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Acceptability of strata title in Brunei Darussalam: an integrated solution to sustainable living

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The recent traction in strata title living (STL) has addressed legal, regulatory, and governance issues to a certain extent. Despite addressing these underlying issues, the acceptance of STL remains low due to the low understanding of the features shaping residents' perceptions and expectations. Accordingly, this study aims to explore the features of STL and examine how they contribute to enhancing the acceptance of STL (ASTL). Considering STL as an innovative living arrangement, we use the diffusion of innovation (DOI) theory to categorize the factors affecting 201 Bruneian residents' perceptions of STL. The data collection was done through a self-administrated survey questionnaire and the collected data was analyzed using SPSS software. The findings reveal that perceptions of resource facilitation, relative advantages, and compatibility features of STL have the highest effect on ASTL. Whereas, perceptions of trialability, complexity, and observability have the lowest effect on ASTL. This study contributes to developing commercialization strategies for ST properties by understanding the features affecting the perceptions of ST residents.

KEYWORDS

strata title, living perceptions, diffusion of innovation, vertical properties, sustainable living

1 Introduction

Strata title (ST) is a composite division of common property into multiple units or lots allowing individuals/title holders to own a small proportion of that property through mutual sharing of access and maintenance responsibilities (Bailey and Robertson, 1997). The evolving literature on housing and property indicates that practitioners have used discrete terminologies, namely, multi-titled property schemes, multi-owned buildings, vertical living, high-rise living, and condominiums to describe ST (Randolph, 2006; Guilding et al., 2014; Leshinsky et al., 2018; Ashik et al., 2020; Shilon and Eizenberg, 2021). Overall, the main goals of these schemes are to ensure housing and property titles for the property holders (Kamaruzzaman et al., 2010). The unique features of ST cater to the diverging societal and personal needs by creating a vibrant and inhabitable society, offering a legal and economic opportunity to own a house, and allowing investments in a lucrative and profitable property market (Troy et al., 2016). Despite massive social and business potential, the literature discussing strategies to penetrate ST in the property market of developing countries and the factors affecting its acceptability among consumers is largely underdeveloped.

Further, an in-depth review of past studies elucidates that extant property and housing literature is concentrated on three main issues. The seminal studies indicate that legal, regulatory, and governance complexities in ST may affect its future growth, penetration, and

creation of a sustainable property market (Christudason, 2008; Christudason, 2009; Christudason, 2010; Easthope and Randolph, 2009; Crommelin et al., 2020). A few novel studies have identified the structural issues in the design and facilities of ST and their impact on ST planning and property market development (Celine, 2015; Sajan, 2015; Sia et al., 2018; Olanrewaju et al., 2021). Similarly, another research cluster highlights the significance of humanitarian factors such as diversity (Liu et al., 2018), social interaction (Thompson et al., 2022), cultural norms (Kerr et al., 2021), and managerial skills (Altmann, 2015; Liat Choon et al., 2022) in the creation of an integrated ST market. Although these contemporary issues are still ongoing and continue to develop, we argue that the recent traction in ST has addressed these underlying issues to some extent. Hence, it is timely for property practitioners to shift their focus to commercializing ST by understanding how different features of ST may affect the perceptions and willingness of customers to consider ST as a primary housing/living option. Considering the above argument about the role of the features of ST in shaping the customers' perceptions leads to our first research questions;

RQ1. What are the features of ST that shape the perceptions and acceptability of customers?

Contextually, a few fragmented studies have attempted to examine the role of psychological factors such as cognitive, inherited, and learned skills in shaping the perceptions and satisfaction of the people residing in ST properties (Easthope et al., 2012). Although ST appears complex, some of its characteristics and individuals' perceptual attitude toward these features are likely to determine its diffusion within a society (Guilding et al., 2014). ST offers an economic opportunity to gain property rights allowing people to gain control over valued resources often reinstated in inherited perceptions of individuals (Alexander et al., 2009). Further, the provision of aggregate facilities under the umbrella of ST is likely to conform to people's existing lifestyle and surge for a valuable living (Musa et al., 2020). The findings of past studies have established that dynamic changes in perceptions of people motivate them to explore culturally diverse places as it allows them to undertake informal social interaction (Ho, 2011; Ho et al., 2015). ST has emerged as a preeminent solution for consolidating these intuitional dwellings by creating ethnocultural societies for people to live in closer proximities to each other (Liu et al., 2018). Nonetheless, following the dearth of studies categorizing the cumulative features of ST and the significance of psychological factors toward the adoption of ST, the second research question (RQ2) is as follows;

RQ2. What is the role of individuals' perceptual attitudes in the acceptability of ST?

While the introduction of the ST system in Brunei Darussalam through the Land Code (Strata) Chapter 189 of Brunei Laws in 1999 serves as the rudiments of this study due to four main reasons. First, although Bruneians have actively approached local authorities to seek subsidized houses, the government is yet to fulfill the housing demand of more than 22,000 applicants. Second, recent media reports (Brudirect, 2016) and the researchers' personal experiences of more than 30 years in Brunei's property market led to affirm that ST is largely underdeveloped or even yet to emerge despite a clear demand due to changes in socioeconomic conditions. Third, the Bruneian government's initiatives to accelerate the land ownership system received relatively less attention from the general public due to the lack of facilities and customer-centric features of allocated ST lands. Fourth, the development of ST in Brunei is expected to facilitate strategic urban planning by using 30% useable land area to equally distribute residents in different locations. Taking together, the rise in housing demand, the government's limited capabilities to handle escalating demand for houses, consumers' dispositions in facility-based houses, and contribution in strategic urban planning is expected to offer an interesting and factual case to investigate the research questions probed in this study.

The next section reviews the literature and presents the research hypotheses in Section 2. The research methods outlining the research strategy, data collection, and analysis procedures are discussed in Section 3. The empirical findings of this study are presented and discussed in Section 4. The conclusion, implications, and limitations of this research are elucidated in Section 5.

2 Literature review

2.1 Conceptualizing ST

The evolution of ST began 150 years ago in France however, its formal development occurred in the 1960s when Western societies started claiming ownership of the properties through strata titles (Webster and LeGoix, 2005). The global jurisdictions use different names for ST properties, in the United States and most Canadian territories, it is commonly known as a 'condominium', in Australia and the British Columbia province of Canada, it is called an 'ST'. A few other countries, namely, New Zealand, France, and United Kingdom categorized it as 'unit titles,' 'coproprie´te´,' and 'commonhold'. The Asian jurisdictions of Singapore and Malaysia also classified it as 'ST' property (Sood, 2020). Predominantly, ST grants a legal privilege to the owners to hold shares in private lands or buildings for a specified term. The shareholders of these common properties manage their mutual interests by forming legal structures called 'homeowners associations' and 'body corporates'.

The definitions and perspectives of ST vary and are country-specific following encrypted land and property laws. Hence, the original context of ST is largely modified to synchronize with the socioeconomic, cultural, and property market dynamics of host countries. However, a common feature of lands and buildings under the ST scheme is the mutual sharing of facilities and responsibilities among ST owners (NSW Fair Trading New South Wales Department of Fair Trading, 2009). Generally, ST operates as follows; owner purchases a unit on land/building and receives the title, and has an access to common facilities such as a lift, stairwell, lane, car park, and recreational amenities of cinema room, pool, tennis court, etc., and in return has the obligation to share maintenance and management cost (Dredge and Coiacetto, 2011). The use of company title is a widely popular method to purchase shares from the companies that hold the ownership of the land/building which in return allows ST holders to occupy one or more lots/units. Lately, this method started facing legal, regulatory, and management issues materializing the implementation of the modern concept of ST (Hussain, 1994; Christudason, 2004).

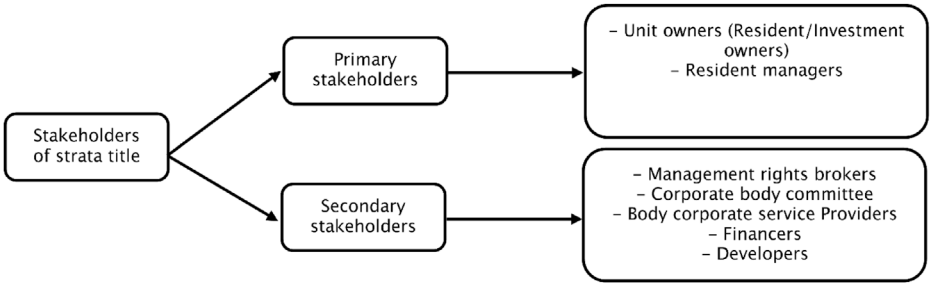

FIGURE 1
Stakeholders of ST. Source: (Guilding et al., 2006).

The main stakeholders of ST are separated into primary and secondary stakeholders (Figure 1) based on their varying roles and functions in the acquisition, management, and maintenance of units (Guilding et al., 2006). The primary stakeholders include unit owners and resident managers whereas, secondary stakeholders are the management rights brokers, corporate body committee, body corporate service providers, financiers, and developers. The prevalence of multiple stakeholders in ST enhances the functioning as well as increases the risks in the management due to conflicts of interest among stakeholders which may serve as potential drivers or barriers to ST (Altmann, 2015; Sia et al., 2018).

2.2 ST—A paradigm shift in the property market ST

The modern evolution of ST represents a paradigm shift in the property market resulted due to changes in economic, social, lifestyle, and perceptual attitudes of people toward living (Leshinsky et al., 2018). The proceeding discussion presents a brief outlook of the features of ST and contextualizes them to the factors driving and hampering the development of ST in the property market.

The recent developments in ST properties can be linked to the increasing residential density across the world which led to contemporary changes in modern living (Brugman, 2020). Modern transformative living has been associated with the facilities, design, and underlying features of the properties and their role in shaping residents' perceptions and interaction with each other hence, it is crucial to understand the features of these properties (Burton, 2000; Bramley and Power, 2009). The expanding literature on property and housing recognized assorted features of ST living. Among these studies, a comprehensive work by Easthope (2019) outlines the capabilities of ST in filling the colossal demand and supply gaps by offering economic opportunities to own a house/property. Similarly, another scholar conferred that ST is an innovative and logical response to massive urbanization and perpetual housing crises ushered by extensive population growth and highly dense housing societies (Allatt, 2020). Besides bridging elongated demand and supply gaps, ST allows informed metropolitan planning to manage extensive and concentrated development ensuring the sustainability and efficiency of urban areas (Dredge and Coiacetto, 2011). The centralized-governance system maintained by ST properties' management ensures the maintenance of facilities, and the safety of residents, and creates an ultimate living experience for residents (Liat Mehmood et al., 2022).

2.3 Features of ST and residents' perceptions

The living conditions and the premises are the indicators of quality life powered by economic and social polarization overturning the conventional perceptual chronicles of the house into quality living (Kern, 2014). Alternatively, this has altered residents' perceptions as they started viewing houses as a combination of physical, economic, and social components (Said and Martin, 2013). The typical components of a house include structure, layout, features, utilities, and accessible amenities while social components encompass neighboring communities according to religious beliefs, race, culture, and taste of residents (Hashim, 2003). Following the earlier discussion on the emergence of ST as a physical and social paradigm shift in the housing and property market, we intend to understand the factors that motivate people to choose ST by contextualizing their perceptions and experience toward ST living arrangements.

A few normative studies deliberated that geographic displacement often drives people to consider relocating to strata-based houses offering better services and facilities as well as ample economic, social, economic, functional, and psychological opportunities (Kearns and Mason, 2013; Crommelin et al., 2020). Another crucial aspect of ST is the assurance of residents' health by providing required facilities and community spaces which is perceived as a critical driver to prefer living in an ST home (Kim et al., 2005; Levin and Arthurson, 2020). In a high-density environment, social interaction has become challenging hence, the provision of sports, community parks, public libraries, and cultural center facilities, and inclusion in governance-related issues may help in developing progressive social interaction among ST residents (Thompson et al., 2022). Another key driver of positive ST perception among residents is the recognition of legally owning a valuable property representing residents' personal achievements which may guide them to accept ST homes (Mohit and Raja, 2014; Troy et al., 2016). The affordability and opportunity to own a quality house containing complimentary facilities to

discharge residents from maintenance obligations is perceived as a primary motivational factor to accept ST homes (Cyrus, 2015).

It is worth distinguishing that the complexities in the structure, management, and maintenance may negatively influence the perception of residents minimizing the acceptance of ST. Past studies have highlighted the ineffectiveness of existing procedures and associated them with higher maintenance costs for ST units (Sherwin, 2000; Vanier, 2001). Additionally, the strategies used for the maintenance of ST buildings were perceived as obsolete and forced residents to shift to alternative homes (Jones and Sharp, 2007). Often ST residents find it difficult to understand their contribution and responsibility in the maintenance of properties due to the lack of proper information from the management (Easthope et al., 2009). The safety and design of ST buildings are considered an important barrier to its acceptance as some studies indicated that spatial layouts and safety procedures employed by developers do not conform to regulatory requirements (Yang et al., 2022). The residents of ST properties have asserted that the lack of seriousness of management toward climate change and irrelevant preventative measures to mitigate the effects of climate change may alienate them from strata-based houses (Guilding et al., 2015). Some emerging studies have also highlighted the ethnic and social distribution strategies (Web and Webber, 2017), residential disputes (Easthope et al., 2012), an inappropriate attitude of neighbors (Buys et al., 2013), and vandalism and public nuisance (Shim and Kang, 1996; Kan et al., 2022) as the barriers to its acceptance among ST residents.

2.4 Hypothesis development

To understand the acceptability of ST, we need to understand the relationship between residents' expectations and perceptions of ST homes which hinge on personal, cultural, and social ideas about home (Giuliani, 2003). The earlier discussion serves as the foundation to understand the major drivers and barriers streamlining the diffusion of ST in a society which is further investigated by developing a theoretical model. Considering the innovativeness of ST in Brunei Darussalam, we use Rogers'. (2003) diffusion of innovation (DOI) model to investigate the role of personal, cultural, and social factors in shaping the perceptions and expectations about ST living allowing us to assess its acceptability. DOI was initially proposed in 1962 and was subsequently modified in 1999 and 2003.

We operationalized DOI due to two main reasons; first, ST is newly launched in Brunei and is considered an innovation to the population or economic system. Rogers. (2003) argued that the innovation process offers innovative methods to understand the delivery and decisions to adopt innovative products therefore, we expect that DOI will help us in examining the expectations and perceptions of Bruneian residents towards innovative strata schemes. Second, the housing and property literature indicates the effectiveness and relevance of that DOI to examine the diffusion of innovative products in smart homes, residential buildings, load-bearing masonry technology, green building, and construction building sites (Koebel et al., 2003; Ramli et al., 2017; Hubert et al., 2019; Wang et al., 2019). DOI asserts that the innovation process flows through multiple channels and embeds in the personal and social systems. Following DOI's logic, we connect the diffusion of ST living, its products, facilities, and services as an innovative process to the personal, economic, and social perspectives of residents. This theoretical linkage will identify the sequential changes in residents' expectations and perceptions which may alter their conventional perspectives about home and motivate them to search for innovative homes according to their economic, social, and personal perspectives (Sanni et al., 2013).

DOI assumptions further disseminate that diffusion of innovation is a time-dependent phenomenon and involves a five-stage complex process containing knowledge acquisition, persuasion, decision-making, implementation, and confirmation of successful innovation adoption phases (Rogers, 2003). Generally, the first phase (knowledge acquisition) is categorized as the most crucial in the acceptance or rejection of innovation as it determines the general propensity of individuals to gather the desired information linked to his/her social system. The knowledge stage is further categorized into five main components of relative advantage, compatibility, complexity, observability, and trialability. These five components allow us to establish the theoretical foundation of this research (Figure 2) by predicting that residents motivated by expectations and perceptions of ST living may acquire essential knowledge. Alternatively, the extent of this knowledge is shaped by the facilities, services, and personal circumstances of residents eventually determining the acceptance of ST living.

The relative advantage (RAD) phase determines the comparative advantages of innovative ideas over the traditional system (Rogers, 2003). It plays a significant role in determining the acceptance of innovative ideas as individuals expect/perceive that innovative ideas are likely to create higher benefits surpassing their existing social system usage (Yusof, 199). Earlier studies have confirmed a positive relationship between RAD and the acceptance of innovative ideas (Frambach and Schillewaert, 2002; Arts et al., 2011). The pioneering studies on the acceptance of innovation have recognized decreased initial cost and comfort, efficiency, economic gains, and social prestige as the key sub-dimensions of RAD (Gerrard and Cunningham, 2003). Contextually, it is submitted that the relative advantages of ST living such as the affordability of owning a house (Alexander et al., 2009), economic benefits in the form of lower maintenance fees (Cyrus, 2015), customer incentives in the form of aggregate facilities (Musa et al., 2020), and indicator of personal achievement by owning a property to legitimize social prestige (Troy et al., 2016) may positively shape residents' perceptions and enhance the acceptance of ST living. This leads to proposing the first hypothesis (H1) as follows;

H1. RAD has a positive effect on the acceptance of ST living.

Compatibility (CMP) refers to the consistency of innovation with past experiences, cultural norms, and personalized needs (Rogers, 2003). Another study advanced identical arguments and corroborated that individuals' personal beliefs or values toward acceptance of innovative ideas are determined by the extent of innovation to fulfill their desired needs according to their past experience (Gerrard and Cunningham, 2003). The studies discussing the diffusion of innovation have highlighted a positive nexus between CMP and the acceptance of innovation (Kim and Galliers, 2004). The current housing and property acquisition trends

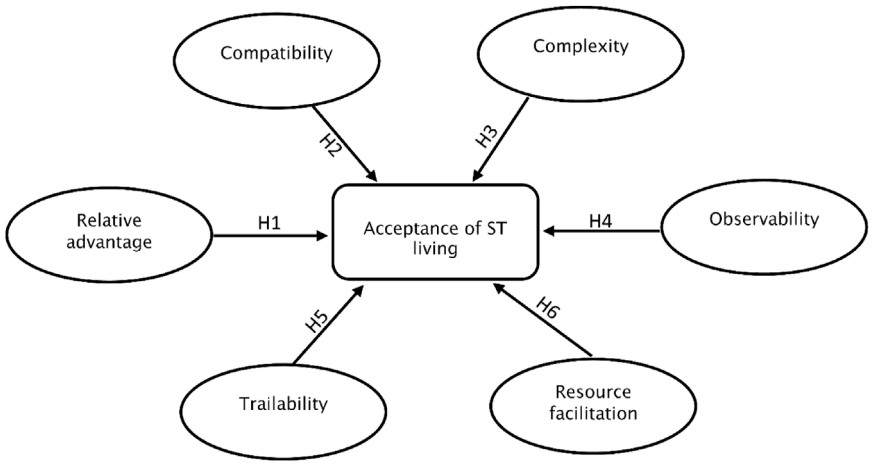

FIGURE 2
Theoretical model. Source: (Authors).

in Brunei lead us to infer that ST living has functional compatibility with the existing interest-based housing system in the country. This also includes Bruneian religious beliefs and a desire for interest-free housing in the country. Therefore, consistency (traditional housing operations and feeling of the need) is necessary to test for ST living. Additionally, the features such as social interaction opportunities (Thompson et al., 2022) and the prevalence of culturally diverse residents situated in ST living are compatibility with the Bruneian culture and social norms which are expected to further strengthen the close-knit family system and help in maintaining a harmonious cultural environment (Kerr et al., 2021). This argument leads to predict that the compatibility of ST living may positively contribute to its acceptance by Bruneian residents. Hence, we propose the second hypothesis (H2) of this study.

H2. CMP has a positive effect on the acceptance of ST living.

Complexity (CMX) determines the perceived difficulties in the usage or understanding of innovation (Rogers, 2003). Typically, innovation is characterized by complex or simple processes as some individuals may find it easier to understand or difficult to comprehend (Yusof, 1999). Past studies have reported a negative relationship between CMX and the acceptance of innovation (Gerrard and Barton Cunningham, 2003; Rogers, 2003; Sanni et al., 2013). The past studies on ST and condominium living have reported a negative impact of legal (Christudason, 2008; 2009; 2010), regulatory (Crommelin et al., 2020), governance (Easthope and Randolph, 2009), structural (Sajan, 2015; Sia et al., 2018), and operational (Easthope et al., 2009) complexities on the perception of residents living in ST homes. Following the arguments of the newness of ST in Brunei increases the risks of operational, governance, and structural complexities which may have a negative effect on its acceptance in the country. Hence, the third hypothesis (H3) is proposed below.

H3. CMX has a negative effect on the acceptance of ST living.

Observability (OBV) highlights the clearly visible outcomes of an innovation (Rogers, 2003). Studies discussing the adoption of innovative products and services suggested that some features of innovation are easily understandable while others require explanation using communication channels. A few scholars conferred that intangible services are difficult to understand therefore, the outcome of innovative services often needs to be communicated to outline the visible benefits. The findings of past studies are mixed as some scholars reported a positive impact of OBV (Yusof, 1999) whereas, a few researchers claimed a negative relationship between OBV and acceptance of innovation (Gerrard and Cuningham, 2003). Since ST living is a tangible experience supported by tangible complimentary services of community spaces (Kim et al., 2005; Levin and Arthurson, 2020), common facilities (Musa et al., 2020), and an opportunity to interact in a socially and culturally dense community by living in ST society (Thompson et al., 2022) are likely to highlight the visible outcomes. Taking together, the availability of ST homes, the provision of common facilities, and the fitness of ST living with the social and cultural dynamics of Brunei lead to suggest that it may accelerate the acceptance process of ST living. The fourth hypothesis (H4) is predicted as follows;

H4. OBV has a positive effect on the acceptance of ST living.

Trialability (TRL) is the fifth component of our theoretical model which determines experiencing the innovative idea on a trail-basis for a limited duration (Rogers, 2003). TRL plays a critical role in the acceptance of innovation as past experience eliminates uncertainties and increases future adaptability (Rogers, 2003; Ali and Chin-Hong, 2015). The studies in the context of TRL of ST living reported that residents prefer ST homes due to affordability and the availability of essential and complementary facilities discharging residents from the obligations of maintaining their properties and creating an entirely new and valuable living experience (Cyrus, 2015). Corresponding to the settings of this study, it is cautiously suggested that catering to the housing needs of Bruneian residents with ST homes containing essential and lucrative facilities on a trial basis may positively tap their

TABLE 1 Operationalized construct.

Construct	Construct label	Measures	Source
Relative advantage	RAD	RAD1) The advantages of ST living outweigh the disadvantages	Musa et al. (2020)
		RAD2) In general, ST living services are better than conventional living	
		RAD3) ST living makes me more confident than the conventional home	
		RAD4) ST living facilities are cheaper compared to conventional living	
		RAD5) Utility bills are cheaper in ST living as compared to conventional living	
Compatibility	CMP	CMP1) ST living is a good substitute for my previous living arrangements	Guilding et al. (2014)
		CMP2) ST living fits well with the way I like to have my home	
		CMP3) ST living is compatible with my lifestyle	
		CMP4) Using ST living facilities fits into my working style	
Complexity	CMX	CMX1) It takes a lot of mental effort to understand the ST living facilities	Sia et al. (2018)
		CMX2) Understanding ST living requires technical knowledge and skills	
		CMX3) ST living facilities can be frustrating	
Observability	OBV	OBV1) ST living facilities are safe to live in	Cyrus. (2015)
		OBV2) The concept of ST living is easy to understand	
		OBV3) I will not feel secure using the ST living	
Trailability	TRL	TRL1) I want to try ST living for at least 1 year	Cyrus. (2015)
		TRL2) I want to use ST living on a trial basis to see what it can do for me	
		TRL3) ST living designs, facilities, and costs motivate me to experience it	
Resource facilitation	RFC	RFC1) The laws, circulars, and policies governing ST living facilitate its effective usage	Easthope. (2019)
		RFC2) My surrounding environment motivates me to use ST living	
		RFC3) The political conditions in Brunei Darussalam motivate me to use ST living	
		RFC4) The government supports ST living	
		RFC5) The government is active in setting facilities to enable the use of ST living	
		RFC6) The government promotes and ensures the effective usage of ST living	

perceptions which may increase the acceptance rate of ST living. Thus, we project our fifth hypothesis (H5);

H5. TRL has a positive effect on the acceptance of ST living.

Resource facilitation (RFC) is the sixth component of the theoretical model of this research which refers to the availability of strategic, functional, and structural resources to develop ST schemes in Brunei. The usage of modified models is common in studies analyzing the adoption of innovation hence, our modified model is valid for two main reasons. First, ST living allows strategic urban planning (Dredge and Coiacetto, 2011) by fulfilling the increasing housing demands to economically own a house (Easthope, 2019). Second, the regulatory and legal support for ST properties will ensure the availability of homes for the residents of a country which may help in legitimizing the narratives of a welfare state. The Bruneian government may use ST schemes as an opportunity to authenticate their welfare state claims through the allocation of required strategic, regulatory, legal, and financial resources which will help to resolve rising housing issues and may promote the acceptance of ST living. Following this argument, our sixth hypothesis (H6) predicts that; Table 1

H6. RFC has a positive effect on the acceptance of ST living.

3 Methods

The research hypotheses of this study were tested by employing a survey for data collection. The survey questionnaire was personally designed by the researchers and was pretested by distributing it to the 4 academic and 4 housing and property professionals who were experts in the thematic areas of ST living and were familiar with the preliminary features of ST and residents' perceptions towards their features. The content of the questionnaire was further improved based on experts' feedback and the language and wording of the questionnaire were modified to remove complex statements. Once the questionnaire was ready

TABLE 2 Demographic profiles of respondents.

Demographic character	Frequency	Percentile	Valid %	Cumulative %
Gender				
Male	123	61.19	61.19	61.19
Female	78	38.80	38.90	38.90
Total	201	100.0	100	100
Nationality				
Bruneian	189	94.02	94.02	94.02
Non-Bruneian	12	5.97	5.97	5.97
Age (years)				
Between 18–29	20	9.95	9.95	9.95
Between 30–39	46	22.88	22.88	22.88
Between 40–49	55	27.36	27.36	27.36
50 and above	80	39.80	39.80	39.80
Marital Status				
Single	43	21.39	21.39	21.39
Married	151	75.12	75.12	75.12
Divorced	06	2.98	2.98	2.98
Others	01	0.49	0.49	0.49
Occupation				
Government	103	51.24	51.24	51.24
Private	63	31.34	31.34	31.34
Academic staff	01	0.49	0.49	0.49
Student	03	1.49	1.49	1.49
Others	31	15.42	15.42	15.42
Monthly Income (BND)				
Below 500	10	4.97	4.97	4.97
501–1,500	22	10.94	10.94	10.94
1,501–2,500	28	13.93	13.93	13.93
2,501–3,500	39	19.40	19.40	19.40
3,501–4,500	40	19.90	19.90	19.90
4,501–5,500	23	11.44	11.44	11.44
Above 5,500	39	19.40	19.40	19.40

for final data collection, the researchers sampled 22,000 applicants from National Housing Scheme (NHS) Brunei who had lodged applications for a house. The survey was administrated to Bruneian applicants having lodged applications for government-subsidized houses. The applicants of NHS are considered a suitable population for this study as it will allow estimating their expectations and perceptions about the facilities and features of ST living as well as examine their willingness to accept ST homes. Thus, this phase of designing a psychometrically accurate survey instrument and sampling the right population for data collection is considered crucial to achieving the objectives of the research.

3.1 Construct operationalization

The researchers conducted a detailed literature review to identify the measures for designing the survey instrument. All the constructs of our theoretical model were operationalized as reflective

TABLE 3 Questionnaire items' statistics.

Variables	Mean	Median	Minimum	Maximum	STD. DEV
RAD	15.03	15	5	25	3.293
CMP	11.25	12	4	20	3.151
CMX	10.49	11	4	15	2.097
OBV	9.48	9	3	15	1.375
TRL	10.21	10	3	15	2.290
RFC	18.90	19	7	30	3.805

TABLE 4 Cronbach's Alpha (items reliability test).

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardized items	No. of items
0.683	0.659	6

TABLE 5 KMO and Bartlett's test of sphericity (scale validity test).

KMO and Bartlett's test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.859
Bartlett's Test of Sphericity	Approx. Chi-Square	2,326.461
	df	276
	Sig	0.000

constructs. Table 2 presents the operationalized construct of this study.

The survey instrument was separated into two sections (A and B). The demographic profiles of the respondents containing gender, age, educational level, job position, and job experience information were covered in section A. Whereas, section B contains 24 items to measure the acceptance of ST living in Brunei based on potential residents' perceptions and expectations about ST facilities and features. Following the discussion in the theoretical model, the perceptions about relative advantages (RAD), compatibility (CMP), complexity (CMX), observability (OBV), trialability (TRL), and resource facilitation (RFC) are likely to determine the acceptance of ST living. Accordingly, RAD was measured by 5 items adopted and modified from Musa et al. (2020), CMP was estimated by 4 items adopted and modified from Guilding et al. (2014), CMX was estimated by 3 items adopted and modified from Sia et al. (2018), OBV was measured by 3 items adopted and modified from Cyrus. (2015), TRL was estimated by 3 items adopted and modified from Cyrus. (2015), and RFC was estimated by 6 items adopted and modified from Easthope. (2019). The participants were provided with a 5-point Likert scale (strongly disagree = 1 to strongly agree = 5) option to respond to these items.

TABLE 6 Results of Pearson correlation test.

Variables	RAD	CMP	CMX	OBV	TRL	RFC
RAD	1.0					
CMP	0.68**	1.00				
CMX	−0.167**	−0.187**	1.00			
OBV	0.293**	0.271**	0.362**	1.00		
TRL	0.559**	0.535**	0.197**	0.531**	1.00	
RFC	0.380**	0.391**	0.09	0.362**	0.531**	1.00

**Correlation is significant at the 0.01 level (2-tailed).

3.2 Data collection process

Altogether, 243 samples were distributed using a purposive snowball sampling technique to the Bruneian applicants from all four (Muara, Tutong, Kuala Belait, and Temburong) districts who had applied for housing under NHS. Since researchers had limited access to confidential information about the actual applicants of NHS, therefore, use of this data collection approach was valid as it facilitated the identification of potential respondents who have experience in dealing with conventional or housing markets in Brunei and have a preliminary knowledge about features and facilities of ST living which helped in examining the acceptance trends toward ST living. The survey was conducted from 01 March 2020 to 21 April 2020 through social media handlers (LinkedIn, WhatsApp, Facebook, and Instagram) and e-mails. This method of data collection is considered efficient and reliable due to the ongoing COVID-19 pandemic and its efficacy in maintaining diversity and randomness in the responses (Ali et al., 2021). The participants returned 213 completed surveys showing a response rate of 87.65%. We excluded another 12 incomplete surveys during the data cleansing and preparation process and used 201 valid surveys for final data analysis. The method used for data collection and the survey response rate verified the validity of cases as the valid cases exceeded the minimum threshold of 200–400 cases indicating 8 respondents for each indicator (Kline, 2016). The non-response bias was checked by *t*-test to compare the difference between responding and non-responding participants and found no significant difference as the *p*-value was >0.05 (Armstrong and Overton, 1977). The demographic profiles of the respondents are reported in Table 2.

TABLE 7 Results of factor analysis (principal component analysis method).

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.702	45.038	45.038	2.702	45.038	45.038
2	1.072	17.871	62.909	1.072	17.871	62.909
3	.874	14.573	77.483			
4	.630	10.496	87.979			
5	.414	6.905	94.884			
6	.307	5.116	100.000			

TABLE 8 Factor loadings of PCA analysis.

Rotated component matrix[a]		
Variables	Component	
	1	2
RAD	0.765	−0.279
CMP	0.790	−0.272
CMX	−0.047	0.931
OBV	0.503	−0.143
TRL	0.792	0.169
RFC	0.755	0.211

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
[a]Rotation converged in 3 iterations.

TABLE 9 Test results of dimension reduction.

Total variance explained						
Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.679	53.580	53.580	2.679	53.580	53.580
2	.875	17.495	71.075			
3	.722	14.446	85.521			
4	.415	8.299	93.820			
5	.309	6.180	100.000			

Extraction Method: Principal Component Analysis.

3.3 Data analysis procedures

Based on the exploratory nature of this research, we designed a theoretical model to test whether the acceptance of ST living is influenced by factors of RAD, CMP, CMX, OBV, TRL, and RFC which is further examined by research hypotheses (H1 to H6). The hypotheses of this research were tested through multiple regression analysis performed in SPSS 22. Generally, regression analysis predicts the outcome of one variable on the basis of one or more than one independent variables (predictors). The regression analysis is useful to investigate the relationship between continuous dependent variables and numerous independent variables (Pallant, 2007). This research engaged six independent variables, namely, RAD, CMP, CMX, OBV, TRL, and RFC for predicting the acceptance of strata title living (ASTL). The regression equation for the selected variables is represented as follows;

TABLE 10 Durbin Watson test results.

Model summary[b]					
Model	R	R square	Adjusted R square	Std. Error of the estimate	Durbin-Watson
1	1.000a	1.000	1.000	.000	1.968

[a]Predictors: (Constant) RFC, CMX, OBV, RAD, TRL, CMP.
[b]Dependent Variable: ASTL.
Note: RAD, CMP, CMX, OBV, TRL, RF, and ASTL represent relative advantage, compatibility, complexity, trialability observability, resource facilitation, and acceptance of ST living.

TABLE 11 Summary of regression analysis.

Model summary				
Model	R	R square	Adjusted R square	Std. Error of the estimate
1	1.000a	1.000	1.000	0.000

[a]Predictors: (Constant), RFC, CMX, OBV, RAD, TRL, CMP.

$$ASTLn = \alpha + \beta 1RADn + \beta 2CMPn + \beta 3CMXn + \beta 4OBVn + \beta 5TRLn + \beta 6RFCn + 1n$$

Whereas ASTL, RAD, CMP, CMX, OBV, TRL, and RFC represents the acceptance of ST living, relative advantage, compatibility, complexity, observability, trialability, and resource facilitation, β is the regression coefficient, and 1 determines the error term.

4 Findings and discussion

The demographic profiles of the respondents presented in Table 2 indicate that altogether, 201 respondents responded to all the questions of the survey out of which male respondents were 123 (61.19%) and female were 78 (38.80%). Further, the majority (94.02%) of the respondents were local Bruneian and 5.97% were non-Bruneians (expatriates). The age group results revealed that respondents' age was between 18 years to above 50 years and the majority (67.17%) were aged between 40 years and above. The marital status was captured by four (single, married, divorced, and others) different demographic indicators. The findings pertaining to marital status indicated that most (75.12%) respondents were married. The researchers divided respondents into five (government, private, academic, student, and others) different occupations based on their employment in relative sectors. It was noticed that the majority (51.24%) were employed in the government sector. The income of the respondents ranged from below 500 Bruneian Dollars per month to above 5,500 Bruneian Dollars per month. However, the majority (70.14%) were earning above 2,501 Bruneian Dollars per month.

We estimated the descriptive statistics (mean, median, minimum, maximum, and standard deviation) of questionnaire items (Table 3). The results of the items' statistics elucidate that the mean values of the scale items are positive which leads to inferring that the respondents have positively responded to all the items used for designing the scale of this research. The mean and standard deviation values of relative advantage (RAD) were 15.03 and 3.293. Similarly, compatibility (CMP) had a mean value of 11.25 with a standard deviation of 3.151. Whereas, the complexity (CMX) mean value was 10.49 with a standard deviation of 2.097. The observability's (OBV) mean value was 9.48 with a standard deviation of 1.375. While trialability (TRL) had a mean value of 10.21 with a standard deviation of 2.290. Finally, the resource facilitation item mean value was 18.90 with a standard deviation of 3.805. The positive mean values represented that the respondents fairly understood most of the statements of the survey as the mean values were >1. Additionally, the standard deviation values were >5 which indicated a low variability in the responses of participants. A careful analysis further revealed that RFC had the highest mean value (18.91) followed by RAD (15.03) which leads to suggest that the respondents highly considered these factors in the acceptance of ST living. Additionally, OBV had the lowest mean value (9.48) followed by TRL (10.21) which implies that respondents least considered these two factors for the acceptance of ST living in Brunei.

To analyze the construct validity, we performed Cronbach's alpha. The results of Cronbach's alpha are presented in Table 4.

The results in Table 4 corroborate acceptable internal consistency between items of the questionnaire as Cronbach's alpha value of 0. . .. is >0.50 criteria (Hair et al., 2006).

The sampling adequacy was estimated using Kaiser-Meyer-Olkin (KMO) criteria and Bartlett's Test of Sphericity to ensure that the collected data samples are sufficient and had exceptional fitness with the estimation model (Kaiser, 1970). The results of KMO and Bartlett's Test of Sphericity are reported in Table 5.

It is notable from Table 5 that KMO values were 0.859 indicating a meritorious and good measure of sampling adequacy (Kaiser, 1974; Hair et al., 2006). Similarly, the values of Bartlett's Test of Sphericity were less than (<) 0.05 criteria representing significant differences in the properties of the correlation matrix and identity matrix (Bartlett, 1954). Altogether, these results imply that the collected samples were adequate and have an acceptable fitness with the estimation model of this research.

The correlation between the variables of this research was measured by Pearson correlation. The results of the correlation between the variables of this research are presented in Table 6.

Table 6 determines that the correlation coefficient between all the variables is significant and positive as R values for all latent variables were >0 except for CMX which shows a negative and significant correlation with other latent variables. Together, this result indicates that the constructs of this study are relevant and have a significant positive/negative correlation to measuring the acceptance of ST living.

TABLE 12 Results of multiple regression analysis.

Coefficients[a]						
Model		Unstandardized coefficients		Standardized coefficients	*t*	Sig
		B	Std. Error	Beta		
1	(Constant)	2.878E-014	0.000		0.000	1.000
	RAD	1.000	0.000	0.316	120,888,396.535	0.000
	CMP	1.000	0.000	0.303	110,403,815.360	0.000
	CMX	1.000	0.000	0.201	104,198,462.229	0.000
	OBV	1.000	0.000	0.132	64,355,508.074	0.000
	TRL	1.000	0.000	0.220	89,281,747.934	0.000
	RF	1.000	0.000	0.365	155,898,398.618	0.000

[a]Dependent Variable: ASTL.

To test the fitness of our theoretical model, we performed a factor analysis test which is a common method to identify potentially contributing latent constructs in a conceptual framework (Everitt, 2006). The fundamental assumptions of this concept outline that the observable variables are reflective and are influenced by an underlying set of latent variables (Kline, 2005). The widely used method to analyze factor analysis is a Principal Component Analysis (PCA) which measures the effect of a latent variable on more than one observable variable (Gorsuch, 1983). Following the features and convenience of PCA to categorize and summarize the observed data and its close conjunction with other analytical methods such as multivariate analysis of variance and multiple regression analysis, this research employs PCA to categorize the factors potentially contributing to the adoption of strata title living. The results of PCA are reported in Table 7 together with the summary of PCA components in Table 8.

The initial eigenvalues of the PCA test indicate that the two components explain at least 45.03% and 17.87% variance in latent variables (Table 7). The overview of the summary of these components (Table 8) represented that the factor loadings for each variable were >0.50 except for the CMX variable which fulfills the recommended criteria of acceptable factor loadings. The researcher dropped items having factor loadings <0.50 and reperformed PCA analysis. The results of the modified model are represented in Table 9.

The eigenvalues of the PCA test result (Table 9) indicate a 53.58% variance in latent variables which is considered exceptionally good. However, in the final analysis, the researcher followed Hair et al. (2013) criteria and decided to retain all CMX items due to their significance in the theoretical model of this study and contribution to measuring the complexities associated with the acceptance of ST in Brunei.

Before proceeding to the final stage of analysis, it is crucial to address the multicollinearity issues in self-reported data. Generally, it is unavoidable in regression analysis as its standard error tends to be large for an independent variable highly correlated with one or more independent variables (Allen, 1997). The issues of multicollinearity can be addressed by the Durbin-Watson test which detects a specific type of serial correlation through the autocorrelation (AR) process. Field. (2009) suggested that the Durbin-Watson test statistics between the range of 1.5–2.5 represent normal and the values <1 and >3 indicate a cause of concern. To verify whether multicollinearity issues are likely to affect the results of this study, the researcher performed the Durbin -Watson test. The results of this test are presented in Table 10.

The results of the Durbin-Watson test indicate a positive autocorrelation between independent variables as Durbin-Watson test values were <2 confirming that the theoretical model of this research does not suffer from multicollinearity issues.

The hypotheses of this research were tested through multiple regression analysis as it will allow us to investigate the relationship between continuous dependent variables and numerous independent variables (Pallant, 2007). We employed stepwise multiple regression analysis as the researcher has used six independent variables, namely, relative advantage, compatibility, complexity, observability, trialability, and resource facilitation to determine the acceptance of ST living (ASTL). The summary of the regression analysis is presented in Table 11.

Table 10 indicate that the values of R and adjusted R square were 1 confirming that the prediction variables of RAD, CMP, CMX, OBV, TRL, and RFC have 100% fitness with the proposed theoretical model to measure the acceptance of ST living in Brunei.

To measure the effect size of each variable for testing the hypotheses of this study, standardized coefficients (β) and ρ values were analyzed. The results of the effect size are reported in Table 12.

The results of stepwise multiple regression analysis indicate that H1 (RAD → ASTL) is supported ($\beta = 0.316$; $\rho = < 0.001$). Similarly, H2 (CMP → ASTL) was also supported ($\beta = 0.303$; $\rho = < 0.001$). The regression values of H3 (CMX → ASTL) were positive ($\beta = 0.201$; $\rho = < 0.001$) indicated the acceptance of H3. Additionally, the results of H4 (OBV → ASTL) determined that it was supported ($\beta = 0.132$; $\rho = < 0.001$), the findings of H5 (TRL → ASTL) also indicated that it was supported ($\beta = 0.220$; $\rho = < 0.001$). Finally, the results of H6 (RF → ASTL) confirmed that it was also accepted ($\beta = 0.365$; $\rho = <$

TABLE 13 Summary of regression effects.

Hypothesis	Effect of	On	β	ρ	Supported/not supported
H1	RAD	ASTL	0.316	<0.001	Yes
H2	CMP	ASTL	0.303	<0.001	Yes
H3	CMX	ASTL	0.201	<0.001	Yes
H4	OBV	ASTL	0.132	<0.001	Yes
H5	TRL	ASTL	0.220	<0.001	Yes
H6	RFC	ASTL	0.365	<0.001	Yes

0.001). The summary of the results of the effect sizes together with hypotheses testing is presented in Table 13.

This study has empirically identified various features of ST living that may positively/negatively shape the perceptions of customers. Following a comprehensive literature review, we engaged different features of ST living such as economic, financial, personal, and social advantages, technical and functional complexities, simultaneous experience of living in an ST home, and legal, regulatory, and governance resources to understand their impact on perceptions and expectations of residents in Brunei toward ST living. The descriptive and statistical findings of this study indicate that the above features positively and negatively shape Bruneian residents' expectations and perceptions toward ST living. The results in Table 13 confirmed that respondents exhibited the highest significance and perceptions of RFC ($\beta = 0.365$) followed by RAD ($\beta = 0.316$) implying that the highly regulated and government-supported and governed ST properties offering the economic, social, and financial benefits are likely to attract residents to consider ST living in Brunei. This finding is consistent with the findings of Mohit and Raja (2014) and Troy et al. (2016) establishing that an opportunity to legally own a valuable property affirms residents' personal achievement which may guide them to accept STL. Alternatively, the provision of regulatory and legal support may facilitate strategic urban planning for the governments in developing countries (Dredge and Coiacetto, 2011) which will also allow them to fulfill increasing housing demands (Easthope, 2019). Further, the economic, financial, and social benefits of ST living may also enhance its acceptance. This study validates the findings of recent studies (Alexander et al., 2009; Cyrus, 2015; Crommelin et al., 2020; Musa et al., 2020; Thompson et al., 2022) corroborating that opportunities to economically own a house, reduced financial burden of maintenance, essential, and complimentary services, and social interaction are positive indicators of STL acceptance.

The findings of the simultaneous experience of living in an ST home indicate that the effect size was relatively lower as TRL ($\beta = 0.220$) and OBV (0.132) perhaps due to the underlying complexities in understanding the features of ST homes and the perceptions of the issues likely to occur while experiencing ST living. This finding authenticates the findings of previous studies (Sherwin, 2000; Vanier, 2001; Jones and Sharp, 2007; Easthope and Randolph, 2009; Yang et al., 2022) confirming that ineffective procedures in the maintenance and governance of ST buildings, a lack of proper information, safety and design procedures of ST buildings may force residents to switch to alternative homes. Further, the perceptions of fear of escalation in residential disputes, social and health issues, an inappropriate attitude of neighbors, vandalism, and public nuisance may also lower the acceptance of ST living among residents (Shim and Kang, 1996; Easthope et al., 2012; Buys et al., 2013; Guilding et al., 2014; Levin and Arthurson, 2020; Kan et al., 2022). Hence, assorted features of ST homes, essential and complimentary facilities, design and features, and its management and governance are synchronized in a way that creates the perceptions of transformative living experience among residents (Burton, 2000; Bramley and Power, 2009).

5 Conclusion

ST living as an innovative housing concept has been proposed as an integrated solution to overcome social, economic, and development issues affecting the sustainable living of the people. However, there are little information about the factors contributing to its acceptance in a developing country like Brunei. To understand the factors affecting the acceptance of ST living, we proposed a theoretical framework following Rogers. (2003) DOI theory outlining different features of ST living and residents' perceptions and expectations toward these features. The empirical findings reveal that different features and aspects of ST living may positively and negatively shape residents' perceptions affecting the acceptance of ST living. Particularly, resource facilitation offering legal and regulatory support and relative advantages in the form of economic, financial, and social benefits may highly affect the acceptance of ST living. Whereas, the simultaneous living experience can be improved by coupling essential and complimentary facilities, better management, and governance to shape positive perceptions about ST living eventually enhancing its acceptance.

5.1 Implications to theory and practice

The results of this study have several contributions. The first main contribution of this study is to the literature on housing and sustainable living by proposing ST living as an innovative living solution. The findings of this research have confirmed that ST living can be an innovative housing and living option that is influenced, motivated, and enhanced by different factors such as RAD, CMP,

CMX, TRL, OBV, and RFC. Second, our research extended the theory of DOI by implementing a modified version of DOI in the context of ST living contributing to DOI's validation to estimate residents' perceptions in property literature. Third, the findings of this research contribute to developing the theoretical framework to empirically explore the factors influencing the perceptions of ST living which will allow future researchers to use our theoretical model to examine behavioral attitudes toward ST living. Fourth, the contribution of the study is towards the transition of the housing market in Brunei as the finding of this study has proposed ST living as a dynamic housing and living option. This will also contribute to the development and growth of the property market in Brunei Darussalam.

Our findings also propose several practical implications for regulators, policymakers, practitioners, property consultants, and the general public. Following the findings of RFC and RAD, regulators are suggested to consider improving the legal and regulatory infrastructure with market-enabling guidelines to develop and promote ST living which may resolve existing housing issues and future urban planning. The policymakers may use the insight of this study for proposing and recommending the regulatory and facility-centric circulars binding ST property developers to oblige with promulgated safety, facility, and services guidelines so that residents can experience safe and assorted living in ST homes. The ST property practitioners may use our findings to understand the underlying complexities in the governance, management, maintenance, and operations and develop strategic policies to overcome these issues so that ST living perceptions are shaped positively. The property consultants may use the results of this study to recommend market penetration strategies to ST property developers by instilling customer-oriented facilities and features in ST homes which may help in gaining a competitive advantage.

5.2 Limitations and ways forward

Similar to other studies, this study has certain limitations which are associated with to survey instrument, data collection methods, and data analysis procedures. First, the survey instruments were designed by considering the most relevant factors which may affect the acceptability of ST living by employing DOI constructs. However, these instruments have not considered the effect of external factors such as demographic factors which may affect the acceptability of ST. Therefore, future studies are recommended to consider examining the effect of these external variables. Second, this study used purposive snowball sampling for data collection and verified the adequacy of collected data through statistical procedures. However, data collection using purposive snowball sampling may exclude participants who may represent potential participants of this survey. This may reduce the general representation of the finding of this study. Therefore, future studies are recommended to render a comprehensive data collection approach so that the findings have better generalization. Third, the data analysis procedures and techniques may reduce the robustness of the findings. The researcher has conducted the robustness test using the Durban Watson test to ensure that the results of this study were not affected by the multicollinearity issues. However, the problems of self-reported data often result in the halo effect which may reduce the robustness of the results hence, future studies are encouraged to consider additional statistical procedures to ensure the robustness of findings.

Data availability statement

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

Author contributions

Conceptualization, MO and QA; methodology, MO; software, QA; validation, QA; formal analysis, MO; investigation, QA; resources, MO; data curation, QA; writing—original draft preparation, MO; writing—review and editing, QA; visualization, MO; supervision, QA; project administration, MO.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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