterising belt-tightening times.

8 Limitations and directions for further research

While we are persuaded that the proposed RO inventory is a novel contribution to the scholarly world, we are alive of the fact that its utility is yet to survive the test of time. Therefore, the inventory is open to further empirical scrutiny and enrichment. For instance, the tool was primarily developed to measure RO in the banking sector. Its application in non-bank financial institutions and other economic sectors constitutes new knowledge research trajectories. Therefore, our work represents a seed for expanding the RO inventory into other contexts.

We believe that additional research will be required to support the findings, particularly the inclusiveness of the proposed inventory, possibly with more comprehensive and diverse data sources. While this research conceptualised a few metrics for RO, a model that is a closer representation of real-life situations could be developed.

The study sample was limited to senior management of listed banks, and while the dominant role of listed banks cannot be underestimated, the findings still offer a one-sided narrative of the construct. Therefore, replication of this study using a more diverse sample representing the whole spectrum of banking sector stakeholders, including shop floor staff, customers, and investors, should be undertaken to enhance the reliability of statistical outcomes.

The current study was conducted solely within the banking sector, yet the results may be generalisable to other comparative business sectors. Thus, this research presents an opportunity to replicate its conclusions in other industries. To this end, similar studies should be undertaken in other areas of the economy for comparison. As this research was

conducted among leading corporate organisations, it is also imperative to investigate the realm of small and medium enterprises (SMEs) for a more comprehensive understanding.

Finally, applying this research to a single context opens opportunities for replicating it in other comparable contexts. The study can also be expanded to cover other dissimilar contexts, such as Europe, Asia, and the Americas if the data scope and methodologies are customised to adhere to the respective contextual specificities.

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