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Thematic agency and spatial manifestations in heritage places with nuanced scale

Introduction

Overview

In broad strokes, this paper contemplates events occurring in heritage places through time as the framing variables for discussion with a consideration to the holistic connotations of scale, size, and growth. In this vein, the paper explores the notion of cultural theme, a trend or a phenomenon understood to mean the accumulation of related events or actions occurring in a historic district, town, or urban settlement over time. In parallel, the paper explores the physical, spatial manifestations in the place where a theme dominates.

Urban events or changes accumulate in some broad aspects of society such as health system or water provision. Changes, innovations, or additions in health planning or water engineering fields can be expressed through distinct events or trends of occurrences situating under the umbrella of the health system theme or water engineering theme, respectively. The buildings, landscapes, and infrastructures associated with health system or water service are the physical and spatial manifestations of such themes—reflecting the cultural imaginings of the society on how to go about living. Occurrences under a theme naturally breed changes in the place—say a medical discovery in some historic period results in the creation of a type of evolving hospital laboratory. The accumulation of events under a theme and the parallel accumulation of changes in place, as spatial manifestations, go hand in hand.

This study takes the inseparable thematic agency and spatial manifestations notions as a lens through which heritage districts and cities can be scrutinized to understand the history and culture of the place, and ultimately, to influence development plans and intervention projects. To define the thematic and spatial characteristics of an archeological site or a historic downtown involves identification, classification, and ordering tasks facilitated by assessment processes grounded in the use of evaluative tools such as measures, metrics, and criteria. These tasks and tools dovetail with the expanding definitions of scale. Dabiri and Blasteche (2019) stated the many meanings of scale and the scale dependence on context; as an example, they relayed three aspects of scale in human geography including size, level, and relation. This expanded, holistic understanding of scale goes with the development outlook for this paper.

Study Challenges and Objectives

This study springs from a knowledge gap in understanding the thematic agency in heritage preservation and the spatial manifestations thereof. Such gap forfeits the opportunity of using the paired thematic agency and spatial manifestations best for

heritage urban development plans and projects. Further, the ambiguity of scale in its expanded epistemological and utilitarian senses adds to the reasons for the study. Table 01 summarizes the challenges and corresponding objectives.

Table 01. Research challenges and objectives

Challenges	Objectives
Appropriating the term “theme” to specific purposes with anticipated outcomes is difficult to achieve.	Explore the notion of thematic agency in historic preservation.
The relationship between the theme construct and the associated spatial manifestations is not readily comprehensible.	Explore the notion of spatial manifestation associated with thematic agency.
Knowledge about the interpretation of scale and its expanded connotations is still limited.	Explore scale and associated principles in evaluating thematic agency and spatial manifestation.

Methods and Organization

Because the thematic agency and spatial manifestation are time-bound constructs of heritage cities, districts, and landscapes, subjecting examples of these heritage resources to scrutiny will be a defining methodical element for the study. Of the many resources available, one site inscribed on the UNESCO World Heritage List is chosen, the Petra site in Jordan (Figure 01). Petra is a rich framework for extracting and organizing information for analyzing the cultural themes of the site and associated spatial manifestations. As a World Heritage Site, Petra garners several cultural themes that we have reduced to the number sufficient to address the study objectives. As part of the methodology, we aimed to use the notions of scale, measure, and size in their expanded meaning to support the analysis.

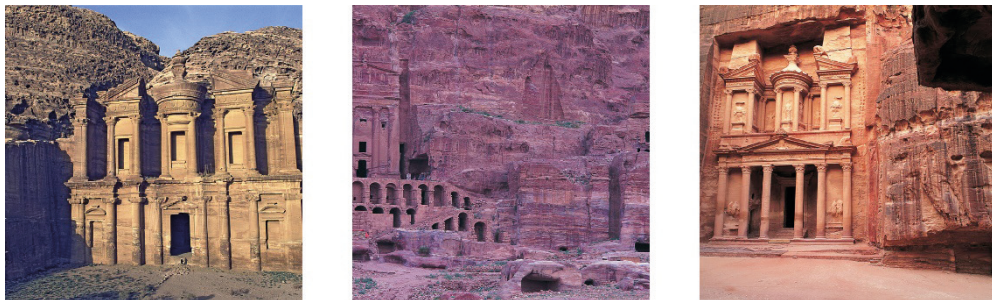


Figure 01. Some archaeological sites in Petra.

Source: Gelbert; Gray.

The discussion of this study is organized around a set of cultural settings that we have identified for the Petra site. A cultural setting as used here connotes a defined theme together with its associated spatial manifestations. We have adopted three settings: a) Engaging nature, b) Water management, and c) Design inventiveness. These are relevant and sufficient, in number, to support the study objectives. Other

potentially useable settings, including international trade and religious life, were not considered for the indicated reasons.

Implications

This study will add to the theoretical understanding and use of the thematic and spatial dimensions of historic towns, urban districts and archeological sites for the purpose of devising development plans. The present understanding of cultural themes and associated spatial resources will be elevated to workable constructs, thus enabling an improved navigation of the landscape thematic and spatial complexities to benefit development plans. Further, the results will shed light on the value of scale and scalability in their holistic and expanded connotations. The workability of scale in terms of supporting the characterization of the thematic and spatial dimensions of heritage sites will be defined.

Petra and the Nabateans

Timeline

The history and culture of Petra and the Nabateans are intertwined (Figure 02). Petra was founded and developed by the Nabateans as a capital of the kingdom and reached cultural heights between the middle of the 2nd century BC and early AD 2nd century with an estimated span of 275 years. Marking the foundation of the State under the leadership of Aretas I, the first historical monarch of the Nabateans, the year 168 BC ushered to the golden age of the Nabateans. Of tribal origins and commercial savviness, these people crossed boundaries and connected with near and far nations, a humanistic undercurrent (National Geographic, Meeting Hinat) not common among societies at the time. While some sources establish the presence of the Nabateans in the area as far back as 600 BC, the emergence of these people can be situated more confidently in the 4th century BC (Mouton and Schmid, 2013).

Petra and its region endured the appetite of world powers reaching out to control the Near East. The Nabatean lavish trading in Arabian frankincense, myrrh, and other commodities stirred the envy of the Greek, then in Damascus, who led an unsuccessful military campaign to seize Petra in 312 BC. The annexation of the region as Arabia Petrea by Rome in AD 106 under Emperor Trajan dealt a blow to the Nabatean independence and funneled Petra's rule and urban development in service of the occupier's wishes. Some sources, however, confirm that the city continued in vitality under the Roman regime, and, for long years under the succeeding Byzantines, starting in AD 355. With the advent of Islamic rule about AD 636, Petra was not a functioning city and subsequently fell out of world's memory till it was investigated by some European explorer in AD 1812.

Natural Context

The geographic, geologic, topographic, and hydrologic features of the Petra region mediated the dynamic of the Kingdom of Nabataea with its contemporary neighbours and the outlying superpowers acting across the Near East at the time as well as with the natural resources needed to support the growth of the city—into a

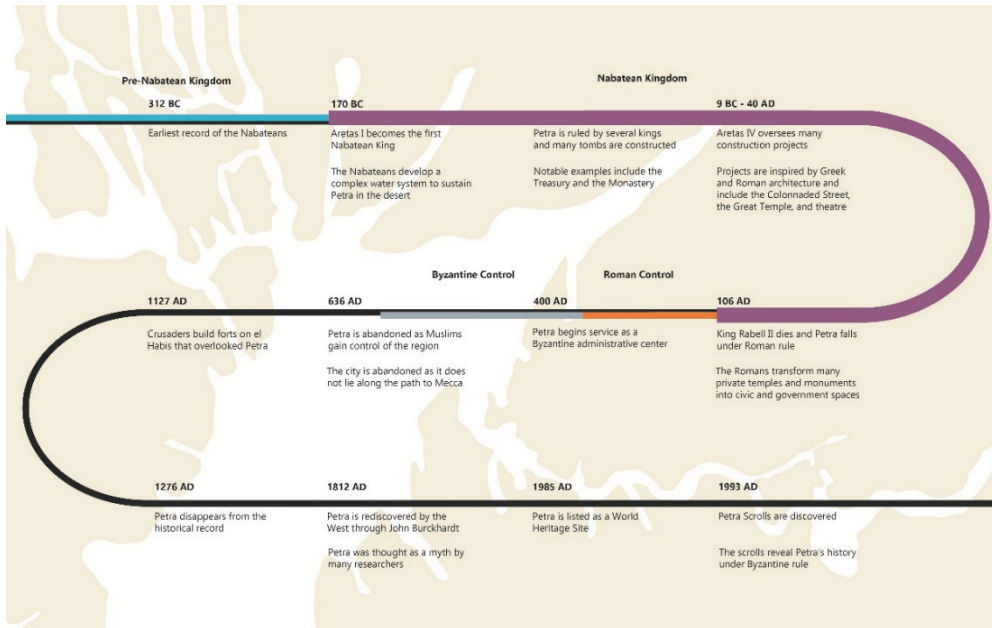


Figure 02. Timeline of Petra.
Adapted from the credited sources

Sources: *Kendackji; Petra Development & Tourism Regional Authority, 2012; Reynolds, 2012.*

metropolis. The setup of each of the four natural features offered opportunities, and limitations, for the Nabateans to consider for developing and protecting their capital city. First, Petra geographic location had the potential to facilitate trade exchanges with and between commercial centres in the four cardinal directions including Mediterranean seaports, Arabia, Egypt, and China. Promoting the nation's prosperity, Kouki (2012, p.15) recognizes the Nabatean adept trade with South Arabia and the eastern Mediterranean and highlighted the importance of the crossroad location of Petra as a commercial centre. Second, the geological formations where Petra sprang up in this part of ash-Sharah Mountains offered massive ranges of sandstone and limestone of potential to cut and shape for constructing monuments, facilities, homes, and tombs. Third, the stark topographic variations of Petra landscape with summits, steep ridges, and valleys offered the potential for judicious adaptation of construction projects to the site features. For the same reason, the topographic characteristics offered opportunities for defence of the city from adverse tribes and competing nations. Fourth, although falling in a hot-arid desert environment with meagre water sources, the Petra environs possessed scattered springs at varied mountainous elevations that could be harnessed. Further, regardless of scarcity of rain, the area witnessed torrential pours resulting in massive amounts of water that could be, again, harnessed.

Themes and Produced Works

Figure 03 depicts layout of Petra with salient physical development projects. The Nabateans thematic agency had been at work throughout the nation's historic epochs acting within the region's natural forces to produce the Petra's infrastructure, buildings, and landscapes we now come to know. Working hand in hand, a thematic agency and its produced works, otherwise spatial manifestations, coalesce into a unified construct we here appropriate as "setting." Because of the complexity of urban societies, we imagine that thematic agencies and corresponding spatial manifestations materialize in multiple settings for the archaeological city of Petra, and for any city for that matter. In pairing the research methods and objectives, we have appropriated for discussion the three most conspicuous settings of Petra. These are engaging nature, water management, and design inventiveness.

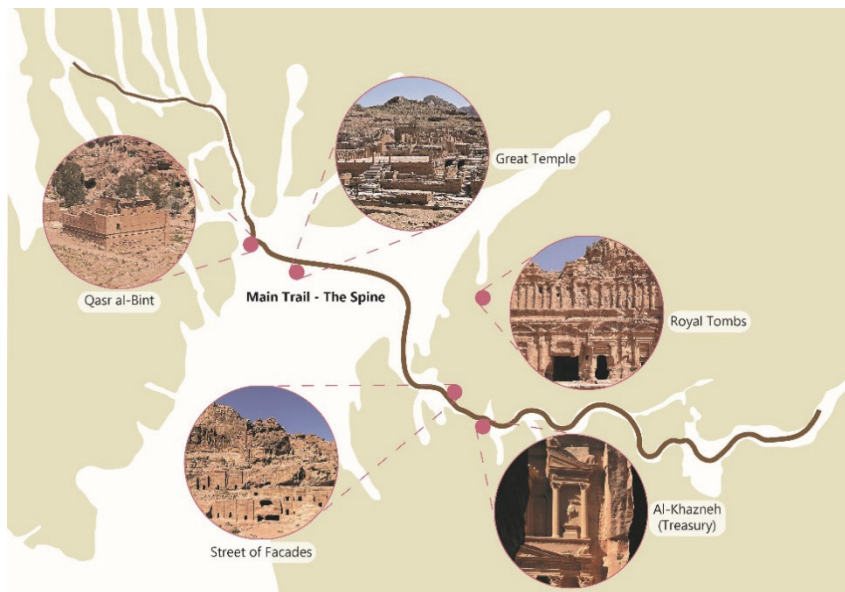


Figure 03. Layout of Petra with major development projects. Adapted from the credited sources
 Sources: Azurfrog, 2013; Gagnon, 2010; Petra Development & Tourism Region Authority.

Setting 1: Engaging Nature

Overview

The daily encounters with nature seem to have developed the Nabatean capacity for taking advantage of natural opportunities to support community living. Among these opportunities stands out the use of the natural environment for shielding the city from invaders and for shaping public places and community dwellings. At the importance scale, defending the city must have been an utmost consideration during the incipient phases of building the kingdom. Although never waned, this consideration gave grounds to another intent, using ecological resources for city development in terms of sheltering, trading, and administration.

Defence

The geography and topography of Petra corroborate the perceived defense needs of the city amidst the region's tribal and kingdom nations' strives since about the middle of the 4th century BC, believed the documented time of first Nabatean presence. Formidable to breach, the rugged mountains and difficult topography of the Petra environs were natural defense considerations for locating the settlement that had grown to an estimated size of twenty to thirty thousand people. The location and the configurations of the Siq, the 1.5-kilometer-long gorge triggered at the main entrance to the city, speak for the Nabateans physical adaptation of the natural environment to control access to the city. The narrowness and depth of the gorge made blocking this only passage to the city effective in defending against invading adversaries. Generally, "high walls and surrounding mountains served as intimidating defenses against raiders tempted to plunder the city's wealth" (Strange, 2008).

Ecological

Besides its importance as indigenous craft, the Nabatean carving of buildings and complexes out of mountain cliffs was an adaptive practice hardly observed in ancient times at such a scale. As opposed to "brick and mortar" construction, carving that weaved the physical development of the city of Petra by cutting into the hard rock is indicative of the appreciation and environmental use of the natural resources for the communal good. Further, cliff carving left an enclosure into the depth of rock with the geothermal qualities known to help condition the environment of the space. This thermal mass and the geothermal effects must had been welcome to the space users who otherwise had to endure the harsh summer temperatures of the hot-arid climate of this ancient part of the Near East. With their thermal properties, the rock hollowed-out enclosures tend to have a temperature close to the average annual temperature of the region. This transmutes to a cooler inside temperature in the summer and warmer inside temperature in the winter—than the outside temperature. Further, traditionally built (uncarved) construction projects have used stone and other local materials extracted from the immediate rocky hills, similarly an environmentally sound practice.

Setting 2: Water Management

Overview

As roaming tribes with firsthand knowledge of the Levantine terrain to the east and south of the Dead Sea, the Nabateans were cognizant of the water supply challenges in the environs of Petra where they settled for a home. The development of the now reasonably identified water system infrastructure that the Nabateans engineered, installed, and used may have started in the middle of the 4th or the 3rd century BC and continued through the middle of the 2nd century BC—the kingdom foundation phase, and from there with leaps to the end of the Nabatean reign. By 106 BC, the water system developed into the configurations that we have come to know about this otherwise genius hydraulic engineering feat. Hamarneh (2023) confirms that the "Nabataeans were specifically keen to showcase their ingenuity and wealth, as they were situated in a dry and arid area. For this, an extensive network of channels, pipes

and aqueducts were built to draw water from the numerous springs situated in the karst of the ash-Sharah Mountains.”

Water Resources

The city tapped on many water springs at different mountain elevations across the rugged landscape of the eastern fringes of the city and set them as sources of water draw. Al Farajat and Salameh (2010, p.322 and p.328) studied nine of these water springs but described the coordinate locations of at least twenty. The historical significance of water sources is underscored by authors’ proposition of the vulnerability of these water sources to the Roman control, speculating further that such control might have contributed to the Nabateans downfall (p. 334). Further, the flash floods symptomatic of the region prompted the city water authorities to capture and store for use every drop of the rainwater.

Water Distribution

The water delivery was accomplished through a network of ceramic pipelines and open channels set into the inclined elevations of hills and canyon surfaces. Here is where the hydraulic skills excel. Reflecting an understanding of fluid dynamics, city engineers took into consideration the effect of such factors like the size, geometric slope, and interior surface roughness of the pipe to deliver a measured quantity of water at optimum speed. Open channels were integrated into the distribution line at critical points to quell the speed of water flow. “Analysis of the system indicates exploitation of all possible water resources using management techniques that balance reservoir storage capacity with continuous flow pipeline systems to maintain a constant water supply throughout the year” (Ortloff, 2005).

Setting 3: Design Inventiveness

The Nabateans design inventiveness theme shows at both, the architectural project scale and the urban plan scale. The rough, rocky landforms of Petra natural landscape have played a major role in painting the urban character of the city through indisputably indigenous Nabatean innovations with adaptations influenced by the Hellenic, Mesopotamian, and Egyptian precedents and, from 106 AD, by the Roman development interventions.

Architectural Project Scale

The rock-cut architecture, including funerary structures, with chambers dug into the depth of the cliff is a hallmark of the Petra urban scene. This resulted in façade declared peculiarity of architectural production compared to free-standing structures. This phenomenon materialized clearly at a particular stretch of the main trail pathway (Wadi Musa) past the Treasury (Al Khazneh) in what is now known the Street of Facades. Here are several bands of tombs stacked at three or four levels on the face of ridge. Having diversity of geometric carvings in the façade, the entrance openings to the tomb burial chambers anchors the visual perception of the burial ensemble scene (Figure 04). The “Facadism” example repeats at a more majestic scale in the Royal Tombs site along the Al-Khubtha Trail, short distance from its convergence with the Main Trail at a point between the Theatre and the Nymphaeum (Figure 05).

The four abutting tomb structures align roughly in a south-north direction, facing west. As it was meant to be perceived, the burial ensemble declares the grandeur of the royalties interned in the alcoves behind. Here the burial façade size and treatment scales are worked out to bring about the visual effect at higher levels than those worked out at the Street of Facades burial site.



Figure 04. Street of Facades lines of tombs.

Credited image edited
Source: Gunther, 2014.



Figure 05. The Royal Tombs, four lined tomb structures.

Credited image edited
Source: Raddato, 2018.

In contrast to the practice of the rock-carved structures physically integrated into the cliffs, the sandstone block unit construction had a share in Petra's built environment design, and in the course, provided a flexibility for pragmatic development. The completion of the Great Temple complex located at the south bank of the Colonnaded Street in the city center attests to discretion afforded the designers and constructors for shaping the complex (Figure 06). Completed in the 1st century BC, the design, materials, and size of the project reflect the Nabateans program of growth and urbanization (Joukowsky, 2023) and their exposure to the Roman and other cultures of the time.



Figure 06. The Great Temple, a "brick and mortar" construction.

Source: Institute for Archaeology and the Ancient World, 2006.

Most buildings connect to the public realm at some external space anchored with the building entrance to provide, in addition to the circulatory function, a transitional external environment, or a courtyard. This building-city public space was normally used for celebratory gatherings, and in terms of treatment scale, ranges from the informal and geometrically irregular, as of that associated with the Treasury, to the formal and regular, as with that associated with the Great Temple.

The Treasury project located at the west end of the Siq's canyon displays the irregular type of outdoor spaces. Here, the space footprint is largely determined by the lines where the steep ridges meet the "ground" (Figure 07). At Qasr Al-Bint monument, the Temenos terrace linking the building with the Main Trail serves the transitional function between the building and the urban realm of the city as shown in the ensemble reconstruction scene in Figure 08. Here, the footprint of the temenos, and for sure its three-dimensional configurations, have a stark contrast with what we have seen for the Treasury outdoor space counterpart. This sequence of scale at the building, site, and city levels seems to have been used as a tradition in urban design.

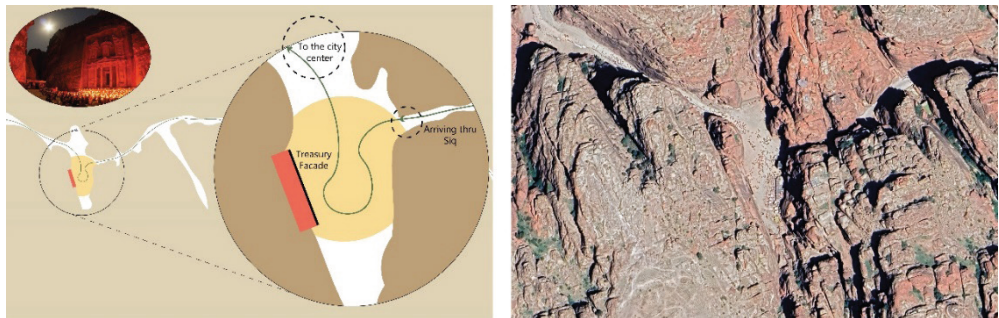


Figure 07. Informally shaped public space associated with the Treasury.

Image, left adapted from source image, right

Sources: *Petra Satellite View, 2023; Sylvain, 2014.*

Urban Plan Scale

The effect of the hilly, rugged landforms of the city's environs have had a hand in the development of the city layout through the years. The dynamic landscapes of valleys have influenced not only the urban fabric in terms of circulation, but also agriculture and rituals (Berenfeld, Dufton, and Rojas, 2016). This topographic characteristic must have been an omnipresent factor in the city planners' judgments as related to transport network and land use layout. What is now called the Main Trail (Wadi Mousa) between the Djin Blocks (East) and Qasr Al Bint (West) hugs the lowest contours of gorges and ravines and reigns as the spinal pathway for the city. Running for a winding length of about four kilometers with alternating plane and low navigable slopes explains the rising role of this thoroughfare in weaving urban circulation and land use patterns. This thoroughfare holds the largest collection of Petra's projects at its flanks including the Dam, Siq, Treasury (Al Khazneh), Street of Facades, Theatre, Nymphaeum, Colonnaded Street, and Great Temple. At desperate junctures along the thoroughfare, as many as eight trails branch out into valleys sloping to defined

destinations. Thus, the circulation scheme of the city builds on clear hierarchy of movement elements at graduated scales of importance and respective spatial configurations (Figure 09).

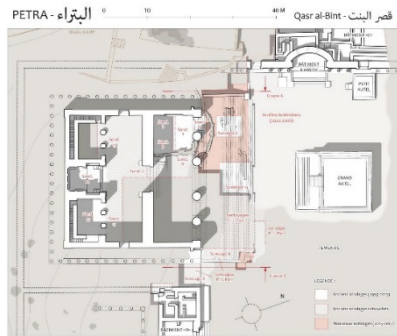


Figure 08. Qasr Al-Bint reconstructed plan with outdoor temenos.
Source: Fournet and Renel, 2019.



Figure 09. Map of Petra showing scale hierarchy of circulation
Sources: Petra Development & Tourism Region Authority; Proust, 2023.

The archeological sources suggest levels of growth or decline of the city development from one chronological period to the next, ensuing respective changes in the City’s institutional, communal, commercial, and residential land uses. Several sources indicate the golden years of project construction and city expansion range from late 1st century BC through early AD 1st century (Kouki, 2012, p.38). Kouki further mentions “this period also witnessed the monumentalization of the city centre and produced the layout of the city much as it is known today.” For example, a residential quarter existed around the city urban center from about the middle of the 2nd century BC through the Byzantine times, early in the AD 5th century (Bouchaud, Jacquat, and Martinoli, (2017).

Discussion and Concluding Matters

We have proposed the importance of understanding the thematic agency and associated spatial manifestations that are inherent in any heritage district, archaeological site, or urban landscape for facilitating informed urban development plans and projects. We have done the following: first, incorporated the concepts of thematic agency and spatial manifestations into the normalized construct of “setting;” second, appropriated for discussion three settings attuned to Petra’s cultural themes and spatial development through time: engaging nature, water management; and design inventiveness; third, used the expanded concept of scale, as applicable, throughout the discussion of the three settings. This Section reflects on the study accommodations and limitations, conclusions, and implications and recommendations.

Accommodations and Limitations

- This paper accommodates only three cultural settings—each integrating a thematic agency and the associated spatial manifestations. Although preliminary investigation revealed several settings applicable to the city of Petra, we selected the settings based on the relevance and the number sufficient for informative feed. Settings such as international trade and religious life, although significant, were not entertained.
- As thematic agency and spatial manifestations were set as the framework of the discourse, scale and scalability played as an analytical tool to support the discussion, whenever appropriate. Scale has been used in its expanded interpretation to describe or differentiate magnitude, value, and levels. In this capacity, scale was set as an interpretive, expository tool rather than substantive domain of the discussion.
- The thematic and spatial milieus of Petra are, in principle, rich for supporting the objectives of the study. The references on Petra’s history, culture, and development are numerous, but we have encountered some challenges in obtaining precise facts in terms of dates, and more importantly, in terms of societal events and trends, the latter representing the ingredients for weaving key themes. While there are plenty of maps, images, and other digital information available, the selected items needed adjustments and adaptations to suit the reference purpose.

Conclusions

Although the concepts of thematic agency and spatial manifestations of historic sites are not quite foreign terms in historic preservation, the study has provided a fresh look at their meanings individually, and more importantly, at the critical relationship between both within an umbrella of cultural setting. Normalizing the construct of cultural setting proved useful to refine the relationship of its components—the thematic agency and spatial manifestations. And, in the process, this kept the message to the reader (or user) at a pragmatically fathomable level. The workings of these dual concepts under the normalized cultural setting become more tangible when they are brought to bear on analysing a viable heritage site “in situ,” per se. As the subject, Petra carried viable ingredients to support the study objectives, and by extension, represents heritage sites that can benefit from the results of this study for continued curation and preservation of heritage assets.

Bringing scale to bear on the discussion of this research proved useful in analysing conditions in certain contexts such as when comparing the levels of façade treatment of different buildings. At certain points of discussion, the use of scale related to size or extent. This, for example, materialized for Setting 3: Design Inventiveness where the discussion made a distinction between the architectural project scale and the urban plan scale.

Implications and Recommendations

The concepts of thematic agency and spatial manifestations accept further investigations and so is the construct of the cultural setting into which they coalesce. These theoretical domains will deliver good when applied to qualified heritage

resources, typically beyond the scale of single structure of small site such as an archaeological complex, urban centre, or historic landscape. Work is needed to clarify how heritage programs would realign conservation policies and approaches to take advantage of cultural setting proposition.

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