COMPARATIVE STUDIES IN TROPICAL EPICENTRES IN SOUTHEAST ASIA: UNDERSTANDING ENTANGLEMENT, RESILIENCE, AND COLLAPSE.

A Thesis Submitted to the Committee on Graduate Studies
in Partial Fulfillment of the Requirements for the
Degree of Master of Arts
in the Faculty of Arts and Science.

TRENT UNIVERSITY
Peterborough, Ontario, Canada

© Copyright by Lindsay Shirkey 2015

Anthropology M.A. Graduate Program
January 2016
ABSTRACT

COMPARATIVE STUDIES IN TROPICAL EPICENTRES IN SOUTHEAST ASIA:
UNDERSTANDING ENTANGLEMENT, RESILIENCE, AND COLLAPSE.

Lindsay Shirkey

From ca. 800-1400 CE, low-density agrarian states dominated Southeast Asia, their authority emanating from their epicentres at places such as Angkor in Cambodia, Bagan in Myanmar, and Sukhothai in Thailand. These epicentres were the setting for numerous structures, activities, and stakeholders that became integral for the perpetuation of the state. These states and their epicentres declined and collapsed around the same time. As part of a larger project (the Socio-ecological Entanglement in Tropical Societies (SETS Project), the aim of this thesis is to add to our understanding of entanglement, resilience, and collapse in Southeast Asia. Using a relatively new method that combines resilience and entanglement theories, this thesis presents a view of epicentral entanglements and vulnerabilities that eventually contributed to the collapse of these societies. The results indicate that overextended socio-ecological systems and their growing entanglements created a loss of resilience and, when faced with change in these systems, collapse.

Keywords: Southeast Asia, Charter State, Angkor, Bagan, Sukhothai, Collapse, Resilience, Entanglement.
ACKNOWLEDGMENTS

Firstly, I want to thank my supervisor, Dr. Gyles Iannone, for offering a place on his team and giving me the opportunity to work on his project. His time, support, and dedication helped move me forward and keep me on track. I would have never had such a unique experience without him and I am a better student, researcher, and academic because of him.

I would like to thank my fellow SETS team members for their excellent work and their dedication, which helped motivate me to put my greatest effort into my work, particularly Kendall Hills, Natalie Baron, Pete Demarte, Scott Macrae, and Leah Marajh. Leah, you have been my office-mate, my research fellow, and my link to sanity and there is no possible way I could thank you enough for getting me through graduate school. You have been an invaluable friend and this thesis would probably not exist without you. My peers in the Anthropology graduate program, as well, gave me much needed support and inspiration when I needed it most. I wish my 2015 fellows luck on their defenses and hope the members of the 2016 class will find as much support in their second year as I did.

I’d also like to extend my thanks to my committee members and the Trent faculty. I am grateful for all the support I received and how welcome I always was. I want to thank everyone for their patience with me, even when I was more clueless than I would have liked to admit.

Without the Social Sciences and Humanities Research Council of Canada’s generous funding to the SETS Project, I would never have had this amazing opportunity and my research would never have been as detailed, as comprehensive, and as vibrant.
My family has supported me through these two years, offering encouragement and an ear when I needed it. Mom, thanks for helping me proof my thesis, even when you didn’t understand it. I couldn’t have done it without you! I’m grateful to the friends who stayed with me through this process and who have been there for me through the bad times and the good. You rescued me with our time spent together.

Finally, I’d like to thank all the people whom I met on my trips to Southeast Asia for their hospitality and insight. I’d like to thank the drivers and guides who helped me find my way around a foreign country and Damian Evans for giving our project his time and valuable expertise.

These few pages cannot begin to truly acknowledge and recognize the people who helped me through these two years. This experience has been one I won’t forget and I can never be grateful enough for all of you!
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>v</td>
</tr>
<tr>
<td>CHAPTER 1: INTRODUCTION</td>
<td></td>
</tr>
<tr>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>Environmental Context</td>
<td>3</td>
</tr>
<tr>
<td>Socio-Political Context</td>
<td>4</td>
</tr>
<tr>
<td>Contemporary Context</td>
<td>4</td>
</tr>
<tr>
<td>Epicentres</td>
<td>5</td>
</tr>
<tr>
<td>Theory And Methods</td>
<td>8</td>
</tr>
<tr>
<td>Resilience Theory</td>
<td>8</td>
</tr>
<tr>
<td>Entanglement Theory</td>
<td>9</td>
</tr>
<tr>
<td>SETS</td>
<td>10</td>
</tr>
<tr>
<td>Research Questions</td>
<td>10</td>
</tr>
<tr>
<td>Thesis Overview</td>
<td>11</td>
</tr>
<tr>
<td>Conclusions</td>
<td>13</td>
</tr>
<tr>
<td>CHAPTER 2: THE EPICENTRE</td>
<td></td>
</tr>
<tr>
<td>Initial Conditions</td>
<td>14</td>
</tr>
<tr>
<td>Environment of Southeast Asia</td>
<td>14</td>
</tr>
<tr>
<td>The Emergence of the Proto-states</td>
<td>19</td>
</tr>
<tr>
<td>The Cambodian Proto-states: Funan and Chenla</td>
<td>20</td>
</tr>
<tr>
<td>The Burmese Proto-states: Pyu Polities</td>
<td>24</td>
</tr>
<tr>
<td>The (Mon) Thai Proto-states: Dvaravati</td>
<td>26</td>
</tr>
<tr>
<td>Southeast Asian Epicentres</td>
<td>28</td>
</tr>
<tr>
<td>Epicentral Activities</td>
<td>31</td>
</tr>
<tr>
<td>Epicentral Stakeholders</td>
<td>38</td>
</tr>
<tr>
<td>Epicentral Buildings and Spaces</td>
<td>42</td>
</tr>
<tr>
<td>Summary and Conclusions</td>
<td>49</td>
</tr>
<tr>
<td>CHAPTER 3: THEORY AND METHODS</td>
<td></td>
</tr>
<tr>
<td>Resilience Theory</td>
<td>51</td>
</tr>
<tr>
<td>The “r-phase”: Exploitation</td>
<td>57</td>
</tr>
<tr>
<td>The “K-phase”: Conservation</td>
<td>58</td>
</tr>
<tr>
<td>The “Ω-phase”: Release</td>
<td>59</td>
</tr>
<tr>
<td>The “α-phase”: Reorganization</td>
<td>59</td>
</tr>
<tr>
<td>Characteristics of Resilience</td>
<td>61</td>
</tr>
<tr>
<td>Panarchy</td>
<td>62</td>
</tr>
<tr>
<td>Entanglement Theory</td>
<td>62</td>
</tr>
<tr>
<td>Dependent Relationships</td>
<td>63</td>
</tr>
<tr>
<td>Tying Entanglement Theory to Resilience Theory</td>
<td>66</td>
</tr>
<tr>
<td>Methods</td>
<td>68</td>
</tr>
<tr>
<td>Application of Theory</td>
<td>68</td>
</tr>
<tr>
<td>Data Collection</td>
<td>71</td>
</tr>
</tbody>
</table>
The Research Questions.................................................................175
Conclusions..................................................................................191
REFERENCES CITED.........................................................................193
LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Locations of epicentres, marked with a star, with modern borders and other important sites discussed in the thesis (modified from Wikispaces)</td>
</tr>
<tr>
<td>1.2</td>
<td>Spatial layout of the epicentres of Angkor, Cambodia (modified from Canbypublications.com)</td>
</tr>
<tr>
<td>1.3</td>
<td>Spatial layout of the epicentre of Bagan and its close urban sprawl, Myanmar (modified from myanmartravelinformation.com)</td>
</tr>
<tr>
<td>1.4</td>
<td>Spatial layout of the epicentre of Sukhothai, Thailand (modified from Sukhothai Historical Park)</td>
</tr>
<tr>
<td>2.1</td>
<td>Major rivers and topography of mainland Southeast Asia (modified from Wikispaces)</td>
</tr>
<tr>
<td>2.2</td>
<td>Exposed laterite column at Sukhothai, revealing its porosity</td>
</tr>
<tr>
<td>2.3</td>
<td>Locations of proto-state epicentres (Sri Ksetra, U-Thong, Nakhon Pathom, Isanapura, and Angkor Borei) with locations of later epicentres and modern country borders (modified from Wikispaces)</td>
</tr>
<tr>
<td>2.4</td>
<td>Site plan of Angkor Borei, Cambodia with walls indicated in red (modified from Bishop et al. 2003)</td>
</tr>
<tr>
<td>2.5</td>
<td>Site plan of Isanapura, Cambodia showing the main epicentral groups (modified from Canbypublications.com)</td>
</tr>
<tr>
<td>2.6</td>
<td>Site plan of Sri Ksetra with the walls shown in a black, dashed line (modified from Hudson 2004)</td>
</tr>
<tr>
<td>2.7</td>
<td>Site plan of Nakhon Pathom, Thailand (modified from Khunsong et al. 2011)</td>
</tr>
<tr>
<td>2.8</td>
<td>The buildings, stakeholders, and activities/functions of the epicentre</td>
</tr>
<tr>
<td>2.9</td>
<td>Modern shrine in Myanmar with the images of nats (nature spirits) inside</td>
</tr>
<tr>
<td>2.10</td>
<td>Shwesandaw in Bagan</td>
</tr>
<tr>
<td>2.11</td>
<td>Modern ordination ceremony in Myanmar</td>
</tr>
<tr>
<td>2.12</td>
<td>Bas-relief at Angkor Wat depicting a military battle</td>
</tr>
</tbody>
</table>
Figure 2.13. Ramnarong Gate of the city walls at Si Satchanalai, Thailand, a contemporaneous sister site of Sukhothai……………………………….40

Figure 2.14. The Buddha statue at Wat Saphan Hin near Sukhothai…………………41

Figure 2.15. City wall and gate at Sukhothai………………………………………….42

Figure 2.16. Moat at Sukhothai’s city walls……………………………………………43

Figure 2.17. Phnom Bakheng at Angkor Wat …………………………………………44

Figure 2.18. Magwe Pagoda, a stupa, on the Irrawaddy River near Bagan…………...45

Figure 2.19. East and West Pet-leik, a monastery, outside Bagan…………………….46

Figure 2.20. Portion of the Terrace of the Leper King at Angkor……………………….47

Figure 2.21. Bridge Spean Praptos (also known as Kampong Kdei Bridge) on a southern road from Angkor…………………………………………………………48

Figure 2.22. Bas relief of a battle at the Bayon in the complex of Angkor Thom………49

Figure 3.1. The Adaptive Cycle. The Y-axis represents a system’s potential resulting from accumulated resources, and the X-axis represents the degree of connectivity between variables (modified from Gunderson and Holling 2002:34)………………………………………………………………….54

Figure 3.2. Simplified visualization of spatial resilience (see Hodder 2011:166)………66

Figure 3.3. An example of a tanglegram by Ian Hodder, with the arrow pointing towards the aspect that another depends on, examining the entanglement of clay at the archaeological site of Çatalhöyük. (modified from Hodder 2011:181)………………………………………………………………...68

Figure 4.1. Extent of the Khmer Empire around 1200 CE at its widest range (based on Coe 2003:129)………………………………………………………………….74

Figure 4.2. Map of Angkor with the complex of Angkor Thom in the left-hand corner (modified from canbypublications.com)………………………………………76

Figure 4.3. Lidar survey of Angkor with Angkor Thom in the centre (indicated in green) and Angkor Wat on the bottom (indicated in blue). Note the occupation mounds within these epicentral complexes (modified from Evans et al. 2013)……………………………………………………………76
Figure 4.4. Layout of Preah Ko, built by Indravarman I (modified from Glaize 1963)…………………………………………………………………………………79

Figure 4.5. The Bakong, Indravarman I’s state temple (modified from Glaize 1963)……………………………………………………………………………………………80

Figure 4.6. Phnom Bakheng, an early epicentre and state temple dedicated to Shiva, constructed by Yasovarman I (877-889 CE)………………………………80

Figure 4.7. An example of brick constructions at the Roluos Complex, built by Jayavarman II (802-835 CE) and expanded upon by Indravarman I (877-889 CE) and Yasovarman I (889-900 CE)……………………………….83

Figure 4.8. Prasat Thom, Jayavarman IV’s seven-tiered pyramid and state temple at Koh Ker, which housed a linga and acted as his epicentre (Coe 2003:199; Higham 2001:71)………………………………………………………………….83

Figure 4.9. The East Baray (now dry), constructed by Yasovarman I………………84

Figure 4.10. Depiction of the Angkor Wat epicentral complex showing locations of bas reliefs and its westward orientation (modified from Glaize 1963)……...86

Figure 4.11. Detail of the reliefs at the Terrace of the Leper King (right). Depiction of Yama at the Terrace of the Leper King (left)……………………………87

Figure 4.12. Relief at Angkor Wat depicting a military battle from the historical gallery. See Figure 4.10…………………………………………………………….88

Figure 4.13. Udayadityavarman II’s (1050-1066 CE) state temple, the Baphuon ……90

Figure 4.14. A portion of Banteay Srei, built by the elite Yajnyavaraha …………..90

Figure 4.15. Front view of Phimeanakas, Jayavarman V’s and Suryavarman I’s state temple (modified from Glaize 1963)…91

Figure 4.16. Layout of Jayavarman VII’s state temple, the Bayon………………….92

Figure 4.17. A portion of the Bayon (below). The external walls have bas-reliefs depicting the victories of Jayavarman VII, as well as daily activities, such as hunting, playing games, buying and selling at the market, cooking, and building a palace (Coe 2003:134; Higham 2001:121; modified from Glaize 1963)………………………………………………………………………….92

Figure 4.18. View towards the west, main gate from the top of Angkor Wat……….93
North side of Preah Khan, which Jayavarman VII dedicated to his father. In addition to Buddhist imagery, the complex contains depictions of Shiva, Ganesh, Vishnu, Brahma, and apsaras (Glaize 1963:173-179)…………………93

View of Ta Prohm. Another of Jayavarman VII’s notable building projects was the Ta Prohm complex (1186 CE), which contained a statue of his mother and honoured his family (Glaize 1963:141-144)……………………………………94

A portion of the West Baray, begun by Suryavarman I (1002-1049 CE) and completed by Udayadityavarman II (1050-1066 CE), with the West Mebon in the centre………………………………………………………………95

Extent of the Burmese Empire around 1200 CE (based on Aung-Thwin and Aung-Thwin 2012:90, 95; Lieberman 2003:91-92; modified from Wikispaces)………………………………………………………99

Map of Bagan, including its epicentre within the city walls and notable constructions (modified from myanmartravelinformation.com)………100

The front (east side) of Dhammayazika, a Buddhist temple constructed of six million bricks built by Narapatisithu in only two years due to royal support for its foundation (Aung-Thwin 1990:55-58; Dumarçay and Smithies 1995:22-24; Hudson 2004:27)…………………………………..106

The layout of Dhammayazika, showing its pentagonal style common in Bagan (modified from bagan.travelmyanmar.net)…………………………………106

Shwezigon, built by Kyanzittha (1084-1111 CE), houses a relic of the Buddha – a tooth – and its grandeur is still maintained today (Dumarçay and Smithies 1995:14-17)………………………………………………106

Layout of Nanpaya, a temple built by Anawrahta, with entry to the east and columns depicting Hindu figures marked in red (modified from bagan.travelmyanmar.net)……………………………………………………107

Depiction of the Buddhist deity, Brahma, carrying lotus flowers on the interior pillars inside Nanpaya (1060-1070 CE), revealing a distinct Hindu influence (Dumarçay and Smithies 1995:12)…………………………………………………………107

Ananda, one of the most monumental constructions at Bagan built by Kyanzittha, which contains four standing Buddha statues and over 1500 images depicting the life of the Buddha (Dumarçay and Smithies 1995: 15-16)…………………………………………………………………….108

View of Dhammayangyi, built by Narathu, from the front gate…………108
Figure 4.31. Comparison of Thatbyinnyu (right) built by Alaungsithu (1111-1167 CE) and Htilominlo (left)(1210-1234 CE)……………………………………110

Figure 4.32. The front of Mahabodhi in Bagan with a modern structure in front……..111

Figure 4.33. Ceramic plates at the base of Dhammayazika depicting the Jataka tales……………………………………………………………………..111

Figure 4.34. Frescoes at Sulamani, built by Narapatisithu (1173-1210 CE) the top-left showing geometric patterning on the ceiling, the top-right and bottom are both images of the Buddha………………………………………………………112

Figure 4.35. Map of Bagan’s epicentre (in white), surrounded with city walls and showing the location of the palace (in red)(modified from Grave and Barbetti 2001)…………………………………………………………..113

Figure 4.36. A small water tank near Dhammayazika still in use by locals…………114

Figure 4.37. Extent of Sukhothai’s control ca. 1300 CE (based on O’Brien 1999:65; modified from Wikispaces)………………………………………………118

Figure 4.38. Map of Sukhothai with notable constructions labeled and the city walls in orange (modified from Sukhothai Historical Park)…………………….119

Figure 4.39. Wat Mahathat, Sukhothai, Thailand. 14th c. In the centre is a Thai-style lotus bud stupa and at each cardinal direction, opposite the four corners, are Khmer-style prangs, showing a combination of Thai and Khmer styles……………………………………………………………………120

Figure 4.40. A portion of Wat Aranyik, built by Si Indradit…………………………………….123

Figure 4.41. Wat Kong Laeng, an animist shrine where animal slaughter may have taken place before Buddhism superseded animism and abolished the practice (Dumarçay and Smithies 1995:56)…………………………………….124

Figure 4.42. Wat Phra Phai Luang, one of the earliest remaining Buddhist temples at Sukhothai, showing several building construction materials – including laterite columns (exposed), some remnants of white stucco on the columns, and brick flooring (Rooney 2008:110)……………………………………125

Figure 4.43. Wat Si Chum, which contains the famous 15 m tall, stucco-coated seated Buddha image, Phra Achana (see Figure 4.44)……………………………………126

Figure 4.44. Phra Achana, the Buddha at Wat Si Chum, situated just outside Sukhothai’s walls……………………………………………………………………127
Figure 4.45. Wat Mahathat (begun by Ramkhamhaeng and built by Lo Thai and the elite, Si Satha). Here one of the complexes of Wat Mahathat displays the Thai-style lotus bud stupa in the centre.................................129

Figure 4.46. Thewalai Mahakaset, constructed as a place of worship for the Hindu subjects under Li Thai (Rooney 2008:147).................................129

Figure 4.47. The layout of Sukhothai with the walls marked in red and the possible location of the palace (Noen Prasat) circled in green (modified from Stratton and Scott 1981, found in Swearer 2010).................................130

Figure 4.49. The standing Buddha image at Wat Saphan Hin.................................131

Figure 4.50. Wat Chang Lom’s stupa. The complex may have included a hall of religious scriptures (Rooney 2008:124).................................133

Figure 4.51. Detail of the elephants at Wat Chang Lom.................................133

Figure 4.52. Wat Si Siwai has three Khmer style laterite prangs, a linga, and a lintel with a depiction of Vishnu. It was later modified to Theravada Buddhist temple by adding an assembly hall (Rooney 2008:19, 96-99)...........136

Figure 4.53. Wat Chetupon, surrounded by two moats and a brick wall and consisting of a tall brick mandapa with niches for stucco images of the Buddha (Rooney 2008:130).................................136

Figure 4.54. Wat Sa Si’s main stupa, which may contain the ashes of a ruler, and its surrounding pond.................................136

Figure 5.1. Entanglement web for Angkor’s epicentre during the K-phase. Key environmental factors are circled in dark grey, infrastructures and functions are outlined in black, and the stakeholders of the epicentre are in light grey boxes. The royal family, elites, and bureaucrats are combined as they were often one and the same.................................139

Figure 5.2. Entanglement web of Bagan during the K-phase. Key environmental factors are circled in dark gray, infrastructures and functions are outlined in black, and the stakeholders of the epicentre are in light gray boxes. The royal family, elites, and bureaucrats are combined as they were often one and the same.................................140

Figure 5.3. Entanglement web of Sukhothai during the K-phase. Key environmental factors are circled in dark gray, infrastructures and functions are outlined in black, and the stakeholders of the epicentre are in light gray boxes. The royal family, elites, and bureaucrats are combined as they were often one and the same.................................141
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Table detailing elements of the epicentre used in this thesis to better define its parameters.</td>
</tr>
<tr>
<td>3.1</td>
<td>Characteristics of the four phases of the adaptive cycle and other key concepts relevant to the application of resilience theory (from Iannone 2014:6; see also Holling and Gunderson 2002; Gunderson and Holling, eds. 2002; Nelson et al. 2006:409-411; Walker and Salt 2006:76-79).</td>
</tr>
<tr>
<td>4.1</td>
<td>The known rulers of Angkor, the dates of their reigns, and notable constructions. Some dates are uncertain (see Coe 2003 and Higham 2001).</td>
</tr>
<tr>
<td>4.2</td>
<td>The known rulers of Bagan, the dates of their reigns, and notable constructions (based on Aung-Thwin 1985; Dumarçay and Smithies 1995; Hudson 2004).</td>
</tr>
<tr>
<td>4.3</td>
<td>The known rulers of Sukhothai, the dates of their reigns, and notable constructions (based on Rooney 2008).</td>
</tr>
</tbody>
</table>
CHAPTER 1: INTRODUCTION

“Somewhere between the cosmological past and the modern present scholars lost the Southeast Asian city and put Chicago in its place” (O’Connor 1983:1).

This thesis examines the rise and fall of three Southeast Asian “charter states.” The principal focus is the epicentral complexes of Angkor, Cambodia, capital of the Khmer Empire (802-1431 CE), Bagan, Myanmar, capital of the Burmese Empire (849-1287 CE), and Sukhothai, Thailand, capital of the early Siamese Kingdom (1238-1350 CE) (Aung-Thwin 1985:21; Higham 2001:xiii, xv; McCloud 1995:31, 35; see Figure 1.1).

The goals of the thesis are twofold: 1) to explore the connection between resilience, entanglement, and collapse in regards to these Southeast Asian epicentres; and, 2) to test the applicability of a new way of modelling these socio-ecological relationships.

Specifically, entanglement theory and resilience theory will be applied to the three epicentral contexts by: 1) exploring each epicentre’s dependencies through the use of webs of entanglement called “tanglegrams;” 2) applying resilience theory and adaptive cycles to the case studies to examine the establishment, florescence, collapse, and reorganization of their associated state formations; 3) assessing the resilience capacity of each epicentre using a bundled continua of variation approach; and, 4) through a combination of the above, determining the factors that lead to their vulnerability, and ultimately, collapse. This thesis contributes to the overarching goals of the Socio-Ecological Entanglement in Tropical Societies Project (SETS Project), which aims to build a historical-political ecology of tropical societies through the application of
resilience theory, with the goal of potentially mitigating problems faced by current
tropical societies by mobilizing knowledge gained from the study of past communities.

Figure 1.1. Locations of epicentres, marked with a star, with modern borders and other
important sites discussed in the thesis (modified from Wikispaces).
BACKGROUND

Environmental Context

Angkor, Bagan, and Sukhothai were all tropical states located in mainland Southeast Asia (see Figure 1.1). As such, they share warm, humid weather with seasonal distinctions in the form of wet/monsoonal (May – September) and dry (November – March) periods (Fletcher 2012:298-300). Subtropical moist and wet forests cover this area with rivers and mountains running north-south, creating divisions between regions (O’Reilly 2007:2-3; SarDesai 1997:6-7). The soil quality is low except for those regions supplemented by alluvial deposits near rivers and in volcanic regions; however, construction materials such as sandstone, laterite, and clay are abundant (Kricher 2011:26-27; Orians et al. 1996:215; Uchida et al. 2003:221). The flora of this region is moist subtropical forest with deciduous trees dominating (O’Reilly 2007:2). Nutrients are cycled rapidly as the environment creates decomposition of dead organic matter, creating a thin topsoil (Marcus 2009:28-29). Water saturates the atmosphere during the wet season, as the amount of water in the water cycle exceeds evapotranspiration – the evaporation of water from flora, fauna, land, and water. Evapotranspiration falls significantly during the dry season, meaning the plants of the region must adapt to store water or survive without it for months at a time (Trewartha et al. 1961:278-279). The tropics have a high level of biodiversity and endemic speciation, though their habitats have been and are often threatened by land clearing and landscape modification (Ewel and Bigelow 1996:109; Fletcher 2009:306; Sodhi et al. 2010:318-319). In order to flourish in this environment, communities were required to adapt to the seasonal rains, poor soil quality, and general cliamatic conditions.
Socio-Political Context

The term “charter state” was coined by Victor Lieberman (2009:16) to refer to states which “provided a political and cultural charter for later generations,” which includes Angkor, Bagan, and Sukhothai. The charter states all existed during the “charter era” of 850-1350 CE, which is associated with the Medieval Climate Anomaly (MCA), a time of warmer temperatures and more consistent and predictable rainfall in the Southeast Asian tropics (800-1300 CE). During the agriculturally-advantageous monsoons of the Medieval Climate Anomaly, these centres were able to prosper, as exemplified by an increase in water management, agricultural surpluses, and labour, which coincided with agricultural and population expansion. At the end of the Medieval Climate Anomaly (approximately 1300 CE), the shift to a drier climate put great strain on these agrarian-based states, and internal and external disorder resulted in the collapse of each state between the late 1200s and 1450 CE (Lieberman 2009:16-17).

Contemporary Context

The politics of this region have not always been conducive to archaeological research. Studies of Angkor suffered under the Khmer Rouge as researchers were denied access to the country, local scholars were forced from their intellectual pursuits and made to join agricultural collectives – or simply killed – and significant damage to ruins resulted from bombings, mines, and other aspects of warfare (Asia Watch: Physicians for Human Rights 1991:21-23; Fletcher 2012:288). Since then, exploration of this centre has been significant, and recent restorations have revived Angkor as a tourist location. Myanmar, under a military dictatorship from 1948 to 2011, strictly controlled entry into
the country. Only in the past few years has Myanmar opened up to foreign tourists and the possibility of foreign research collaborations. Tourism has slowly been increasing since 2011, which may help fund more research, excavations, and restorations in the future (Aung-Thwin and Aung-Thwin 2012:285-287). Thailand has not witnessed the same type of conflicts, but Sukhothai itself has failed to garner the same academic attention as its counterparts in Cambodia and Myanmar, despite being a UNESCO World Heritage Site for over 23 years (UNESCO 2015a).

EPICENTRES

In terms of the spatial focus for this research, the “epicentre” is the central, anchoring element of these Southeast Asia charter states. It is from these central places that power emanated. For the purpose of the SETS Project, of which my research is part, the epicentre is defined as the part of the state heartland that lies within the city walls. This criterion was adopted in order to provide some focus for the study, due to the boundary-less nature of the urban component of the case studies, all of which can be described as low-density urban formations. Angkor, Bagan, and Sukhothai all have city walls, which physically and symbolically separated the state’s inner sanctum – and its most significant elite-residential, civic-ceremonial, and ritual spaces – from the rest of the settlement.

In each of the three case studies (see Figures 1.2, 1.3, and 1.4), the epicentre held a place of religious importance for the people and also served as the residence of the ruler. Every other part of the state was, at least theoretically, subject to, and under various degrees of control of, the epicentre. The epicentre’s key structures included the palace, administrative and religious buildings, water management features, roads, the royal
treasury, living quarters, tombs, and inscriptions. In loose hierarchical terms, and with respect to the strength of their ties to the epicentre itself, the key stakeholders associated with these central places included the ruler and royal family, bureaucrats and the elite, monks and other religious figures, servants, labourers, artisans, merchants, and farmers. Epicentres were multifaceted places that were settings for various activities, as well as for political messaging, and included spaces and features that were related to the living quarters and domestic activities for the residents of the epicentre, administration, rituals, ceremonies, games, festivals, religious worship, the keeping of historical records, symbols of power and legitimization, burials for royals, and community integration. All of these features will be detailed further in Chapter 2.

Figure 1.2. Spatial layout of the various epicentres of Angkor, Cambodia (modified from canbypublications.com.).
Figure 1.3. Spatial layout of the epicentre of Bagan (surrounded by the walls) and its close urban sprawl, Myanmar (modified from myanmartravelinformation.com).

Figure 1.4. Spatial layout of the epicentre of Sukhothai, Thailand (modified from Sukhothai Historical Park).
THEORY AND METHODS

Resilience Theory

The theory and methods for this thesis are grounded in resilience theory. Resilience is the ability for a system to absorb shocks without having to shift to a different system and identity (Holling 1973:17). Resilience theory has mostly been used in relation to ecology. However, it can also be applied to past civilizations, as it deals with socio-ecological systems: that is, a society’s relationship with its environment (Redman 2005:70; Walker and Salt 2006:1). The adaptive cycle, a resilience theory modelling tool, is a cycle following the development pattern of socio-ecological systems over time through four different phases: the r-phase (exploitation of resources), the K-phase (conservation), the Ω-phase (release), and α-phase (reorganization) before a return back to the r-phase. The movement from the r-phase to the K-phase shows an increase in connectedness and a decrease in resilience, with the late K-phase being the most vulnerable stage of the system which, with the right catalyst, can transition into a collapse (Gunderson and Holling 2002:43-47; Walker and Salt 2006:76-78). Resilience theory is useful because it focuses on the relationship between humans and their environment, which is particularly important for studying tropical epicentres. Through resilience theory, I can determine which components of these societies were more or less vulnerable to perturbations, and in what phase of the adaptive cycle these vulnerabilities emerged, which will allow me to determine the factors involved in weakening of the state prior to the collapse itself.

Young et al. (2007:450) define collapse as “any situation where the rate of change to a system:
• has negative effects on human welfare, which, in the short or long term, are more socially intolerable
• will result in a fundamental downsizing, loss of coherence, and/or significant restructuring of the constellation of arrangements that characterize the system; and
• cannot be stopped or controlled via an incremental change in behavior, resource allocation, or institutional values.”

Entanglement Theory

Entanglement theory is an effective supplement to resilience theory, as it shares many similar ideas, acts as a connector between theory and materiality, and provides a way to quantitatively and qualitatively measure resilience. In its simplest form, entanglement theory holds that things depend on things, humans depend on things, things depend on humans, and humans depend on humans. Ian Hodder (2012:175) defines entanglement as: “the archaeological sensitivity to the complexities and practical interlacing of material things…entanglement comes about as a result of the dialectic between dependence (the reliance of humans and things on each other) and dependency (a constraining and limiting need of humans for things).” In essence, humans and things live in an interconnected system of relationships with each other. As a system becomes dependent on more elements (i.e., humans or things), the failure of any of those elements can create reverberations throughout the system, affecting an entire web of elements through their entanglements. Entanglement theory is useful for the examination of epicentres as a number of interlocking and connecting features were required for the functioning of the epicentre and their associated state formations as discussed in the previous sections. More entanglements generally make a system vulnerable, ergo, less resilient, and thus susceptible to collapse.
The Socio-Ecological Entanglement in Tropical Societies Project (SETS)

The Socio-Ecological Entanglement of Tropical Societies project (SETS), led by Dr. Gyles Iannone (Trent University), approaches the study of collapse by examining various aspects of these past tropical societies, including water management, integrative mechanisms (e.g., roads, bridges, monasteries), settlement, agriculture, and epicentres. As one of the researchers focusing on epicentres within the project, my responsibility was to “examine the various architectural features associated with the epicentres, and assess construction methods and energy expenditures, building style and adornments, the possible functions and meanings behind specific buildings and building complexes, and overall spatial arrangements” (Iannone 2014:12). My field research was therefore aimed at examining the quality, type, and availability of these data for the three epicentres in question.

In order to address issues of resilience, vulnerability, entanglement, and collapse, I have framed my investigations around the following research questions:

1. What architectural features makeup the epicentres?
   a. Did the architectural inventory change over time, and if so, how and why?

2. How were the various architectural features organized vis-à-vis each other?
   a. Did this organization change over time, and if so, how and why?

3. What symbols, statuses, roles, and activities were situated in the epicentres?
   a. Did these change over time, and if so, how and why?

4. Who invested materially and ideologically in the epicentres?
   a. Did this change over time, and if so, how and why?

5. Who maintained and modified the epicentres?
a. Did this change over time, and if so, how and why?

b. Did construction practices change over time, and if so, how and why?

6. What role did city walls play in defining epicentres?

   a. Did the role of city walls change over time, and if so, how and why?
   b. Did the meaning of city walls change over time, and if so, how and why?
   c. Were there significant differences between the symbols, statuses, roles, and activities found within and outside the city walls?

7. What was the overall significance of the epicentres?

   a. Did this change over time, and if so, how and why?

8. How were these centres entangled with the landscape, environment, and society as a whole?

9. How did entanglements affect resilience and vulnerability of specific segments of the society?

10. How did epicentral entanglements contribute to charter state collapses?

   **THESIS OVERVIEW**

   In Chapter 2, I will explore the concept of the epicentre and the context in which Southeast Asian epicentres existed. I define the environment of Southeast Asia, expand on the topic of charter states and their epicentres, and explore the notion of low-density urbanism and its significance. Then, more specifically, I focus on the historical context of each state, identifying and describing earlier proto-state formations. The latter half of the chapter analyzes the activities, stakeholders, and structures of Southeast Asian epicentres.

   Chapter 3 focuses on the ideas and concepts that guide my analysis. The chapter begins by expanding on resilience theory, detailing its most important concepts, and
explaining the different phases of the adaptive cycle. The next section concerns entanglement theory, particularly the types of entanglements that can exist, and how entanglement and resilience theory can be combined into a unified method. Finally, in the Methods section, the SETS project is discussed, and explanations are provided for how the theories and methods will be applied to the epicentres in question.

Chapter 4 presents the data sets collected both from library research and fieldwork on the Southeast Asian epicentres. Each section focuses on one epicentre, details the nature of the datasets and epicentres, and examines the histories of each centre, with particular focus on the functions and activities, stakeholders, and structures associated with each capital and their change over time.

Chapter 5 focuses on the analysis of each data set, using the concepts and processes derived from both resilience and entanglement theories. The chapter begins with the presentation of tanglegrams detailing the quality and quantity of entanglements. Then the adaptive cycle is applied to each epicentre, which aids in determining shifting levels of resilience over time. Each section concludes with a summation of vulnerabilities and theories for the weakening and collapse of each specific state and its associated epicentral capital.

Chapter 6 summarizes the thesis and addresses the strengths and weaknesses of the model used to interpret the various data sets and its usefulness for future research. The implications emerging from the assessment of resilience and entanglement for our understanding the collapse of the three charter states form the principal conclusions of the thesis. Finally, possible avenues for future research are presented.
CONCLUSIONS

This thesis strives to understand the collapse of complex socio-ecological systems at Angkor, Bagan, and Sukhothai at the end of the Charter Era (ca. 1350 CE). In doing so, it provides a test case for the combined application of resilience and entanglement theory. Resilience theory and entanglement theory complement each other, as they share many similar features and foci. In essence, resilience theory gives us a way to understand the vulnerabilities created by various entanglements within a system. In turn, entanglement theory provides a measurement for resilience, and allows for researchers to apply its theoretical tenets more tangibly to physical remains in the archaeological record. The stakeholders of the three charter states were made vulnerable by their increasing entanglements with the various aspects of their epicentral capitals. The next chapter will expand on the idea of the epicentre, and discuss the various activities and functions, stakeholders, and structures associated with these places. This will foster an understanding of the various entanglements that manifest in these central places.
CHAPTER 2: THE EPICENTRE

Traditionally, the urbanized spaces of Southeast Asia have often been left out of the categorization of a city due to the restricted definition of urbanism within the Western scholarly tradition (Fletcher 2009:7; O’Connor 1983:1). The boundless cities of Southeast Asia are marked by a unique settlement pattern known as low-density urbanism. Low-density, agrarian-based urbanism is characteristic of tropical societies with marked seasonal differences in rainfall. This includes the epicentres of Angkor, Bagan, and Sukhothai, but it can also be viewed in such areas as Vietnam, Java, South India, Sri Lanka, and Mexico’s Yucatan Peninsula (Fletcher 2009:14; Fletcher 2012:288, 292-295). In low-density, agrarian-based urban communities, there was little clear division between urban and hinterland (Fletcher 2009:4, 7, 14). In such settlement systems, epicentres were the nucleus and core of the region in terms of space and power. This chapter explores the unique environment and attributes of the Southeast Asian epicentre, the constructions, people, and undertakings of the epicentre, and how they connected to each other to create the most important, nucleated source of power, without which the state could not function.

INITIAL CONDITIONS

Environment of Southeast Asia

Climate. As Angkor, Bagan, and Sukhothai are all tropical epicentres, to understand them, it helps to first define the environment and attributes of the tropics. The region between the Tropic of Cancer at 23° N and the Tropic of Capricorn at 23° S is marked by warm year-round temperatures with a mean exceeding 20°C. In tropical
Southeast Asia there is little temperature variation annually. Tropical seasons are differentiated by rainfall in the outer tropics with high rainfall during the summer monsoon season, and a long dry season in the winter (Koeppen 2011:353; Orians et al. 1996:214). Tropical Southeast Asia is also commonly subject to various climactic events, such as hurricanes and typhoons, which can devastate the region (SarDesai 1997:7).

**Figure 2.1.** Major rivers and topography of mainland Southeast Asia (modified from Wikispaces).

*Topography and Landscape.* Mainland Southeast Asia is comprised, from east to west, of Vietnam, Laos, Thailand, Cambodia, Myanmar, and Malaysia. North-south running mountain ranges separate India from Myanmar, Myanmar from Thailand, Laos from Vietnam, and an east-west range separates China and Southeast Asia. Rivers run
north-south, parallel to the mountains, most of which originate in Tibet. The main rivers of the region are the Irrawaddy, Chindwin, and Salween in Myanmar, the Chao Phraya in Thailand, the Song Koi in Vietnam, and the Mekong, which cuts through Laos, Thailand, Cambodia, and Vietnam (SarDesai 1997:6).

Soils and Vegetation. The soil fertility in the tropics is comparatively low, with relatively homogenous, nutrient-deficient clay particles dominating (Kricher 2011:26-27). The high rainfall during the wet seasonal monsoon saturates and erodes the soil, effectively leaching nutrients and leaving behind an acidic base (Orians et al. 1996:228). The high temperatures of the tropics also contribute to the weathering of the soil (Trewartha et al. 1961:336). However, fertile soils can be found in volcanic regions, areas close to rivers and other bodies of water, and the outer tropics where leaching is lessened seasonally (Orians et al. 1996:215). Mainland Southeast Asia is a subtropical moist forest, abundant in deciduous species of trees capable of withstanding long periods of no rainfall. Dipterocarp trees, smaller shrubs, and grasses are able to get adequate moisture and light during leaf fall (O’Reilly 2007:2).

Despite their detriment to food production, the abundant clays of the tropics offered a construction material – in the form of kiln-fired bricks – for the earliest structures at Angkor, and a vast majority of structures at Bagan and Sukhothai (Aung-Thwin 1990; Mabbett and Chandler 1995; Rooney 2008; Uchida et al. 2003). The region’s extensive laterite and sandstone deposits were also used in monumental constructions at each charter state epicentre (Uchida et al. 2003:221). The laterite, which is an iron and aluminum-rich soil type, was often used for foundations and core facing. It is soft until being exposed to air, which means it can be easily cut and carved into the
desired shape before it hardens into a coarse, stone-like consistency (see Figure 2.2). Sandstone was a long-term building material (as opposed to wood), and was more visually appealing than laterite. Quarries of sandstone existed at Phnom Kulen, a sacred mountain in Cambodia (Mabbett and Chandler 1995:186; Higham 2001:103).

Figure 2.2. Exposed laterite column at Sukhothai, revealing its porosity.

*Hydrology and Evapotranspiration.* The tropics typically see 1000-1500 mm of annual rainfall, but the region of mainland Southeast Asia experiences larger fluctuations from year to year, which can result in either flooding or drought (Trewartha et al. 1961:219-221). Evapotranspiration refers to the loss of water through evaporation off the surfaces of soil, plants, animals, lakes and streams, and the ocean (Trewartha et al. 1961:278-279). Potential evapotranspiration (PET) refers to the maximum amount of evapotranspiration that could occur if sufficient water was available. In monsoonal tropical climates during the wet season, precipitation exceeds evapotranspiration, which leads to soil leaching, as the rain percolates into the ground water. During this time, the evapotranspiration tends to match PET (de Bruin 1983:299; Trewartha et al. 1961:280).
After the wet season, actual evapotranspiration matches PET for some time, as the plants still have stored moisture. Eventually, however, during the dry season, evapotranspiration falls significantly. Leaching lessens as evaporation draws nutrients upward into the topsoil (de Bruin 1983:299). Southeast Asia’s monsoonal seasons result in flooding of many of the region’s waterways, including the region’s rivers and the Tonle Sap Lake in Cambodia, which swells to 250 km² during the wet season (UNESCO 2015b). The inland agrarian centres depended on freshwater sources for irrigation, with each case study being located in a lowland area with access to a reliable water source (SarDesai 1997:6; UNESCO 2015b). The hydrology of the region also deposits fertile sediment during wet season flooding, and provides easy trade routes (SarDesai 1997:7).

**Biodiversity.** Tropical environments have high biodiversity of species, in part due to the high amount of rainfall (Ewel and Bigelow 1996:109; Kricher 2011). As tropical ecosystems’ species are tied to soil fertility, regions with more fertile soil contain a higher abundance of species, including trees and epiphytes (Ewel and Bigelow 1996:108; Orians et al. 1996:214-215). The vegetation of the tropics supports a variety of animals, including grazing and arboreal species (O’Reilly 2007:2). The tropics also serve as a home to a high number of endemic species, enabled by the climate, which helps facilitate speciation (Sodhi et al. 2010:318-319).

**The Initial Conditions for Specific Case Studies.** Despite the frequent use of the word “homogenous” to characterize tropical environments as a whole, particular emphasis must be placed on the *variety* among tropical societies and their environmental contexts. While all of three of the case studies for this thesis are located in relatively flat inland zones, there is still variation between them, which affected their functions and
adaptations. Located in northwest Cambodia, Angkor becomes inundated with a large amount of rain in the wet season, and the region’s fertile soil is replenished by the annual recession of the Tonle Sap (Evans and Traviglia 2012:200). At 21° N, located almost at the Tropic of Cancer, Bagan sees the coldest weather of the sites, and is situated in the heart of Myanmar’s Dry Zone, which receives an average of 1143 mm of rain annually. The abundant rainfall in the surrounding hills, however, feeds the rivers and irrigation networks of Bagan through the Irrawaddy River and its tributaries. Due to its location adjacent to the Irrawaddy River, Bagan’s soils are particularly fertile, producing a diversity and abundance of crops (Aung-Thwin and Aung-Thwin 2012:40). Sukhothai is located in the Chao Phraya River Basin, and its development was aided by the fertile soil provided by the Yom River, which deposits alluvial soils during seasonal floods (SarDesai1997:7). It has a slightly cooler season from November through January (Rooney 2008:15). Even though there is diversity in the tropical societies studied, they all shared a set of vulnerabilities due to the nature of the environment, from comparatively infertile soils, to disease, to periodic disastrous climactic events (e.g., floods and droughts), and the difficulty of procuring water during dry seasons.

THE EMERGENCE OF THE PROTO-STATES

Proto-states began to form in mainland Southeast Asia in the first centuries CE, and these political formations would come to act as precursors to the later states of Angkor, Bagan, and Sukhothai (Aung-Thwin and Aung-Thwin 2012:40-41; O’Reilly 2007:3-6; see Figure 2.3). Communities in the region began to accumulate in areas of abundant inland water or along the coasts (Stark 2006b:413). Major surpluses and growth were eventually made possible given the more predictable and agriculturally favourable
conditions of the Medieval Climate Anomaly (ca. 800-1300 CE), leading to the formation of the more complex political entities that are the focus of this thesis (Lieberman 2009:16).

**Figure 2.3.** Locations of proto-state epicentres (Sri Ksetra, U-Thong, Nakhon Pathom, Isanapura, and Angkor Borei) with locations of later epicentres and modern country borders (modified from Wikispaces).

*The Cambodian Proto-states: Funan and Chenla*

*Funan.* Funan first appeared in the fertile Mekong Delta around 500 BCE, empowered by its location on the trade route between India and China (Coedès 1968:41; O’Reilly 2007:108). Funan was an early Hindu polity exhibiting the beginnings of state level indicators, as it contained high populations and urban centres, an agricultural surplus, diversified agricultural production, social stratification, taxation, a system of
writing, a network of trade, coinage, and monumental architecture in the form of canals and religious brick structures (O’Reilly 2007:92, 94-99). Chinese accounts claim Funan was ruled by “kings,” indicating a higher level of centralization and power. However, some scholars believe Chinese sources exaggerated or misinterpreted the nature of Funan’s communities, and claim these were, in fact, chiefdoms with decentralized authority (Coe 2003:58; O’Reilly 2007:97; Stark 2006a:152). Regardless, there was an increasing level of centralization and political control appearing in the large, connecting centres scattered across the Funan territory (O’Reilly 2007:99; Stark 2006b:417).

Individual settlements were enclosed with walls and moats and contained precincts populated by residences, monuments, water management features (such as dykes, reservoirs, and canals), and inscriptions (Higham 2002:236-239). These cities were usually located near bodies of water, such as rivers or lakes, and tended to be closer to the coast for access to trade resources (O’Reilly 2007:93, 101).

Angkor Borei, speculated to have been the capital of Funan, is among the largest known Funan settlements at 3 km² (O’Reilly 2007:93; see Figure 2.4). Settled as early as 300 BCE, it was a city protected by a double moat and wall, possibly intended to divert floodwaters. Angkor Borei subsisted on its crop surplus (produced by multiple subsistence methods) and fish from the nearby river, and took advantage of many forest products (O’Reilly 2007:107). This centre was more densely populated than other settlements, connected to surrounding smaller sites by way of canals, and was possibly home to 20,000 people who, by the 6th-7th centuries, were highly cultured, with a writing system, archives, and music (SarDesai 1994:23; Stark 1998:185, 2003:3, 2006b:419).
Figure 2.4. Site plan of Angkor Borei with walls indicated in red (modified from Bishop et al. 2003).

Chenla. While it is unclear what caused Funan’s decline, whether it was a shift in trade, failing hydraulic networks, or usurpation (either peaceful or by force), Chenla became the new power in Cambodia around 500 CE (O’Reilly 2007:109-111). Chenla was an inland, agrarian proto-state that practiced both Hinduism and Buddhism, and its dominance lasted until 800 CE (Higham 2002:252-253; Stark 2006a:152-153). While still a decentralized polity, there was a trend towards centralization as exemplified by larger capital cities and more powerful rulers, possibly enhanced by temple construction (Higham 2002:245; O’Reilly 2007:115). These temples were an important draw for people as they served as gathering places for the elite and as economic centres for artisans and farmers.
Isanapura (commonly known as Sambor Prei Kuk), one of Chenla’s largest communities, is a 4 km² centre speculated to have been its capital (Higham 2002:248; see Figure 2.5). During the 7th century, the city had three walled precincts, each populated with a series of Hindu stone temples dedicated to Shiva. These were placed around a central sanctuary in the city (Higham 1998:254). Isanapura, according to Chinese texts, was larger than Angkor Borei, with more than 20,000 families in the 7th century. It conquered surrounding territories, possibly controlling up to 30 cities (Coe 1961:70). Isanapura was an elite centre and a place where rulers gave audiences to courtiers and officials (Higham 2012:284-285). Those loyal to the leader and his family were appointed to govern and control conquered territories in the leader’s stead. These people were also rewarded for loyalty in the form of elite titles, elite jobs, land, and taxation relief (Higham 2012:285).

Figure 2.5. Isanapura site plan showing the main epicentral groups (modified from canbypublications.com).
Particularly notable for Chenla is the kingship of Jayavarman I, a predecessor to the great kings of Angkor. Jayavarman’s rule marked a shift to state-level society in the region, increasing political complexity, unification, and centralization. Jayavarman was able to increase administrative authority and exert power over other officials and communities, partially through conquests (O’Reilly 2007:112, 115-117). Chenla established the groundwork for Angkor’s rise to power at the Roluos Group within the next century.

The Burmese Proto-states: Pyu Polities

The Dry Zone of Upper Myanmar was populated by Pyu settlements from 100-800 CE, after which these polities declined for unclear reasons (Lieberman 2003:89; O’Reilly 2007:9, 25). These typically moated and walled settlements, mostly Buddhist in nature, were an average of 9-19 km\(^2\) in size, and extended from Chenla to India and from southern China to the ocean (Fletcher 2012:296; O’Reilly 2007:9, 11). Sri Ksetra, which may have been the Pyu epicentre, or at least one of the larger cities serving the surrounding hinterland, was a chiefdom that lasted from approximately 400-800 CE (Moore 2003:25; O’Reilly 2007:10, 12). Approximately 14.3 km\(^2\) in size, Sri Ksetra had numerous hydraulic constructions (including wells, moats, reservoirs, and drainage channels), fortifications, and modest Buddhist brick architecture (Hudson and Lustig 2008:271-273; O’Reilly 2007:18). These water management features were supplemented by flooding and helped create a surplus of the staple crop: rice (O’Connor 1995:974; O’Reilly 2007:10). The epicentre of Sri Ksetra was home to the royal court and may have overseen its territories by way of garrison towns ruled by subordinate chiefs (O’Reilly
The scattered settlement landscape was integrated through coinage and Buddhist religious constructions scattered across the region (Aung-Thwin 1985:160; Stark 2006b:218). The epicentre of Sri Ksetra contained a palace, temples, monasteries, and residences within the city, but also had burial grounds, storage facilities, and irrigation systems connected to it (Aung-Thwin and Aung-Thwin 2012:70; Htin Aung 1967:10-11).

Figure 2.6. Site plan of Sri Ksetra with the walls shown in a black, dashed line (modified from Hudson 2004).

The (Mon) Thai Proto-states: Dvaravati
The Dvaravati was a collection of predominantly Buddhist settlements across the central plains of Thailand that likely appeared as a unified group in 500 CE (O’Reilly 2007:66-67). The people likely practiced Hinduism and Buddhism, with a possible preference of the elite for Hinduism, or religions being divided on geopolitical lines (O’Reilly 2007:68-69). These settlements were located near rivers to exploit the waterways as trade routes, sources of fish, water for wet rice irrigation, and the filling of defensive moats (O’Reilly 2007:74). Debate circulates around the nature of the Dvaravati settlements, especially whether they were ruled by one king or chief or if they were separate communities sharing one culture (O’Reilly 2007:65, 72).

While social stratification clearly existed and larger settlements may have served as homes for the rulers of Dvaravati society, it is unclear if a true capital existed (O’Reilly 2007:66, 74-75). Nakhon Pathom, U-Thong, and Khu Bua were all sizeable centres of the Dvaravati culture that may have been epicentres controlling larger areas (O’Reilly 2007:77-79). Nakhon Pathom, a city 50 km west Bangkok, is thought to be the most likely candidate for a later capital, and U-Thong may have served as an early capital (O’Reilly 2007:77-78; see Figure 2.7). Although we have little information on the nature of Dvaravati, some speculations have been made about state formation indicators. These indicators include increased trade (missions to China and waterways used as trade networks), the construction of brick monuments, and the minting of coinage. However, these were not integrated features, and they were mostly independently funded by each community (O’Reilly 2007:66, 80, 88-90). The reason for Dvaravati’s decline is unknown, but it is clear that centralization and political power increased during this time, and would lead to the eventual formation of the later Thai states.
Figure 2.7. Nakhon Pathom site plan (modified from Khunsong et al. 2011).
SOUTHEAST ASIAN EPICENTRES

In this section, the Southeast Asian city, with particular focus on epicentres, will be discussed in general, overarching terms and themes. The individual epicentres will be discussed in detail in Chapter 4. The Southeast Asian epicentre uses a personal model of connectivity, creating a network of fictive kin and community, meaning the people share symbols and meanings across both the epicentre and the hinterland (O’Connor 1983:4).

This works as a tool to unite a sprawling empire by attracting people to the epicentre (O’Connor 1983:5, 51). People were connected through an ideology to the epicentre, which was the locus of religious and ritual power, and accepted as the superlative centre of the state (Miksic 2000:107; O’Connor 1983:11). The symbols created a connected community with the power based in the epicentre, and where identities of the people were based on where they fit within the hierarchy (O’Connor 1983:12). Table 2.1 helps define the epicentre as used in this thesis.

<table>
<thead>
<tr>
<th>THE COMPOSITION OF THE EPICENTRE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Secular Structures</strong></td>
</tr>
<tr>
<td><strong>Residence of the Ruler</strong></td>
</tr>
<tr>
<td><strong>City Walls</strong></td>
</tr>
<tr>
<td><strong>Centralizing Element</strong></td>
</tr>
</tbody>
</table>

**Table 2.1.** Table detailing elements of the epicentre used in this thesis to better define its parameters.
A word that is used frequently throughout this thesis is “monumentality,” for which I will be using Bruce Trigger’s (1991:119) definition:“(i)ts principal defining feature is that its scale and elaboration exceed the requirements of any practical functions that a building is intended to perform.” Monumentality is an indicator of status and hierarchy within a society: the more stratified the state, the more likely monumental architecture will appear (Trigger 1991:120). By asking which types of buildings are the most “monumental,” one can determine which aspects of a cultural and political power were given precedence at a given point in time.

In addition to being agrarian-based, low-density urban centres, Miksic (2000:107) terms the “Classic” epicentres of the charter states “orthogenetic,” the characteristics of which include association with stability, partially generated by surplus staple crop production, and ritual, which becomes apparent in monumentality. Orthogenetic cities were “large, and usually organized on a spatial layout such as a partial grid, and operated as the locus of ritual state power” (Fletcher 2009:288). Angkor, Bagan, and Sukhothai are all known for their monumentality and are all located within fertile rice-growing zones. Despite being associated with manufacturing, such activities did not take place within the orthogenetic city itself, nor were these centres significant hubs of commercialization (in contrast to heterogenetic cities). Orthogenetic cities are also characterized by a lack of a dense population, a characteristic of low-density centres (Miksic 2000:107, 109).

The term “mandala,” rather than “state,” has been applied to these Southeast Asian polities to more aptly describe their organization. “Manda” (core) and “la” (enclosing element) denote a state defined by its epicentre rather than a concrete set of borders (Dellios 2003:1; Tambiah 2013:503). Royal power radiated from the centre as a
set of concentric circles, diffusing outward from the capital and region of direct control, to the areas ruled by king-appointed governors and princes, to the surrounding tributary states (Tambiah 2013:509). Tambiah (1976:69) terms these mandalas “galactic polities” and Lieberman (2009:22) refers to them as “solar polities” to describe the geographically decreasing gravitational pull of the epicentre on the surrounding territories, where control decreases as you move from the epicentre, without the necessity of fixed boundaries.

**Figure 2.8.** The buildings, stakeholders, and activities/functions of the epicentre.
Epicentral Activities

Administration/Justice. As the home of the ruler and the state’s most important functionaries, administration of most aspects of the state occurred within the epicentre. This administration extended to justice, the economy, trade, redistribution, and maintenance of integrative features, agriculture, and water management systems (Coedès 1963; Coe 2003:136, 141; Dumarçay 1991:41-42; O’Connor 1983:52; Rooney 2008:28-29). The management of the royal religious cult was also centred within the epicentre, as the ruler had some control over the religious orders, and his power was vital to the distribution of resources and labour to the state religion’s activities and funds (Aung-Thwin 1985:165). Stability of the state was a form of functional legitimacy, derived from the ruler’s perceived administrative responsibilities. Dissatisfaction among the common people, as a result of too much or too little force and interference, weakened the ruler’s authority, since he was perceived as either neglecting or becoming overzealous in his duties (McCloud 1995:73).

Symbolic of Political and Religious Might. One of the most important aspects of the epicentre was its demonstration of political and religious might (Rooney 2008:40). Religious power was ritually, and sometimes physically, centred inside the epicentre (O’Connor 1983:51). Some structures acted as repositories for relics of the Buddha, which endowed the epicentre with religious sanctity and connected local cities with the historical Buddha. Religion tied people ideologically to the epicentre, in part through an affixed location of an event – such as a footprint left behind by the visiting Buddha – or through the purposeful creation of religious sanctity through temple building or importing relevant religious figures (e.g., the head of the religious order). The epicentre’s temples
were places of worship for both the elite and often the common people (O’Connor 1983:51; Rooney 2008:40, 43, 74). Here, people would give offerings and pray to Hindu gods, Buddha, or sometimes the indigenous guardian spirit of the epicentre (Rooney 2008:91). Ordinations of monks and religious festivals often took place within temples in the epicentre (Rooney 2008:43). In addition to contributing to the most monumental religious structures, these activities and practices firmly established the epicentre as the religious power of the area.

The depiction of cosmological attributes in the epicentre established the connection to the state religion, justified the ruler’s divine right to rule, and celebrated their role as an intermediary between the divine and the mundane (McCloud 1995:73-75). The imitation of the heart of the epicentre as the centre of the cosmological realm created an ideological link that effectively served to represent the state as a microcosmic version of the universe, with the epicentre and ruler situated as the paramount elements. The epicentre’s monumentality, both religious and secular in nature, was representative of its power and wealth (Dumarçay 1991:7; Dumarçay and Smithies 1995:88; Rooney 2008:40).

**Legitimization of Power.** The ruler and the epicentre were highly dependent on legitimacy for their power and position. The epicentre’s monumentality served as an embodiment of the ruler’s legitimacy. The ruler used the size and elaboration of structures within the epicentre to display his/her power. Larger structures reflected larger resource and labour pools, which symbolized a more powerful ruler. In discussing the complex, hierarchic systems of Southeast Asia, O’Reilly (2007:184) states that: “the hierarchic system needs reinforcement through a system of tribute and regalia, materials
that must be supplied by lower ranking members of the society.” The idea of legitimacy becomes an important one for the divine rulers of Southeast Asia as it specifically relates to their ability to maintain their power.

*Religious Activities.* Religious activities were pervasive in Southeast Asian epicentres, affecting nearly every aspect of architecture, sculpture, and painting. Most monumental, long-lived buildings functioned as religious structures rather than as residences or places of administration. Religious institutions helped the state by cultivating a religious network with a growing number of adherents who found themselves tied ideologically to the epicentre (Lieberman 2011:940).

Briefly stated, the indigenous religions of mainland Southeast Asia were based on animism, where spirits existed in natural objects. Many Southeast Asian cities had a dwelling for the guardian spirit of the city (Rooney 2008:30). Offerings to the spirit guardians were made at dwelling places, in some cases located within the city, to seek their protection from malicious spirits and enemies (Rooney 2008:73, 91). Later, indigenous beliefs would become assimilated into religions imported from India (Rooney 2008:30).

![Modern shrine in Myanmar with the images of nats (nature spirits) inside.](image)

**Figure 2.9.** Modern shrine in Myanmar with the images of nats (nature spirits) inside.
The two religions imported from India, Buddhism and Hinduism, were the most important theologies to influence the charter state case studies. In Southeast Asia, Hinduism recognizes a cycle of reincarnation and rebirth, and karma (the effects of good and bad actions). Mythical deity cults surround gods such as Brahma, the Harihara amalgam (a combined god composed of one half of Vishnu and one half of Shiva), as well as both Shiva and Vishnu as separate deities. Hinduism shares with Buddhism the concept of Dharma, which relates to the moral order of the universe and the balance of good and evil (Coe 2003:80-83; de Casparis and Mabbett 1999:288-290; Rooney 2008:31). Theravada Buddhism, the sect practiced in Bagan and Sukhothai, followed closely the Buddha’s original doctrine of the Middle Way, which depicts the Buddha as finding a way towards nirvana, or release from the cycle of rebirth. This is achieved by understanding Four Noble Truths: 1) That all clinging to life brings suffering; 2) This suffering is caused by the passions of desire; 3) The cessation of suffering is through the complete detachment from desire; 4) This cessation is accomplished by following the Eightfold Path of moral conduct: correct view, resolve, speech, conduct, livelihood, effort, mindfulness, and concentration (Rooney 2008:31-32).

Syncretism, an important facet of Southeast Asian religions, involves the combining of the conflicting and varied beliefs of indigenous and Indian belief systems. For example, Southeast Asian Buddhism, contrary to the original beliefs of Buddhism, accepts the idea of the individual spirit and Bagan’s indigenous pantheon of thirty-six nats, or nature spirits, which was achieved by adding a thirty-seventh nat for the Buddha. Hinduism was also influential on early Bagan, as it incorporates Hindu gods as nats (see Figure 2.10; Aung-Thwin 1985:167-168).
The merit-path to salvation, one of the principles of Buddhism, means one must invest in religious expenditures with labour or resources to obtain rebirth into a better life. This resulted in monumental construction projects of religious architecture, including temples and monasteries. These endowments empowered the sangha, or Buddhist church, and thus its status could, at times, threaten or nearly supersede that of the ruler (Aung-Thwin 1985:162-164).

**Figure 2.10.** Shwesandaw in Bagan, Myanmar was dedicated to Ganesh, a Hindu deity incorporated into the pantheon of nats, and also housed hair of the Buddha (Aung-Thwin 1985:168).

*Domestic Activities of the Ruler and Court.* The ruler, their spouses, and rest of the royal family lived within the confines of the epicentre (Dumarçay 1991:7). Usually, additional living quarters for the court, ministers, and the elite existed as well. The ruler lived in the palace and performed the majority of his daily activities there, while some additional structures served as food storage facilities and as kitchens. Many of the ruler and court’s daily activities were centred on entertainment and administration (Dumarçay 1991:41-42).
Ceremonies/Games/Festivals. Ceremonies, games, and festivals acted as shows of wealth and extravagance (Dumarçay 1991:41-42). Stark (2015) argues that political might was symbolized and legitimacy was established in performance, ritual, and ceremony. Ceremonies were an important source of legitimacy as they could create an ideological tie between the commoner and the ruler. Often, in the empty spaces of the epicentres, games were played and entertainment was abundant in the form of acrobatic dances, military tournaments, animal combat, and chess. The royal procession – which occurred whenever the ruler left the palace as a show of power – also began and ended in the epicentre (Dumarçay 1991:41-43).

Figure 2.11. Modern ordination ceremony in Myanmar.

Burials for the Royal Family. The ruler and the royal family remained in the epicentre both in life and death. In Southeast Asia, cremation was the common method of funeral rites, often with the remains of a ruler or other elite being placed in a stupa (Dumarçay 1991:116-121). Cremations of important figures may have taken place on architectural terraces across Southeast Asia (Higham 2001:124). Burials of ancestors also
acted as a legitimization of power by connecting rulers to powers from the past through the epicentre (Rooney 2008:82, 94).

*Connecting the Community.* The epicentre was a centralizing force for hinterland settlements. By holding court with local leaders from smaller settlements, the epicentre could create ties with these communities (O’Connor 1983:52). Through adornments and inscriptions, the epicentre also kept the histories and mythologies of the state and its people, in part connecting to people’s identities through their collective history (Rooney 2008:26). A sense of community could be fostered as people invested in the edifices of the epicentre and therefore felt personal investment and connection to the centre (O’Connor 1985:36). Connection to the epicentre functioned as a “civilizing” power for the people, which gave them a history and community (O’Connor 1983:11).

*Keeping Historical Records/Propaganda.* Inscriptions, bas-reliefs, murals, and statues were often located within or commissioned by the epicentre. Inscriptions are the most permanent form of keeping histories in Southeast Asia, though paper documents and libraries did exist (Lieberman 1987:171; Rooney 2008:124). Inscriptions and artwork tied to structures were effective in strengthening the ruler and the state, as they attributed constructions to the ruler and acted as ideological propaganda, suggesting the ruler was divine or closely connected to the divine (Aung-Thwin 1985:166; Bentley 1986:282; Lieberman 1987:169).
Figure 2.12. Bas-relief at Angkor Wat depicting a military battle. Bas-reliefs were one manner in which histories could be kept and propaganda could be spread.

Epicentral Stakeholders

All people under the control of the state, termed stakeholders, were bound to the epicentre to varying degrees. The term “stakeholder” is used here to explore how different people engaged with, and were affected by their relationship to the epicentre. The principal stakeholders in the epicentre can be divided into two categories: 1) the people who resided or spent the majority of their lives within the confines of the epicentre; and 2) those outside of the epicentre who were still tied to the epicentre in some way.

The Ruler and Royal Family. The largest stakeholder, i.e., the person most affected by change in the epicentre, was the ruler, followed by their spouses, concubines, and the royal family (Aung-Thwin and Aung-Thwin 2012:80; Dumarçay 1991:41-42). The ruler was the head of the state, the administrator, and the most powerful person in the
epicentre. Their role was to administer justice, distribute power and status, maintain the infrastructure and economy, act as a leader for the army and the culture of the state, empower the state religion, act as a connection with the divine, serve as a cohesive element for the sprawling community of people, and, overall, maintain the smooth functioning of the epicentre (Aung-Thwin 1985:162; O’Connor 1983:57-58, 67; Rooney 2008:23). In Southeast Asian epicentres, the ruler was bound to place, and they were thus empowered by their epicentre, which played an integral role in legitimizing their rule (O’Connor 1983:65).

Power and legitimacy were deeply tied to the state religion and were dependent on the ruler’s ability to maintain their ties to the state belief system. As the most powerful individual, and the one with the most means, the ruler was expected to donate large amounts of labour and resources to the state and/or state religion to maintain his high level of merit (Aung-Thwin 1985:164; Hall 1999:243). If the ruler failed to provide, or if disaster struck, they were considered to be neglecting their duties (Coedès 1966:142). In return for protection, stability, identity, and access to resources – both economic and religious – the people gave the ruler their own natural and human resources and loyalty.

The Court and the Elite. A number of the elite and/or the court of ministers, judges, princes, and governors lived and worked within the epicentre. These members of the court, and the ministers, princes, and governors who administered outside the epicentre, owed their power to the ruler and the epicentre. However, this meant their power only remained if the ruler and epicentre prospered (Aung-Thwin and Aung-Thwin 2012:80; Miksic 2000:107). The court and the elite were often linked to the royal family, whether as friends, or as powerful allies, or through bloodlines (Coedès 1966:221;
Higham 2001:151). The purpose of the court was to help the ruler in their administrative tasks and cultivate ties to allied communities in the form of local leaders who participated in the court (O’Connor 1983:52). The court had control over a number of infrastructural sectors and central activities, such as royal warehouses, the collection of taxes, the administration of borders, the command of the army, the organization of corvée labour, and administration of the outer regions of control, thereby extending the ruler’s hegemony over a vast realm (Higham 2001:153).

Servants and Guards. Servants and guards of the royal family often stayed within the walled epicentre most of their lives, serving both the ruler and the elite (Aung-Thwin and Aung-Thwin 2012:80; Miksic 2000:107). They depended on the epicentre and the ruler for their livelihood, and were closely tied to the royal family and the epicentre by an ancestry of service and devotion to the ruler (Higham 2001:152).

Figure 2.13. Ramnarong Gate of the city walls at Si Satchanalai, Thailand, a contemporaneous sister site of Sukhothai. Ramnarong, according to local signage, had a fort to house soldiers who would protect Si Satchanalai in times of war.
Religious Figures. It was vital for the epicentre to house and connect to important religious figures to strengthen the court’s sacred ties. Sometimes the head of the religious order or a significant personality lived within the epicentre (Miksic 2000:107; O’Connor 1983:51). The Buddhist sangha or Hindu priesthood, whether or not it resided within the epicentre, depended on the epicentre for a large amount of resources and labour to put towards religious construction. However, due to its high status in many areas throughout the region, the priesthood was not as heavily entangled with the epicentre as the royal family. The religious organizations were powerful mainly because they were necessary for the ruler to accrue merit through donations of labour, resources, and land. Without the epicentre’s support, the religious institutions would not have achieved such significance (Hall 1999:142). This was, however, a reciprocal relationship of empowerment. The state was empowered by the religion, and the religion was empowered by the state (i.e., the sacred and the secular were firmly entangled).

Figure 2.14. The Buddha statue at Wat Saphan Hin near Sukhothai, which was housing for the Supreme Patriarch, or head of the monkhood (Dumarçay and Smithies 1995:56).
The Common People: Artisans, Merchants, Labourers, and Farmers. “People needed the centre. Who they were, what they had, and what they hoped for all came from ritual or status distinctions that had no meaning without a centre” (O’Connor 1983:58). The common people were ideologically tied to the epicentre, their identities deeply entwined with it. The investiture of the people within the epicentre as the source of their identity came in the form of their resources and labour. As such, they wanted the epicentre to flourish and felt a strong connection with the places they helped build (O’Connor 1983:36). Artisans and labourers were linked to the epicentre through their contributions to its construction, and the blacksmiths, weavers, traders, miners, merchants, and farmers also depended on the epicentre as a place of redistribution and management (Higham 2001:53).

Epicentral Buildings and Spaces

The Southeast Asian epicentre is a settlement comprised of “a ritual core with hydraulic features, a resident halo, and surrounding agrarian lands dotted with shrines” (Stark 2015:92). Epicentres contained predominantly administrative, elite, and religious structures. What the epicentres did not typically contain, however, are markets (Miksic 2000:107). There is a lack of middle and lower class populations residing in or serving within the epicentre, unless they serve the royal household. The majority of the population, as well as the majority of agriculture and irrigation works, and many temples and monasteries, were located outside of the walls, as the epicentre was a place of privilege, for only the most elite and high ranking members of society (Aung-Thwin 2012:69; Dumarçay and Smithies 1995:90; Rooney 2008:29).
The City Walls. The city walls defined the epicentre, effectively separating the secular and sacred parts of the epicentre from the rest of the urban sprawl (Coningham et al. 2007:703). The city walls were usually made of earth, stone, or brick, punctuated by gates, and constructed with a surrounding moat (Dumarçay and Smithies 1995:9). Over time, as the meaning of the epicentre changed, the meaning of the walls changed, and vice versa. Their role at each epicentre will be discussed further in Chapter 4.

Figure 2.15. City wall and gate at Sukhothai.

Figure 2.16. Moat at Sukhothai’s city walls.

The Palace/Living Quarters. Although varying between epicentres, residences existed for the elite, court, and the ruler. Palaces, defined by Dumarçay (1991:1) as the
“residence(s) of temporal power,” were always located within the city walls and were typically constructed of wood; as such, they are rarely preserved. However, some information can be inferred from remaining foundations and historical accounts and inscriptions (Aung-Thwin and Aung-Thwin 2012:69; Dumarçay 1991:40; Rooney 2008:26, 82). The palaces are described as being monumental, with intricate artistry and adornments associated with the religion of the ruler, and such complexes therefore ostensibly served as another symbol of the ruler’s power (Higham 2001:94-95).

The residences of the court and other important figures within the epicentre were also made of wood, tile, and thatch (Aung-Thwin 2012:92-93; Evans et al 2013:1).

Servants, guards, their commanding officer, and priests – who may or may not live in the monasteries – also had residences in the epicentre (Dumarçay 1991:5).

**Religious Structures.** Religious constructions were the most dominant architectural features in Southeast Asia, surpassing administrative and civic constructions in quantity, quality, and monumentality (Dumarçay and Smithies 1995:7). Both Buddhist and Hindu structures followed this pattern of monumentality and abundance. Depictions of Hindu figures can be found all over mainland Southeast Asia. Adornments and sculptures featuring Shiva and Vishnu were ubiquitous at Angkor, and were even featured in association with structures that may have not been religious in nature. Hindu and Hindu-influenced structures were often oriented east, as that was the direction of royal divinity (Coe 2003:102). Hindu structures frequently served as representations of the cosmological realm surrounding Mount Meru, the sacred five-peaked mountain at the centre of the universe (Dumarçay and Smithies 1995:88). Adorned with religious scenes,
these were places of worship and contained important relics, such as the state or ruler’s linga, a phallic representation of Shiva (Coedès 1963:30, 109).

Figure 2.17. Phnom Bakheng at Angkor Wat is built as a representation of Mount Meru.

Buddhism is featured in Southeast Asian structures in the form of adornments depicting the life of the Buddha, a popular style of which are ceramic plates of the Jataka Tales, a compilation of 550 stories that illustrate the previous lives of the Buddha (Rooney 2008:34). Religious buildings were usually composed of permanent, or at least long-lasting, materials such as brick, laterite, and sandstone (Aung-Thwin 2012:92; Mabbett and Chandler 1995:186; Rooney 2008:39; Uchida et al. 2003:222). The common Buddhist temple is comprised of an assembly hall or cella, a windowless body of a temple that houses a deity statue for worshippers. Some temples included an ordination hall built upon the most sacred ground reserved for monks and important ceremonies (Rooney 2008:41-43). A stupa, a solid structure that was influenced by burial mounds in India, was a common religious construction usually used to house relics of Buddha or royal remains. However, some Southeast Asian stupas are called “pagodas” despite not following the typical tiered architecture of other East Asian pagodas (Le 2010:140;
Rooney 2008:43). Although there were many variations of the Buddhist temple, it often was surrounded by a moat or ditch that could be crossed at either two (east and west) or four pathways (the cardinal directions) (Rooney 2008:41).

**Figure 2.18.** Magwe Pagoda, a stupa, on the Irrawaddy River near Bagan.

The dwellings of the guardian spirit, which contained a representation of the spirit, and monasteries, which provided housing for the monkhood, were also sometimes located in the epicentre (Rooney 2008:73, 91). Buddhist monasteries, usually constructed of wood, were comprised of a number of buildings, including a meditation hall, a shrine hall, and refectory. In Thailand and Cambodia, boundary stones marked the space of the most sacred area (Coe 2003:87). Religious structures did not necessarily have to be located in the epicentre in order to be closely connected to it, as many constructions outside of the city walls were funded by the ruler.
Administrative Structures. From the palace, and from behind its enclosed structures, the ruler could govern the state. Some constructions, including terraces and palaces – some of which contained an audience hall – were considered to be places of administration (Coe 2003:125; Dumarçay 1991:41-42). Audience halls were constructed with a window for the ruler to witness or partake in the proceedings, or with features where the ruler was situated above the audience (Dumarçay 1991:7).

Figure 2.20. Portion of the Terrace of the Leper King at Angkor, possibly a place of administration of justice.

Infrastructure: Water Management, Roads, Royal Treasury, Tombs, and Inscriptions. Also housed within the epicentre were vital infrastructure features such as
reservoirs, barays (a rectangular or square reservoir at Angkor), canals, moats, irrigation pipes, roads and paths, and, sometimes, the royal treasury (Aung-Thwin and Aung-Thwin 2012:69; Bentley 1986:284; Dumarçay 1991:5; Rooney 2008:71). Dams, reservoirs, and barays retained water for the dry season and fed canals and irrigation systems which distributed the water within and outside the epicentre (Dumarçay and Smithies 1995:12, 88, 108). Integrative mechanisms, such as roads, were also often part of the epicentre – in part due to their being funded by the epicentre (Dumarçay and Smithies 1995:102, 106; Evans et al. 2013:3). Through their adornments, such as bas-reliefs, engravings, sculptures, and inscriptions, the epicentral constructions can depict mythological tales, religious scenes, and historic accounts, effectively becoming a focal point for the state’s histories and social memory (Rooney 2008:26). In some epicentres there is also evidence of libraries containing holy scriptures (Dumarçay and Smithies 1995:26). Within the empty spaces of the epicentres there were gardens and areas for growing crops, and spaces for viewing games, ceremonies, and entertainment (Dumarçay 1991:5, 41-42). Evidence also suggests that there were areas for burial and cremation of royal remains (Coe 2003:125, 174; Rooney 2008:82).

Figure 2.21. Bridge Spean Praptos (also known as Kampong Kdei Bridge) on a southern road from Angkor.
SUMMARY AND CONCLUSIONS

The development of charter state epicentres was strongly linked to the difficult environment of the tropics, and began with the early, decentralized proto-states of Funan, Chenla, Pyu, and Dvaravati. The key point for understanding Southeast Asian epicentres is to consider them in their roles as power centres, which is the crux of the mandala and galactic/solar polity models. Among the case studies, often the epicentre, rather than the ruler or the palace, was the most significant feature for the people, though this is not always the case (O’Connor 1983:61). It was the locus of administration and religion, becoming the gravitational centre for the surrounding areas, drawing people to it as a source of power and identity (O’Connor 1983:51). Within the city walls were some of the most important centralizing structures, people, and activities. In addition to being the ruler’s home and centre for their administrative rule, the epicentre in Southeast Asia was
the home to the royal and state cults, the seat for vital infrastructure, the centre for administration and redistribution of the economy, the hub for the state’s history, the locus of identity for the people, and preeminent location for the most important relics and religious objects and iconography (O’Connor 1983:51-52). These epicentres, and their components, were deeply entwined with their socio-ecological system, and made vulnerable or resilient by it. In the following chapter, resilience theory and entanglement theory will be discussed in detail in order to lay the groundwork for understanding the nature of these relationships and entanglements.
CHAPTER 3: THEORY AND METHODS

Acting as an initial study to evaluate the quality of data sets regarding the collapse of tropical states, the SETS project as a whole is a comparative study focusing on the tropical charter states of the Khmer Empire centered at Angkor, the Burmese Empire focused on Bagan, and the Siamese Kingdom whose capital was at Sukhothai, as well as the Chola Empire of South India, the Sinhalese Empire of Sri Lanka, the Dai Viet and Cham Kingdoms of northern and central Vietnam respectively, and the Mataram/Kediri/Singhasari/Majapahit Kingdoms of central and east Java. In addition, comparisons will be drawn to the Maya kingdoms of tropical Central America in the larger study to rule out similarities caused by the geographic proximity and cultural diffusion/migration inherent in the Asian case studies. As of this writing, no known contact between Southeast Asia and the Maya has been discovered.

In each state, five topics are being studied by different researchers to thoroughly address the interlocking socio-ecological systems, both in isolation and as a larger holistic study. The water management sub-project deals with irrigation, ponds, reservoirs, canals, and water temples (Marajh 2014:27-53). The agriculture sub-project looks at granaries, swidden polyculture, more complex agroecosystems (e.g., terraced and/or irrigated field systems), and agricultural extensification (Macrae 2014:58-85). The settlement sub-project studies patterns and distribution of populations across the landscape (Demarte 2014:108-119; Coria 2014:120-141). The integrative mechanisms sub-project includes roads, bridges, monasteries, markets, rest houses, hospitals, storage houses, and other connecting features (Hills 2014:142-177). Finally, the epicentral sub-
project, and the focus of this thesis, examines the central urban node or precinct of the empire, which was cordoned off from the rest of the city using city-walls (Baron 2014:100-107; Shirkey 2014:86-99). Together, these studies will form the groundwork for a research program that aims to explore issues unique to the tropics, such as the resilience aspects of the low-density urban footprint, disease, poverty, deforestation, rising populations, the effects of climate change, access to necessities such as food and water, and diminishing biodiversity. Phase 1 – the preliminary study of which I am part – focuses on the resilience and vulnerability of “charter states” in the tropics to better understand the factors and causes of their rise and fall between roughly 850-1350 CE. This study involves research trips to each state listed over the course of two years, with each polity subject to at least five days of intensive exploration in and around each of the epicentres (Iannone 2014).

My portion of this larger pilot study examines the epicentres of the Khmer Empire, the Burmese Empire, and the Early Siamese Kingdom. These central places contained “the most significant ritual, residential, and administrative features” (Iannone 2014:12). My field research, conducted from December 12th – January 1st 2013, included five days each at Angkor, Bagan, and Sukhothai. With regards to the overarching SETS project, my goal is to evaluate the current data sets pertaining to my topic, and to examine the architectural remains and archaeological evidence of these epicentres to better understand collapse through the lens of entanglement and resilience theory. Such analysis contributes to the goal of the SETS Project by elucidating vulnerabilities that allow us to better understand the obstacles faced by modern tropical societies, as many such vulnerabilities are ubiquitous throughout time in the region.
RESILIENCE THEORY

Today’s socio-ecological systems suffer from ecological overshoot, consuming more than can be regenerated, which results in a rapid loss of resources. According to Walker and Salt (2006:2-4), this overshoot happens for one of three reasons: 1) we have no choice but to overuse resources; 2) we acknowledge these resources are overtaxed, but we continue to use them anyways; or, 3) it is caused by a misunderstanding of the world’s dynamicity – its changing nature – and how its systems function. Most ways of thinking about systems today are focused on predictability and the existence of a single equilibrium, and are geared towards efficiency and optimization, which can actually be the cause of a loss of resilience (Walker and Salt 2006:10). These optimization-focused modern systems often fail due to their dependence on a predictable set of conditions and expectations of steady, incremental growth. These systems are unable to deal with major disturbances and effectively ignore the changing world, especially how feedbacks cause changes and secondary effects in the system as a whole. Resilience thinking addresses the world as it is, prioritizing adaptability and flexibility, with the goal of preventing misunderstanding of the world’s systems, and improving our knowledge of system dynamicity (Walker and Salt 2006:7, 14).

Resilience theory, as it relates to ecology and ecosystem functionality, first appeared in the 1970s. Thirty years later, it was applied to socioeconomics under the umbrella of a holistic, panarchic approach that dealt with the entanglements of ecological, sociological, and economic systems (Surjan et al. 2001:17-18). The main definition for resilience used in this thesis refers to “ecosystem resilience,” which is the ability for a
system to absorb disturbances without having to shift to a new system and acquire a new identity (Holling 1973:17).

Human development is linked with the resilience of ecosystems, which owe much of their stability to diversity and heterogeneity. Ecological systems can retain their functions even in the face of massive change (Gunderson and Holling 2002:15, 18). However, it is impossible to disengage people from their ecosystems, and this thesis will examine the resilience of interconnected systems of humans and their environments, from here on referred to as socio-ecological systems (Walker and Salt 2006:1). As everyone lives and operates within unpredictable socio-ecological systems, understanding these systems, their functions, and what makes them resilient or vulnerable becomes imperative. Socio-ecological systems are extremely susceptible to change, as no part is an isolate, and change in one segment of the system results in modification of another (Walker and Salt 2006:31). Many of these systems, due to the nature of transformations and the vulnerability of most socio-ecological systems, tend to fall prey to a cycle of failure and rebuilding, whereas “resilient social-ecological systems have the capacity to change as the world changes while still maintaining its functionality” (Walker and Salt 2006:12).

According to Walker and Salt (2006:11), there are two central themes within resilience thinking. The first is thresholds, which is the key idea behind multiple equilibriums. Acting as the maximum capacity of a system to maintain its functional integrity, if a threshold is crossed – a result of too much change – the socio-ecological system will experience a “regime shift,” which is the system moving into a different structure and identity. The second theme is connected with this threshold-crossing
process. Adaptive cycles (see Figure 3.1 and Table 3.1) demonstrate how socio-ecological systems develop over time and advance through four phases: exploitation, conservation, release, and reorganization. However, it must be noted that the adaptive cycle is an idealized model. As such, there are some deviations from the norm, and not all systems progress through the sequence in the expected order, but adaptive cycles remain useful as they represent a common sequence of events and offer a model applicable to societal developments and collapses.

![Figure 3.1. The Adaptive Cycle.](image)

**Figure 3.1.** The Adaptive Cycle. The Y-axis represents a system’s potential resulting from accumulated resources, and the X-axis represents the degree of connectivity between variables. The fore loop (in red) is the development loop, which operates on an incremental time scale loop and is notable for its accumulation of capital and stability. The back loop (blue) of release (Ω-) and reorganization (α-) marks a more difficult time for the actors, with uncertainty as its key characteristic (modified from Gunderson and Holling 2002:34).
<table>
<thead>
<tr>
<th>ADAPTIVE CYCLE</th>
<th>CHARACTERISTICS</th>
<th>ASSOCIATED CONCEPTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>r-phase</td>
<td>rapid movement into uninhabited or sparsely populated landscapes, rapid population growth, new technologies and food acquisition strategies</td>
<td>niche construction refers to the process whereby “human beings initially adapt themselves to the dynamics of their environment, but over the long term societies’ needs are best served by modifications to the environmental dynamics” (Dearing et al. 2007:266; see also van der Leeuw 2007:215); colonized ecosystems, also known as artificial or cultural landscapes, result from “the deliberate and sustained alteration of natural processes that aim at ‘improving’ them according to society’s needs” (Weisz et al. 2001:123; see also Dearing et al. 2007:266; Fischer-Kowalski 2003; Haberl et al. 2011; Ponting 2007:67-69; Sieferle 2003; van der Leeuw 2007:214-215).</td>
</tr>
<tr>
<td>K-Phase</td>
<td>slow growth; conservation, accumulation, consolidation, and sequestration; intensification of production; increased management over, and investment in, a smaller number of key productive strategies; and, hypercoherence, which means there is a high level of integration</td>
<td>A risk spiral “is a dynamizing principle in the development of complex societies [wherein] the reduction of a particular risk leads to new types of uncertainty, which in turn require further (risky) innovations…[and a] permanent innovation pressure [that is] responsible for the restless transformations in complex societies” (Müller-Herold and Sieferle 1997:201-202); path dependency refers to a state in which people “cannot stop investing knowledge and effort into the system that they have modified, because any reduction in effort will allow natural dynamics to take over and transform the environment into one to which society is no longer adapted” (van der Leeuw 2007:215); sunk-costs or Concorde effects refers to a situation where agents “put more…effort into continuing with existing investments rather than exploring new ones,” which results in a tendency to undermine innovation (Cumming 2011:94; Janssen and Scheffer 2004; Walker and Salt 2006:87);</td>
</tr>
<tr>
<td>Ω –Phase</td>
<td>rapid, “creative destruction,” declining construction, abandonments, and the chaotic unraveling and release of resources</td>
<td>tipping points (Gladwell 2000), critical transitions (Scheffer 2009), or collapses (Diamond 2005; Tainter 1988); revolt refers to a situation where “a critical change in one cycle cascade[s] up to a vulnerable stage in a larger, slower one” (Holling et al. 2002:75).</td>
</tr>
<tr>
<td>α-Phase</td>
<td>increased diversity, migrations (mobility), innovation, and rapid restructuring</td>
<td>reorganization can lead to a phase change, which might involve reorganization and return to a similar form of system, a system more akin to an earlier form of organization (i.e., as is inherent in the concept of remember [Nelson et al. 2006:246]), a reorganization into a “degraded state” – which is a process known as a poverty trap – or a more dramatic regime shift (also referred to as a system or state flip) into an entirely new form of system, with an entirely different identity (Holling and Gunderson 2002; Scheffer 2009:357; Walker and Salt 2006); Exit refers to a possible “leaking” away of potential, and/or options as part of the shift from the Ω to α Phases (Holling and Gunderson 2002; Gunderson and Holling, eds. 2002; Nelson et al. 2006:409-411; Walker and Salt 2006:76-79).</td>
</tr>
</tbody>
</table>

Table 3.1. Characteristics of the four phases of the adaptive cycle and other key concepts relevant to the application of resilience theory (from Iannone 2014:6; see also Holling and Gunderson 2002; Gunderson and Holling, eds. 2002; Nelson et al. 2006:409-411; Walker and Salt 2006:76-79).
The following adaptive cycle phase descriptions are synthesized from Gunderson and Holling (2002:43-47) and Walker and Salt (2006:76-78).

_The “r-phase”: Exploitation_

The exploitation phase of the cycle, or “r-phase,” is marked by high socio-ecological resilience. Characterized by high levels of innovation, rapid population growth, and exploitation of resources, the population of the r-phase is flexible and can easily absorb change. As it exploits new opportunities and available resources, the r-phase system creates a diverse resource base with the ability to adjust to changes in the fledgling system. The system is still open and filled with redundancy, meaning a failure in one variable of the system does not necessarily result in a failure in others, as is the case in more interconnected and specialized socio-ecological system phases. As seen in Table 3.1, the systems are weakly interconnected and not well-regulated. R-phase societies prosper under high environmental and climatological variation, but operate over short time frames, as they are marked by a maximum rate of growth in the cycle.

The progression from the r-phase to the K-phase is incremental, marked by an accumulation of potential from the exploited and stored resources (Gunderson 2000:430). Adaptability is lost in favour of specialization and optimization. As management becomes strengthened and variables increase in interconnectivity, resources become locked in and innovation all but disappears.
The “K-phase”: Conservation

As the population draws nearer to the conservation phase, or “K-phase,” the system stabilizes and reaches its zenith. However, this stability is only ensured for a predictable set of parameters, as the society becomes fixed, no longer retaining the flexibility of the r-phase (Middleton 2012:266). Adaptation becomes difficult and the population becomes trapped by its own stability. As Holling (2001:394) states: it becomes “an accident waiting to happen.” The K-phase is characterized by a slow growth in population, with focus on increased management, consolidation, and intensification. No longer subject to external variability, the goal of K-phase systems is to eliminate uncertainty and take control of variables. As the process of integration and increasing interconnectivity continues, the socio-ecological system becomes more rigid and less diverse, with little opportunity to respond to shocks within the system. The population eventually reaches a maximum carrying capacity, or the maximum amount for which their environment and resources can provide.

Marked by a continuous degradation of resilience, the K-phase is the most vulnerable phase in the adaptive cycle. K-phase societies tend to exist over long time-spans and operate on larger spatial scales. Although the K-phase has the highest specializations and highest efficiencies, with change kept to a minimum and redundancies eliminated, the system only becomes increasingly stable over a decreasing range of conditions (Walker and Salt 2006:85, 87). Capital reaches a standstill as the system continually invests in existing processes rather than exploring new innovations. Collapse becomes an inevitability and the likelihood of release increases the longer the phase
endures. This means that as the phase continues it takes smaller and smaller perturbances to upset the balance of the socio-ecological system and drive it into the release phase.

*The “Ω-phase”: Release*

In resilience theory, an “Ω-phase” collapse, prompted by high entanglement and connectivity, is the result of perturbance acting on a brittle system, bringing on a rapid release of accumulated resources. When this release happens, due to the nature of the population’s entanglements, the collapse “cascade[s] rapidly through the over-connected system” (Gunderson 2000:430). The disturbance exceeds the system’s threshold and breaks apart its web of interactions. The system and its entanglements essentially unravel, with weakened regulations and broken connections. Termed “creative destruction” by Schumpeter (1950), this release phase creates a conduit for innovative and adaptive reorganization. Transition to the next phase is rapid, as options open and the population of the system reacts to the system’s failure.

*The “α-phase”: Reorganization*

Following the Ω-phase, the society attempts recovery, using the released capital of the Ω-phase as a basis for renewal. In the “α-phase,” the system becomes extremely vulnerable to changing stabilities in the environment as it tries to reorganize (Gunderson 2000:430-431). The reorganization phase sees an increase in mobility and in the diversity of responses to perturbances. Like the r-phase, the reorganization phase has loose connections, increased innovation, and rapid restructuring (Gunderson and Holling 2002:46). The transition to this phase from the release is swift. Options open up for the
system and small events can have a large impact on the future structure of the system. The potential is extremely high due to the skills and experience maintained after the conservation phase that may help shape the system’s new identity. During this chaotic phase, there is no stable equilibrium and the system becomes unpredictable. However, like the r-phase, the α-phase is resilient due to the newfound flexibility and adaptability of the socio-ecological system caused by the released capital.

According to Gunderson (2000:432), there are three classes of response to a release. The first option I have termed static expectancy, which refers to the expectation that the system will return to its previous state, and thus the population takes no action. The second, termed dynamic restructuring, refers to attempts by the population to force the system to return it to its former stability. In this scenario, the actors take an active role in rebuilding the system to its former state. The third option is dynamic innovation, wherein the population adapts to the new system. The actors become flexible and are able to change the system to better fit the new variables. These responses are otherwise termed “phase change,” “poverty trap,” and “regime shift,” respectively, within resilience theory (Iannone 2014:6; see Table 3.1), but are put into more cohesive terms for the sake of this thesis, and to clarify the meaning behind the term while removing the inherent vivid and biased imagery of a term like “poverty trap.” In all cases, diversity, flexibility, and adaptability become the most important tools for survival, as managing resources under the assumption of ecological predictability results in an increase in vulnerability and a loss in resilience (Gunderson 2000:433, Redman 2005:72). This phase is usually short lived, with the system failing and undergoing another reorganization phase, or succeeding
and advancing quickly into the r-phase, where, once again, the system begins renewed exploitation of its resources.

**Characteristics of Resilience**

<table>
<thead>
<tr>
<th>CONTINUA OF VARIATION</th>
<th>RESILIENCE IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility to Rigidity</td>
<td>Over time there is diminished ability to change direction, to carry out controlled transformations.</td>
</tr>
<tr>
<td>Diversity to Uniformity</td>
<td>Functional diversity refers to the different functional groups that comprise a system, with these groups exhibiting response diversity (different capability to respond to perturbances). Declining functional and response diversity over time leads to diminished resilience (c.f., Nelson et al. 2011).</td>
</tr>
<tr>
<td>Innovation to Conformity</td>
<td>Systems move from having a significant capacity to learn, adapt, experiment, and embrace change, to being exemplified by strong calls for subsidies and “business as usual” on the part of dominant individuals and institutions.</td>
</tr>
<tr>
<td>Openness</td>
<td>This refers to the ease with which ideas and people are able to move into and out of a system, with systems being too open or too closed being less resilient, because they are always in a state of transformation, or have a diminished capacity to receive innovations.</td>
</tr>
<tr>
<td>Significant Reserves to Diminishing Reserves</td>
<td>Over time, as a result of strategies of intensification, there tends to be fewer resources in play, and most resources tend to get “locked up,” meaning they are more tightly controlled, and more expensive.</td>
</tr>
<tr>
<td>Tight Feedbacks to Loose Feedbacks</td>
<td>Over time, systems start to see an increase in response times as a result of growing complexity, which makes the system as a whole less resilient.</td>
</tr>
<tr>
<td>Redundancy to Top-Down Control and Management</td>
<td>Redundancy and overlap in governance and institutional structures makes a system less specialized, with the various components being less reliant on each other, and hence more resilient during times of stress. Over time this flexibility gives way to a greater degree of conservatism, with incentives being provided to inhibit change, and there is ever-increasing command and control, and a growing emphasis on process, which manifest itself in more rules, regulations, and greater adherence to procedure.</td>
</tr>
<tr>
<td>Intermediate Levels of Modularity to Too Much, or Limited Modularity</td>
<td>Intermediate levels of connectivity, as in modular systems with various subcomponents that exhibit tight interactions, but are more loosely connected to each other, have higher levels of resilience “because the system is neither isolated from changes or perturbations nor overwhelmed by them” (Cumming 2011:138).</td>
</tr>
<tr>
<td>Significant to Diminished Social Capital</td>
<td>Over time there is a diminished capacity for systems to exhibit collective action in the face of perturbances, as exemplified by effective leadership, well-developed social networks, and overall trust.</td>
</tr>
<tr>
<td>Resilience-Positive to Resilience-Negative Efficiency</td>
<td>Some efficiency is useful, particularly if it conserves human or natural resources, but over time there is a tendency for systems to stop taking into account the secondary effects of efficiency, and because of the elimination of redundancies and emphasis on a specific range of values and interests (i.e., an “optimal” condition for a particular ecosystem or organization), there is a diminished capacity for response diversity, resulting in a dramatic decline in flexibility, and hence resilience.</td>
</tr>
</tbody>
</table>

Table 3.2 contains characteristics that make for resilient or vulnerable socio-ecological system (Iannone 2014:7). By examining the characteristics and applying them to the case studies, and by studying the epicentral structures, stakeholders, and functions, we can build an archaeological picture of resilience, and how this changed over time.

**Panarchy**

Panarchy is an interdisciplinary, cross-scale, and dynamic theory that articulates the processes existing within complex socio-ecological systems (Holling and Gunderson 2002:5, 21; Walker and Salt 2006:89). It is important to remember that the adaptive cycles are active at all scales of analysis – from a single farmstead to an entire region. Panarchy examines the hierarchy of the interconnectedness of these multiscalar socio-ecological systems. Failure to plan for cross-scale effects – for example, if one farm fails, what it might mean for the broader community – is a common reason for system failures (Walker and Salt 2006:88-91).

**ENTANGLEMENT THEORY**

Ian Hodder’s (2012) *Entanglement Theory* shifts the gaze away from how “things” make a society possible (i.e., their function), towards an examination of the idea of “things,” and the dependent relationships between humans and things. His 2012 volume, *Entangled*, develops a theory that bridges the gap between human-centeredness and thing-centeredness, addressing how humans and things form dependent relationships. It complements resilience theory in its basic tenets, but with a specific emphasis on the examination of human-thing relationships that is specifically aimed at archaeology. It therefore creates a more complete framework from which archaeological and historical
systems can be examined. More complex societies, that is socio-ecological systems with more facets and interdependent relationships, tend to be more entangled.

In broad terms, entanglement theory holds that humans depend on things, things depend on other things, and things depend on humans. Hodder (2012:9) defines “things” as “temporary bundles of matter, energy and information” with important, defining characteristics that one must understand to make sense of entanglement theory. “Thing,” according to Hodder (2012:7-9), is a very general term. A “thing” must have presence and duration, even a brief one, but can be as abstract as a thought or sound. Entanglements can occur with the intangible and with abstractions such as thoughts, ideas and ideologies, and institutions (Hodder 2012:120). The characteristics of a thing are that (Hodder 2012:3-7):

- It does not exist in a vacuum; it is not isolated and is dependent on humans and other things. Things depend on and are connected to humans, are part of interrelated ecosystems, are affected by other things, and are dependent on a wider social context;
- It is assumed that things are stable and fixed – “inert” – but, in large part due to their lack of isolation, they are dynamic, changing over time or with force acting upon them;
- Different things age differently over time; a sound is usually short-lived while geological processes happen over a long period of time. In terms of an archaeological example, stone stands the test of time while, in all but perfect conditions, wood is not preserved.
- When the human mind becomes accustomed to them, things can often be overlooked, perceived as “non-things,” just like the eyes ignore the nose, the mind can ignore things it cannot see or things that it perceives as ubiquitous;
- Due to ignoring things, things have an inherent “forgetness” for humans. In particular, we forget these characteristics of things.

Dependent Relationships

*Human-Thing*. Human dependence on things is a deeply engrained relationship in which things provide a source of identity and empowerment to humans. However, as
much as the relationship is enabling, the dependence is also constraining, as humans find themselves unable to disengage from things that they rely on for their human identity. Vulnerability for humans stems from dependence on ephemeral or shifting things. Therefore, humans, seeking out stability, spend as much time trying to escape from thing-dependencies as they do being identified by them. These dependencies are not inherent within the nature of a thing; rather, they are inherent in the relationship between humans and things.

**Thing-Thing.** Hodder (2012:42-44) outlines six forms of connections in thing-thing dependence: 1) “production and reproduction,” where materials and tools are linked through the processes of production; 2) “exchange,” often in the form of gifts, where a link and associated histories and memories are created; 3) things becoming related through “use,” such as the hammer becoming associated with the nail; 4) “consumption” of things by social actors creating dependence between items; 5) joint “discard,” where things are associated with one another through common histories and being discarded together (e.g., the parts of a meal or the sweepings around a hearth); and, finally, 6) “post deposition,” where things are held together by flows of energy, matter, information, and human dependencies. The key points of thing-thing dependence is that these connections are heterogeneous, the threads in the network are extensive, many connections are invisible to their social actors, and the open nature of the system creates uncertainty (Hodder 2012:48).

**Thing-Human Dependence.** In their dependence on their creators, things also form relationships with humans, as they depend on humans for their creation, maintenance, and their life histories (Hodder 2012:64). Things have a primary agency, not due to
intention, but to having lives and interactions, and they also have a direct impact on human lives (Hodder 2012:68). Humans get drawn into more intensive labour relations in order to keep the things that are wanted by maintaining and/or reproducing them, continually investing in a system in order to maintain their anthropogenic environments.

*Human-Human.* It is human nature to form dependences with one another. Hodder does not discuss in particular detail “human-human” dependences. However, this relationship is crucial for my thesis. Human-human entanglements stem from the human-thing, thing-thing, and thing-human dependences, as entanglements with things are due to, or act as an extension of, our human-human dependences. Human identity and statuses, which are expressed through things, are for the benefit of other humans, and humans depend on things to do what they cannot (Hodder 2012:210-211).

*Entanglement.* Entanglement is a combination of all four types of dependence, with all these dependences being both enabling and constraining (Hodder 2012:88). These dependencies create a “double bind” for humans, entrapping them, as they depend on things that depend on them. Dependence can be “productive and enabling,” meant for enhancing human life as we produce things and relationships, but dependency is “constraining and limiting,” as we are limited by the dependency on other humans or on things. The dependence, which produced the relationships, can lead to increasing tension and limits, which require more investment to overcome. This is why entanglement is about dependence and dependency (Hodder 2012:88-89). We become locked into a type of “path dependency,” investing and caring for things and relationships, which leads us to more entanglements. It is in the nature of things to lead to eventual “entrapment,” as they must follow a particular order of events – e.g., creation must come before destruction,
and maintenance is needed throughout a thing’s life cycle because it decays over time (Hodder 2012:59). Entanglement becomes an inevitability, then, when any sort of relationship is engaged, and entanglements do not necessarily have to be of physical need, but could be of sentimental connections or ideological ties.

**Tying Entanglement Theory to Resilience Theory**

As stated previously, entanglement creates a bridge between archaeology and resilience theory, given that several concepts overlap between the two theories. Entanglement theory shares similar ideas with the adaptive cycle, as well, as it emphasizes increasing entanglements over time until a catalyst creates an untying of entanglements in reaction to an event (Hodder 2012:89, 166). Both theories address the concepts of spatial resilience, niche construction, path dependency, risk spirals, and sunk cost effects (Iannone 2014:6; see Figure 3.2).

The concept of spatial resilience is particularly important for the study of epicentres because spatial resilience means that the core of a physical space is the most entangled, while the edges are the least. In particular, the most significant unraveling of entanglements can be accomplished by starting in the core. As more complexity equals more entanglements, the epicentre, being the most complex area of the state, is extremely dependent on the success of the infrastructure. The people located within the epicentre are also more entangled with the system and the epicentre than those that live outside it (see Figure 3.2; Hodder 2012:166; Iannone 2014:6).
Figure 3.2. Simplified visualization of spatial resilience (see Hodder 2011:166).

Human society is transformed and restricted by its dependence on things. In other words, the vulnerability, resilience, and progression through the phases of the adaptive cycle are tied to the socio-ecological system’s relationships and entanglements. The relationship between humans and things is unstable, which leads to constant untying and fixing. With this increasing complexity in the r- and K-phase comes an increasing rate of change, as change can be initiated by events within the entanglement from the tight feedback loops. Untying of entanglements occurs when the system crosses a threshold and adjusts in response to perturbances. The more entangled a society becomes, the more likely the release (Ω-) phase is triggered. This happens because greater entanglements lead to diminished resilience as the actors become increasingly dependent on a larger number of relationships and other actors, leaving them vulnerable to perturbation that could come from an increased number of relationships in the system.

Entanglement theory engages the material evidence with resilience theory and the idea of vulnerability in past societies. In the following section, the methods used to
acquire data in order to assess shifts in epicentral entanglement and resilience are addressed.

**METHODS**

*Application of Theory*

It should be noted that this application of resilience and entanglement theory is relatively new. As such, this thesis, in part, has a goal of testing and determining the usefulness of this analytical approach. In the conclusions, the strengths and weaknesses of using this method to study epicentral collapse will therefore be addressed.

First, using the data collected in the field, and through library research, tanglegrams (i.e., webs of entanglement) (see Figure 3.3) are drawn for each epicentre in order to illustrate the number of connections and degrees of entanglement between epicentral activities, stakeholders, and buildings/spaces. Measurement of entanglement is mostly qualitative, with an emphasis on the quality of the entanglements, but there is a degree of quantitative examination in these comparisons. For example, the ruler has a greater number, and higher level, of entanglements with the epicentre than the merchant class does. The degree and number of the dependencies will reveal who or what is most vulnerable in each state. As we know the circumstances surrounding the collapse of each state, examining the network of entanglements can show how a failure cascades through the system, and what aspects of the socio-ecological system are most affected by other actors.
Figure 3.3. An example of a tanglegram by Ian Hodder, with the arrow pointing towards the aspect that another depends on, examining the entanglement of clay at the archaeological site of Çatalhöyük. For example, labelled above, eggs are dependent on birds and vice versa (modified from Hodder 2011:181).

Next, adaptive cycles are applied to each individual epicentre to set a broader spatial and temporal context for the tanglegrams, and to study their history of resilience. The study will start with their r-phase formations and end with post-charter reorganizations, with particular attention paid to the K-phase, and examination of the vulnerabilities of the late K-phase, when these epicentres were at their height. For each case study, crossed thresholds and key catalysts for release are identified, when possible, as well as relevant associated concepts (see Table 3.1).
The r-phase, being associated with the birth and expansion of new societies, archaeologically and historically, can be applied to the emergence of state formation in each region of focus. The layperson might recognize an r-phase socio-ecological system as an early community of pioneers or innovators building the foundations for growth. Judging from the r-phase characteristics of rapid growth, exploitation of a diverse resource set, and a high level of innovation, we can expect to see an increase in and a variety of construction projects; r-phase systems might be in evidence when there are a diversity of construction materials, different styles of architecture, high mobility, and varied construction techniques. However, the structures would likely be modest in size compared to the later K-phase.

If there is ever a “golden age” in the history of a state, then it is almost certainly the state’s K-phase. In archaeological evidence, there is a notable drop in diversity and innovation, meaning the structures and other physical evidence will exhibit greater conformity through the use of similar materials, themes, and styles. K-phase societies will take up a larger space and have more monumental structures and more complex infrastructures. The K-phase is the phase of monumentality, of the greatest wealth, and of slow growth. Expansions, of course, may still continue, and new innovations may appear, but on the much smaller and slower scale than the previous r-phase.

In the chaotic Ω-phase, some of the most adversely affected aspects of the epicentre are construction projects and infrastructure maintenance, which may fall into disrepair (McCloud 1995:78). Structures and settlements are sometimes abandoned. Historically, the socio-ecological system loses its power and significance. There can be several failures across the system, not just of one aspect, but of many, due to the high
interconnectivity, specialization, and lack of redundancies in the K-phase system.

Historians and archaeologists would recognize this as a period of “decline” or “collapse.” Historically, the α-phase follows a collapse or decline. However, it should be noted that collapse could happen on varying scales, requiring a major or only minor recovery. New groups may appear and seize control and novelty is the order of the day (Gunderson and Holling 2002:45-47; Walker and Salt 2006:78). Archaeologically, the reorganization phase is not always characterized by large construction projects or expensive endeavours. Depending on the society or system’s path choice, there may be an attempt to repair old infrastructures, or those infrastructures may be replaced.

Drawing on the tanglegrams and adaptive cycles, the last step of the method is applying the various continua of resilience (see Table 3.2) to the data sets, with the goal of measuring the resilience of each epicentre at certain points in the different phases of the adaptive cycle. Specific elements of the variables are addressed, such as which resources became locked up over time, and the aspects of diminishing social capital. As a result, conclusions will be drawn about the high level of entanglement over time, how this created a loss of resilience, and how these vulnerabilities were the cause of a multi-faceted collapse triggered by a perturbation in the system.

Data Collection

The data for this thesis comes from fieldwork, as well as primary and secondary sources, inscriptions and surviving historical accounts, and material derived from archaeological studies. The methods for data collection during fieldwork included site visitations, accessing collateral evidence through museums visits and conversations with
local scholars, acquiring information from local on-site signage and other sources not widely available, and literature reviews. Site visitations were documented through both notes and photographs. This data was used to expand upon and confirm the knowledge already gained from articles and books. In particular, at each site I focused on documenting and photographing construction materials, architectural and decorative features, spatial organization, and specific structures. As this research was comparative, engaging with the primary data through “data proximity” was necessary (Drennan and Peterson 2002). Visiting the sites created more holistic and equivalent datasets for comparison. This approach also allowed for more complete tanglegrams to be created for each site, which in turn facilitated the delineation of differences and similarities between the case studies. Throughout the process of data collection, I strove for data equivalency between my case studies, as some features and sites have not been studied or documented as well as others (which, in and of itself, confirms the efficacy of the site visitation methodology).

CONCLUSIONS

Using the theories outlined above, my thesis examines the Southeast Asian epicentres of Sukhothai, Angkor, and Bagan to better understand causes for collapse. Resilience theory explains epicentral vulnerabilities, the causes of collapse, and helps us to examine advancement through the adaptive cycles. I use entanglement theory to examine resilience and vulnerability by looking into dependences and investments within the epicentre. Applying these theories involves drawing tanglegrams for each epicentre, applying the adaptive cycle to each epicentre’s history – from the r-phase to $\alpha$-phase – addressing each phase’s most significant continua of variation in resilience terms, and
determining the vulnerability issues that led to collapse. The datasets were gathered through library research and fieldwork, the latter of which not only helped create more equitable datasets, but also allowed me to make more nuanced comparisons between the case studies.

Finally it is important to address the innovative nature of the analytical methods of this thesis, specifically the application of concepts from resilience and entanglement theories. This thesis, in addition to examining broader charter state collapses, acts as a test of these heuristic devices through the more specific study of epicentral collapse. In the next chapter I will present the data collected from fieldwork and research on Angkor, Bagan, and Sukhothai. It is to these datasets innovative analytical tools will ultimately be applied.
CHAPTER 4: DATA

Angkor, the largest centre of the three case studies, saw a succession of rulers, quite often usurpers, from 802-1431 CE. It was common practice for each ruler to build a state temple, an ancestral temple, and a water feature, usually a baray, to establish and legitimize their claim to the throne, particularly through the medium of religion. The Burmese Empire at Bagan, lasting from 849-1287 CE, was a Buddhist state where the rulers legitimized themselves through the act of accumulating merit. This idea led to monumental constructions of temples and created a strong link between the state and the sangha (monasteries), the former presenting the latter with tax-free land and labour. The last case study, Sukhothai (1238-1450 CE), was a briefly-reigning Buddhist state in Thailand. Once a vassal city of Angkor, Sukhothai claimed its independence and functioned as an agrarian state for approximately two centuries.

Fieldwork helped provide a means to flesh out the comparative study of these three charter state epicentres and the actors in their systems, including their epicentral activities, stakeholders, who were the investors and maintainers of the epicentre, and structures. In the following chapter, each facet will be examined over time to note changes and the nature of the relationships between them. This study aims to be as complete as possible; however, if there is no information on certain aspects, only inferences can be made.
ANGKOR

General Information

Figure 4.1. Extent of the Khmer Empire around 1200 CE at its widest range (based on Coe 2003:129).

Nature of the Epicentre. Coe (2003:97) outlines traits of the Classic Angkor civilization, which lasted from approximately 802 CE to 1327 CE. These traits are:

- “A universal monarch as head of an imperial state
- The capital of the empire almost always based in Angkor
- Hinduism and/or Mahayana Buddhism as the state religion
- Religious architecture primarily in stone (sandstone and laterite) rather than wood
- State and ancestral temples
- Worship of the linga
- Prasats (shrine towers) housing images of the gods, often arranged in quincunx [representing Mount Meru] and supported by stepped pyramids
- Massive and extensive public water works, including canals and reservoirs (barays)
- A network of highways, causeways, and masonry bridges
- Inscriptions in Sanskrit, as well as Khmer.
- Iconography primarily Hindu, mainly derived from the epics and from the Puranas’

It was customary after Indravarman I (877-889 CE), who established the standard for the Khmer Empire, for each new Angkorian ruler to build a water work, an ancestral temple, and a state temple, in that order (Coe 2003:107). The rulers of Angkor implemented projects of urban development, usually the construction of new temples, with a focus on expanding Angkor to legitimate their claims to the throne (Bentley 1986:282). Temples themselves were high-density nodes that became anchoring elements for the empire (Evans et al 2013:1-4). During the tenure of Suryavarman II (1113-1150 CE) and Jayavarman VII (1181-1219 CE), Angkor was at its height, exerting control over 420,000 km² of land (Fletcher 2012:300). Angkor’s Golden Age was a time of peak population, with an estimated 1 to 2.5 million people living in the empire (Aung-Thwin 1990:54-55; Evans et al 2007:14277; Groslier 1979:161-202).

Recently, surveys have been done to provide a more complete picture of Angkor. These have included AIRSAR, airborne imaging radar which can penetrate cloud cover, and LiDAR, airborne laser scanning which can penetrate the dense foliage of the tropics to map the landscape beneath (Evans et al. 2007; Evans et al. 2013; Fletcher and Pottier 2002:26-27). The LiDAR survey has revealed evidence of city blocks with occupation mounds and man-made ponds around central monuments (see Figure 4.3). The formalized urban space continues beyond the central area and extends over 35 km², becoming less ordered as one moves away from the epicentre. There is also increasing orthogonal organization of the settlement pattern over time as a result of greater centralization and state complexity (Evans et al. 2007; Evans et al. 2013).
Figure 4.2. Map of Angkor with the complex of Angkor Thom in the left-hand corner. Note the state temples are central for each complex and massive barays are usually outside the centre, with walls and moats surrounding successive epicentres (modified from canbypublications.com).

Figure 4.3. Lidar survey of Angkor with Angkor Thom in the centre (indicated in green) and Angkor Wat on the bottom (indicated in blue). Note the occupation mounds within these epicentral complexes (modified from Evans et al. 2013).
# Rulers of the Khmer Empire

<table>
<thead>
<tr>
<th>Name</th>
<th>Dates</th>
<th>Notable Constructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jayavarman II</td>
<td>802-835 CE</td>
<td>Roluos, Ak Yum</td>
</tr>
<tr>
<td>Jayavarman III</td>
<td>835-877 CE</td>
<td></td>
</tr>
<tr>
<td>Indravarman I</td>
<td>877-889 CE</td>
<td>Indrataka Baray, Preah Ko, Bakong</td>
</tr>
<tr>
<td>Yasovarman I</td>
<td>889-900 CE</td>
<td>Phnom Bakheng, East Baray, moved epicentre to Yasodharapura</td>
</tr>
<tr>
<td>Harshavarman I</td>
<td>900-923 CE</td>
<td>Baksei Chamkrong, Prasat Kravan</td>
</tr>
<tr>
<td>Isanavarman</td>
<td>923-928 CE</td>
<td></td>
</tr>
<tr>
<td>Jayavarman IV</td>
<td>928-941 CE</td>
<td>Lingapura, Prasat Thom, Rahal Baray, moved epicentre to Koh Ker</td>
</tr>
<tr>
<td>Harshavarman II</td>
<td>941-944 CE</td>
<td></td>
</tr>
<tr>
<td>Rajendravarman II</td>
<td>944-968 CE</td>
<td>Pre Rup, East Mebon, repair of East Baray</td>
</tr>
<tr>
<td>Jayavarman V</td>
<td>968-1000 CE</td>
<td>Ta Keo, Phimeanakas</td>
</tr>
<tr>
<td>Udayadityavarman I</td>
<td>1001-1002 CE</td>
<td></td>
</tr>
<tr>
<td>Suryavarman I</td>
<td>1002-1049 CE</td>
<td>West Baray, palace (wood), Southern and Northern Khleangs, West Mebon, Preah Vihear</td>
</tr>
<tr>
<td>Udayadityavarman II</td>
<td>1050-1066 CE</td>
<td>Baphuon, completion of West Baray and West Mebon</td>
</tr>
<tr>
<td>Harshavarman III</td>
<td>1066-1080 CE</td>
<td></td>
</tr>
<tr>
<td>Jayavarman VI</td>
<td>1080-1107 CE</td>
<td>Phimai, Phnom Rung, Phnom Wan</td>
</tr>
<tr>
<td>Dharanindravarman I</td>
<td>1107-1113 CE</td>
<td></td>
</tr>
<tr>
<td>Suryavarman II</td>
<td>1113-1150 CE</td>
<td>Angkor Wat, Beng Mealea, Banteay Samre</td>
</tr>
<tr>
<td>Dharanindravarman II</td>
<td>Between 1150-1177 CE</td>
<td></td>
</tr>
<tr>
<td>Yasovarman II</td>
<td>Between 1150-1177 CE</td>
<td></td>
</tr>
<tr>
<td>Tribhuvanadityavarman</td>
<td>Approx. 1177-1181 CE</td>
<td></td>
</tr>
<tr>
<td>Jayavarman VII</td>
<td>1181-1219 CE</td>
<td>Preah Khan, Ta Prohm, Angkor Thom, Terrace of the Elephants, Terrace of the Leper King, Neak Pean, Jayatataka Baray</td>
</tr>
<tr>
<td>Indravarman II</td>
<td>1219-1243 CE</td>
<td></td>
</tr>
<tr>
<td>Jayavarman VIII</td>
<td>1243-1295 CE</td>
<td>Modifications of Buddhist monuments</td>
</tr>
<tr>
<td>Indravarman III</td>
<td>1296-1308 CE</td>
<td></td>
</tr>
<tr>
<td>Shridrajayavarman</td>
<td>1308-1327 CE</td>
<td></td>
</tr>
<tr>
<td>Jayavarmadiparameshvara</td>
<td>1327-? CE</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1. The known rulers of Angkor, the dates of their reigns, and notable constructions. Some dates are uncertain (see Coe 2003 and Higham 2001).

**Nature of Dataset.** The five major sources for the study of Angkor are the writings of Chinese ambassador Zhou Daguan in 1296 CE, the bas-reliefs at various architectural complexes, inscriptions, archaeological research, and French accounts of pre-colonial Cambodia in the 19th century. Zhou Daguan’s accounts of life at Angkor were written in 1296 CE, during Jayavarman VIII or Indravarman II’s reign, and have not been fully preserved. Bas-reliefs and inscriptions are biased towards religious stories and
military conquests, rather than daily life at Angkor, with some notable exceptions. Therefore, a combination of archaeological evidence and corroborating written texts are necessary to get a full picture of life at Angkor (Coe 2003:131; Higham 2001:133).

*Early Epicentres (802-944 CE)*

*Site Selection.* Situated in northwest Cambodia, Angkor was a forested upland kingdom strategically placed between the Kulen Hills in the north, both a place of religious significance and a source of sandstone, and the Tonle Sap, or Great Lake, 12 km to the south (Coe 2003:103; Mabbett and Chandler 1995:8-9). One of the important reasons behind choosing this area was the dependency on rice as the staple crop of Angkor. Acker (2012:40-41) suggests that Khmer kingdoms were often situated in areas of high water tables due to the need for high agricultural productivity to support the kingdom’s labour requirements.

*Activities.* At Angkor, early kingship was principally tied to the Hindu religion, as the ruler served as a representative of the gods on earth (Coe 2003:135). The rulers during this time were already powerful, Jayavarman II (802-835 CE) arguably being the first to create a unified kingdom in this region, and Jayavarman IV’s (928-941 CE) extent of control covering over 300 km² of land, over which he was able to enforce taxation and mobilize labour (Higham 2001:53, 72). Each ruler sought to appear more powerful than the last and structures, which increased in monumentality, served as representations of religious and political power. Legitimization of right to rule during the early period was primarily done through making ties with the divine, through associations with Mount Meru, the centre of the universe in Hindu cosmology, and commemorating ancestral
connections to gods such as Shiva (Coe 2003:101-102; Higham 2001:61-63).

Ceremonies, such as the one used to declare Jayavarman II the universal monarch, helped legitimize kingship (Coe 2003:99; Pym 1968:37). The building of ancestral temples worked to tie the ruler’s lineage to the gods, to legitimate his claim to the throne, and indicate his divine right to rule (Coe 2003:101; Higham 2001:61-62).

Figure 4.4. Layout of Preah Ko, built by Indravarman I as his ancestral temple and epicentre, which contained a wooden royal palace, a “lion throne,” and a golden pavilion (Higham 2001:61; modified from Glaize 1963).
Figure 4.5. The Bakong, Indravarman I’s state temple, was composed of a central court, five terraces representative of Mount Meru, a double moat, and contained elephant guardians, a linga, and acknowledgement of ancestors (Coe 2003:101; Higham 2001:62; modified from Glaize 1963).

Figure 4.6. Phnom Bakheng, an early epicentre and state temple dedicated to Shiva, constructed by Yasovarman I (877-889 CE). It is believed to be astronomically and religiously significant, the 104 smaller towers on the summit evocative of cosmic revolutions and its five towers representing Mount Meru, the construction thus connecting the ruler with the divine (Pym 1968:50).
Dancers and musicians entertained the ruler and court – and the general public for special events – in the epicentre and in royal processions (Higham 2001:62). Mundane daily activities, though not discussed in inscriptions or appearing on many bas-reliefs at this time, would have occurred in the epicentre, as the ruler was surrounded by attendants who would cook, clean, and take care of similar household matters (Coe 1961:72).

Other epicentral activities included the burial of the royal family, festivals, recording histories through inscriptions and embellishments, and the integration of the community. The wood asharams – or religious retreats – of Yasovarman I served as a way to connect the wider community through the vehicle of religion to the ruler himself and the epicentre (Coe 2003:102; Higham 2001:63).

Stakeholders. The rulers of this period were gaining central authority and became increasingly important from the preceding period at Funan and Chenla (Higham 2001:53-54). Many rulers were successful in increasing the power of the state and expanding the epicentres (Coe 2003:101-108; Higham 2001:70). The royal court also began to gain power, as its members could take administrative measures, such as establishing land boundaries. Elites and dignitaries could, and did, establish their own temples, which provided places of worship for the common people, tying them to the temples and the elites who built them. As a reward for loyalty, land was granted to elites and the royal family (Higham 2001:67, 89-90). The royal family was also important at this time for providing lineage for claims to the throne (Higham 2001:70). Spiritual masters, usually Hindu, were connected to the epicentre through their relation with the ruler and their legitimacy (Coedès 1968:110-111). Also worship in the epicentre during this time were royal astrologers, servants, and a myriad of entertainers, including dancers, singers, and
musicians (Higham 2001:62, 70). Domestic duties, such as cooking and cleaning, were carried out by common people who maintained royal establishments (Coe 1961:72).

Farmers, labourers, dancers, singers, and musicians were donated as gifts from the ruler (Higham 2001:62, 68, 71). Labourers included specialists such as bricklayers, masons, architects, and designers, and artisans included goldsmiths, bronze casters, full-time potters, salt-makers, boat-builders, blacksmiths, weavers, and miners (Higham 2001:69, 153). Merchants and traders were not mentioned in many inscriptions or shown in many bas-reliefs; however, they did exist at Angkor (Higham 2001:153). As mercantile and trade activities were less significant than agricultural activities at Angkor, traders had less of an impact on Khmer society, whose luxury imports were not a basis for the economy (Lieberman 2010:534).

Structures. The city walls encircled temple complexes built by successive rulers (Evans et al. 2013:1-4). From archaeological and historical evidence, we can note the early centres included water management features, palaces, religious and administrative structures, roads, and inscriptions (from which we get much of our information) (Coe 2003:101, 131; Higham 2001:61, 64, 133; Pym 1968:50). Redistribution through the epicentre brought tribute and labour to the royal treasury (Coedès 1968:110-111; Hall 1979:420). Palaces, elite and common residences, and secular structures were built with wood throughout most of Angkor’s history, though common residences were not typically located within the epicentre (Higham 2001:53, 57; Stark 2015:84).

Notably, during this early period, and particularly under the rule of Jayavarman II, the capital of Angkor was often relocated – from Hariharalaya (Roluos) 40 km upland to Phnom Kulen, then back to Hariharalaya. From 889-944 CE, Angkor’s capital continued
to move – from Hariharalaya to the region we now know as Angkor (Yasodharapura),
then 90 km northeast to Koh Ker (Lingapura) and back to Angkor (Coe 2003:103-106;

Figure 4.7. An example of brick constructions at the Roluos Complex, built by
Jayavarman II (802-835 CE) and expanded upon by Indravarman I (877-889 CE) and
Yasovarman I (889-900 CE).

Figure 4.8. Prasat Thom, Jayavarman IV’s seven-tiered pyramid and state temple at Koh
Ker, which housed a linga and acted as his epicentre (Coe 2003:199; Higham 2001:71).
At Hariharalaya, the barays and ancestral and state temples were constructed with brick, the ancestral temple acting as a legitimizing force through a link to the divine through lineage, and the state temple acting as the main temple and epicentre for the state (Coe 2003:106-107; Mabbett and Chandler 1995:186; Uchida et al. 2003:222). Sandstone began to be incorporated into Angkor’s structures during the 10th century. The sandstone blocks were transported by a waterway comprised of a canal and river from the Kulen Hills, 40 km north (Uchida and Shimoda 2013:1158-1162). However, not all religious structures were built of permanent materials – Yasovarman I built over 100 wood asharams across the empire (Coe 2003:102; Higham 2001:63). Some state temples may have also served as tombs for rulers – Phnom Bakheng was possibly the tomb of Yasovarman I, as a sarcophagus was discovered inside the complex (Coe 2003:106; Dumarçay and Smithies 1995:88; MacDonald 1987:91; Pym 1968:50; Sak-Humphry 2005). Notable barays include the Indratataka Baray (Yasovarman I) at Hariharalaya and the massive East Baray (Yasovarman I) at Angkor (Coe 2003:103, 106-107). These barays required maintenance and were prone to silting (Dumarçay and Smithies 1995:88).

*Figure 4.9.* The East Baray (now dry), constructed by Yasovarman I, measures 7500 by 1800 m, and the silting up of this feature may have been a reason behind the move from Angkor to Koh Ker (Dumarçay and Smithies 1995:88).
The Rise and Golden Age of Angkor (944-1219 CE)

Activities. Administration increased as the state expanded to its greatest area, requiring more stakeholders involved in administration, and possible structures for public viewing of administration appeared (Higham 2001:104-105). Monumentality continued to grow as well, culminating in the massive 12th and 13th century complexes that were representative of their respective rulers’ ritual and political power. In addition to religious connections, other ways to legitimize the right to rule included successfully performing sacred rituals, ceremonies, festivals, and inauguration events. Rulers also took measures, such as sending priests to take pilgrimages to holy shrines all over their kingdom and donating goods and creating infrastructure, to improve their standing in the eyes of the people (Higham 2001:74, 113; Stark 2015:86).

Buddhism at Angkor began to become significant during Rajendravarman II’s reign (944-968 CE), eventually becoming the primary religion of the ruler (Jayavarman VII 1181-1219 CE) and growing increasingly popular among the people (Hall 2011:192-193; Higham 2001:75). Libraries with religious manuscripts were also present in the epicentre, as were many important spiritual temples (Pym 1968:103). Structures in the epicentre, such as Jayavarman VII’s Bayon, contained the cults of the royal family and of the people, so they felt drawn to it (Coedès 1963:98). During this time, festivals, ceremonies, and games, as well as public justice, also saw increasing importance, with structures being built for viewing proceedings (Dumarçay 1991:41-42; Higham 2001:135). Servants and guards came and went within the epicentre, some providing the royal court with entertainment, others performing necessary daily tasks, such as cooking,
cleaning, tending to the health of the royal family, delivering messages, making repairs, and general maintenance (Higham 2001:81, 85).

There is some speculation in regards to burials in the epicentre, including debates over Angkor Wat’s (Suryavarman II’s state temple and epicentre) possible status as a burial site for Suryavarman II, and the Terrace of the Leper King built by Jayavarman VII. The Terrace of the Leper King is considered either a place of judgment or a place for cremation, based on the depiction of Yama (incorrectly referred to as the Leper King), who is the god of death (Coe 2003:125; Dumarçay 1991:42).

![Figure 4.10. Depiction of the Angkor Wat epicentral complex showing locations of bas reliefs and its westward orientation (modified from Glaize 1963).](image)

Over time, the people became increasingly connected to the epicentre through the creation of infrastructure, beginning with Rajendravarman II’s roads and shrines that connected people to Angkor proper, and culminating in Jayavarman VII’s extensive road systems, shrines, rest houses, and hospitals (Coe 2003:115; Hall 2011:196).
In addition to inscriptions, the bas-reliefs and sculptures of several epicentral constructions depicted various histories and propaganda, including military battles, religious scenes and figures, the ruler represented as a holy figure, and punishments and rewards for loyalty or disloyalty to Angkor (Coedès 1963:98; Higham 2001:114-119).
Stakeholders. Two of the most notable rulers of this period are Suryavarman II (1113-1149 CE) and Jayavarman VII (1181-1219 CE) (Higham 2001:112; Mabbett and Chandler 1995:103). Suryavarman II was one of Angkor’s most successful rulers, and was responsible for unifying the kingdom, re-establishing relations with China, invading Champa (central Vietnam) and defeating the Cham King, expanding the empire across Southeast Asia, and building Banteay Samre, Beng Mealea, and the Angkor Wat complexes (Coe 2003:116). Jayavarman VII (1181-1219 CE) successfully ascended to the throne after defeating the Chams, who had invaded the area of Yasodharapura (Angkor’s centre) during the rule of a less successful ruler, and became Angkor’s most prolific ruler (Coedès 1966:107; Higham 2001:120-121).

The royal court of this time was increasingly involved in administration and kingship, as evidenced by officials running the empire until Jayavarman V (968-1000 CE) came of age and rulers rewarding loyalties with gifts of land, titles, and royal favour.
The elite were still implementing construction projects to draw the favour of the ruler, the populace, and the religious sector (Higham 2001:76). Spiritual masters continued to hold sway with the rulers of Angkor during this time, and monks resided in monasteries funded by the ruler and elite (Coedès 1966:100; Coedès 1968:138).

Although not the focus of many embellishments and inscriptions, a few sources, such as the bas-reliefs at Angkor Wat, the Baphuon, and the Bayon, and a few inscriptions, give an account of the common people of the epicentre (Glaize 1963:69, 91-99, 121). The royal court required a large regiment of servants, guards, and entertainers, which came in the form of dancers, musicians, singers, and wrestlers (who might wrestle animals for entertainment) (Glaize 1963:121; Higham 2001:113). The servants of the royal household included fan bearers, pages and guardians of the bedchambers, doctors, porters, messengers, valets, fly-whisk holders, cleaners, cooks, clerks, maintenance workers, engineers, carters, and other attendants (Higham 2001:81, 85; Mabbett 1978:10). Elites, temples, and wealthy commoners, such as Chinese merchants, also had servants of their own, including cooks, waiters, retainers, officials and their assistants, and female dancers (Higham 2001:101, 123-129).

The common class was comprised of labourers, merchants, artisans, and farmers, but even these could ascend to significant importance, such as the architects who were increasingly needed as building projects grew in size and scope (Higham 2001:75). More labourers, artisans, and sculptors were also required for these massive projects (Glaize 1963:35). Farmers were increasingly needed, as inscriptions at Ta Prohm and Preah Khan indicate that Jayavarman VII required a combined 150,000 farmers to support them.
Most of the population of Angkor consisted of rice farmers who lived across the countryside (Coe 1961:72). Sometimes, however, farming communities would leave Angkor due to discontent (Mabbett and Chandler 1995:170).

Figures 4.13. Udayadityavarman II's (1050-1066 CE) state temple, the Baphuon, was a representation of Mount Meru with a central shrine of gold built to the east of the massive West Baray and was later included in the complex of Angkor Thom.

Figure 4.14. A portion of Banteay Srei, built by the elite Yajnyavaraha, an example elite contribution to the epicentre and the ideological system of merit (Higham 2001:80).
Structures. A city wall, distinct from the temple enclosures at Angkor Wat and Angkor Thom, was constructed at the peak of the Khmer Empire, effectively separating the inner epicentre from the rest of the urban sprawl (Evans et al. 2013:1-4). The main square of Jayavarman V’s (968-1000 CE) walled city was separated from irrigated fields, a marked difference from the previously integrated form at Hariharalaya (Dumarçay and Smithies 1995:90). Elites may have lived in the epicentre considering the elite nature of the epicentre and the discovery of occupation mounds using LiDAR (Evans et al 2013:2).

Figure 4.15. Front view of Phimeanakas, Jayavarman V’s and Suryavarman I’s state temple located on the north-south axis of Phnom Bakheng and the royal palace, showing a deliberate choice of layout (Coe 2003:112; Dumarçay and Smithies 1995:90; Higham 2001:95; modified from Glaize 1963).

Jayavarman VII (1181-1219 CE) built the massive epicentral complex of Angkor Thom, with a religious quarter in the centre and a royal quarter in the northeast (Stark 2015:90). The 3 km long walls with massive 23 m tall gates enclosed the older structures of the Baphuon, the Phimeanakas, and the palace, and included new constructions such as the Bayon, and two administrative terraces (Glaize 1963:103-106). The Terrace of the Leper King and the Terrace of the Elephants were significant in that these were non-religious, most likely secular structures that were made of permanent materials (Glaize
The palace, constructed of wood and serving a civil (rather than religious) purpose, was used by several successive rulers and was thus repeatedly embellished and maintained for centuries (Dumarçay 1991:40; Pelliot 1951:12). The palace was the home of the ruler, his wives and concubines, and the royal family (Dumarçay 1991:41-42).

**Figures 4.16 and 4.17.** Layout of Jayavarman VII’s state temple, the Bayon (above) and a portion of the Bayon (below). The external walls have bas-reliefs depicting the victories of Jayavarman VII, as well as daily activities, such as hunting, playing games, buying and selling at the market, cooking, and building a palace (Coe 2003:134; Higham 2001:121; modified from Glaize 1963).
The practice of each ruler of building new state temples, which housed the royal linga, continued during this period (Dumarçay and Smithies 1995:88). Angkor Wat, Suryavarman II’s state temple and epicentre, is the best known of the architectural complexes at Angkor, and one of the largest religious structures in existence (it is dedicated to the Hindu god Vishnu) (Higham 2001:115). Some of the finest pieces of artwork at Angkor Wat are the bas-reliefs. These depict the ruler and his court, military parades, religious motifs – such as Vishnu riding Garuda – punishments for harming Angkor and rewards for serving it, scenes from Hindu epics, and apsaras, the dancing heavenly maidens (Higham 2001:114-119). Ancestral temples, such as Preah Khan and Ta Prohm, which also acted as a monastery, were continuously built to legitimize each new ruler (Hall 2011:186; Higham 2001:124-125).

Figure 4.18. View towards the west, main gate from the top of Angkor Wat.
Figure 4.19. North side of Preah Khan, which Jayavarman VII dedicated to his father. In addition to Buddhist imagery, the complex contains depictions of Shiva, Ganesh, Vishnu, Brahma, and apsaras (Glaize 1963:173-179).

Figure 4.20. View of Ta Prohm. Another of Jayavarman VII’s notable building projects was the Ta Prohm complex (1186 CE), which contained a statue of his mother and honoured his family (Glaize 1963:141-144).

During this period, water management, tombs, and the royal treasury reached peak monumentality. The West Baray (Suryavarman I and Udayadityavarman II) was the largest reservoir at Angkor, capable of holding 80 million cubic metres of water (Coe 2003:113; Dumarçay 1991:40; Higham 2001:95-96, 103). According to some sources, the royal treasury of Angkor occupied several kilometres of land (Gerini 1905:382). Inscriptions were being written across the empire by rulers of this period (Higham 2001:111). There were six major roads, one in particular, which facilitated travel between Phimai (300 km away), and the epicentre (Hills 2014:145). Some, such as Coedès
(1958:68-85), believe Angkor Wat’s westward orientation indicates the function of Angkor Wat as a funerary temple to house the ruler’s remains after his death. However, others, such as Freeman and Jacques (2009:48), have pointed out Angkor Wat is oriented west due to its dedication to Vishnu, as west is his principle direction (Coe 2003:120). Major building efforts ceased in Angkor after Jayavarman VII’s reign, with the existing Bayon becoming the permanent state temple of the empire (Fletcher 2012:298).

Figure 4.21. A portion of the West Baray, begun by Suryavarman I (1002-1049 CE) and completed by Udayadityavarman II (1050-1066 CE).

Decline and Collapse (1219-1431 CE)

Activities. Although Angkor had already reached its peak during Jayavarman VII’s reign and started to decline, administration was still occurring in the epicentre where ordinary people could view the proceedings (Daguan 2007:34-35, 52). Legitimacy was still deeply linked to the state religion, ritual practice, and performance (Daguan 2007:35-37; Stark 2015:91) The rulers still had a façade of grandeur outside of residing in monumental constructions built by their predecessors, which included showing off their wealth and power in proceedings such as royal processions (Daguan 2007:52). Attendants and servants took care of daily domestic activities, which still included
cooking, cleaning, domestic administration, record keeping, keeping the royal family comfortable, protecting the royal family, writing official documents and records, and household maintenance (Daguan 2007:34-37, 41, 52). Upon death, the rulers were buried in the epicentre in towers, while the common people were cremated or their bodies were left to decompose and be consumed by animals (Daguan 2007:43).

**Stakeholders.** Several unsuccessful rulers led up to the complete abandonment of Angkor after the sack of Ayutthaya in 1431 CE – with the last mention of a ruler in 1327 CE (Higham 2001:138-139). During decline, the ruler still had relatively strong ties with the royal family, who were often appointed as officials, and with the religion, as the ruler was said to stop at a Buddhist stupa out of necessity and consult religious figures when making important decisions (Daguan 2007:36-37, 52).

During Zhou Daguan’s visit, the ruler had 1000-2000 servants, and 3000-5000 females – including concubines – serving him in the epicentre (Coe 1961:72). Servant women were the only ones allowed to go into the palace, and these women acted as guards, concubines, servants of concubines and the kings’s five principle wives, and palanquin carriers (Daguan 2007:37, 52). The ruler also employed various officers, musicians, and entertainers (Daguan 2007:52). Presumably, the household still employed numerous cooks, cleaners, clerks, and attendants, though Daguan was not able to view much of the daily domestic activities of the palace (Daguan 2007:34). Merchants and traders of Angkor were usually female, according to Daguan (2007:45), and they dominated the marketplace, though Chinese merchants were a sizeable minority. Doubtless there existed artisans within the epicentre during this time, as well, seeing as Jayavarman VIII embellished and modified existing structures (Higham 2001:133).
Structures. Epicentral movement had ceased after Jayavarman VII, and the epicentre during this time was still the Angkor Thom complex (Higham 2001:134). Prior to the attack on Angkor by the Thais from Ayutthaya, no more monumental constructions occurred and very few inscriptions were recorded (Higham 2001:138). The palace and terraces were still places for administration and ceremony, and the royal family and ruler still lived within the epicentral complex (Daguan 2007:34-35, 52).

Jayavarman VIII was likely responsible for the destruction and modification of every image of the Buddha within the capital, changing the Buddhas to linga and rededicating the Bayon to Shiva (Coedès 1963:99; Higham 2001:121, 133). This was done despite the religion of the people being Theravada Buddhism (Daguan 2007:38; Mabbett and Chandler 1995:213). Jayavarman VIII embellished older buildings and maintained a level of magnificence; however, several pieces of infrastructure, such as the West Baray, were already falling into disrepair during his reign, the treasury was depleted, and warfare was constant, shrinking the landholdings of Angkor (Dumarçay and Smithies 1995:108; Mabbett and Chandler 1995:210-212; MacDonald 1987:61-62; Mishra 2010:27). Epicentral structures, such as temples, were still the tombs of rulers, though it is unclear if there were any other types of tombs in the epicentre (Daguan 2007:43).

In 1369 CE, Angkor was temporarily abandoned as the empire’s capital, a possible prelude to permanent abandonment less than a century later (Mabbett and Chandler 1995:212). Eventually, it is believed the capital was shifted to the Southeast – to the area of Phnom Penh – although Angkor remained an outpost for some time before final abandonment (Mabbett and Chandler 1995:212-213).
Shift to Phnom Penh (after 1431 CE)

Theories of Collapse. Scholars tend to agree that there is no one reason behind Angkor’s collapse, and the sack of Angkor in 1431 was merely a catalyst acting upon an already weakened system. Some scholars cite the humble sect of Theravada Buddhism as a cause for discontent simmering in the common population, one that criticized the extravagance of the ruler and the court (Briggs 1951:258-259; Mabbett and Chandler 1995:213). Vickery (1977:515) cites Angkor’s weakening system as a result of a shift of power from upland agricultural centres to coastal centres that were better suited for the rise in the importance of trade during this time. This was possibly a result of declining crop yields as high maintenance water management systems fell into disrepair and intensive agricultural practices damaged soil fertility (Groslier 1974:105). Recent studies have suggested environmental causations behind the move to the coast, particularly in the form of droughts associated with the Medieval Climate Anomaly (800-1300 CE) (Buckley et al. 2010:6748). Angkor’s success was dependent on the more predictable annual monsoons of the MCA, the end of which brought with it alternating periods of drought and heavy flooding that weakened the infrastructure Angkor. The Phnom Penh region was a more promising alternative as the inland agrarian centres failed. As an epicentre, it was able to gain advantage of the coastal trade routes to China and control the trade coming through the Mekong to the rest of inland Southeast Asia (Lieberman 2003:263).
**General Information**

![Map of Southeast Asia showing extent of the Burmese Empire around 1200 CE](image)

**Figure 4.22.** Extent of the Burmese Empire around 1200 CE (based on Aung-Thwin and Aung-Thwin 2012:90, 95; Lieberman 2003:91-92; modified from Wikispaces).

*Nature of the Epicentre.* The small walled city of Bagan was home to the royal family, senior ministers of the court, and guards (Aung-Thwin and Aung-Thwin 2012:80). The epicentre held a palace, temples, monasteries and their lands, some residences of elite citizens, and acted as a “showcase” of the kingdom. “The capital city was the seat of government – the religious, cultural, and ceremonial center of the kingdom – but not necessarily the heart of its economic resources. It was the conceptual and physical source from which political patronage and redistribution of goods and power commenced and the source from which merit flowed” (Aung-Thwin 1985:99-100). The
people who actually built the temples and palaces, however, did not reside within the epicentre (Aung-Thwin 1985:100). Bagan was packed with constructions, with the densest urban node in and around Bagan’s city walls (Hudson et al. 2001:48).

![Figure 4.23. Map of Bagan, including its epicentre within the city walls and notable constructions (modified from myanmartravelinformation.com).](image)

At its height, Bagan controlled more than 18,000 km$^2$ of irrigated land and 16,000 km$^2$ of rice paddies, the yield of which could feed a population of over one million people a year (Aung-Thwin 1990:52-57). However, the walled epicentre itself was only 1.4 km$^2$ and the urban area covered just over 100 km$^2$ (Aung-Thwin and Aung-Thwin 2012:80, 93). Aung-Thwin and Aung-Thwin (2012:93-94) estimate the peak population of Bagan at 400,000 people, with the greater empire estimated at a possible 2.5 million (Aung-Thwin 1990:54-55).
## Rulers of the Burmese Empire

<table>
<thead>
<tr>
<th>Name</th>
<th>Dates</th>
<th>Notable Constructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saw Rahan</td>
<td>956-1001 CE</td>
<td></td>
</tr>
<tr>
<td>Kyaung Phyu Min</td>
<td>1001-1021 CE</td>
<td></td>
</tr>
<tr>
<td>Anawrahta</td>
<td>1044-1077 CE</td>
<td>Manuha, Nanpaya, Shwesandaw</td>
</tr>
<tr>
<td>Sawlu</td>
<td>1077-1084 CE</td>
<td>Myinpyagu, Pahtothamya</td>
</tr>
<tr>
<td>Kyanzittha</td>
<td>1084-1111 CE</td>
<td>Shwezigon, Nagayon, Abeyadana, Ananda</td>
</tr>
<tr>
<td>Alaungsithu</td>
<td>1111-1167 CE</td>
<td>Thatbyinnyu</td>
</tr>
<tr>
<td>Narathu</td>
<td>1167-1170 CE</td>
<td></td>
</tr>
<tr>
<td>Naratheinkha</td>
<td>1170-1173 CE</td>
<td></td>
</tr>
<tr>
<td>Narapatrisithu</td>
<td>1173-1210 CE</td>
<td>Sulamani, Gawdawpalin, Dhammayazika</td>
</tr>
<tr>
<td>Htilominlo</td>
<td>1210-1234 CE</td>
<td></td>
</tr>
<tr>
<td>Kyazwa</td>
<td>1234-1249 CE</td>
<td></td>
</tr>
<tr>
<td>Uzana</td>
<td>1249-1254 CE</td>
<td></td>
</tr>
<tr>
<td>Narathihpade</td>
<td>1254-1287 CE</td>
<td>Mingalazedi</td>
</tr>
<tr>
<td>Kyawzwa</td>
<td>1287-1300 CE</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4.2. The known rulers of Bagan, the dates of their reigns, and notable constructions (based on Aung-Thwin 1985; Dumarçay and Smithies 1995; Hudson 2004).

**Nature of the Dataset.** Our sources of information for Bagan include inscriptions, copies of epigraphies, Chinese sources and texts, archaeological data, chronicles written in the colonial period, and folk histories (Hudson 2004:36). The verifiable inscriptions, unfortunately, only date back to 1113 CE. All earlier inscriptions exist as copies or are outside of their original context (Gutman and Hudson 2004:166). By themselves, the Chinese texts, chronicles, and folk histories are too untenable to give a trustworthy account of Bagan’s history. Unless there is archaeological evidence to support claims made by these sources, they must be taken with a grain of salt.

**Early Bagan (849-1044 CE)**

**Site Selection.** This region along the banks of the Irrawaddy River was continually occupied since the Palaeolithic, as the river valleys of Myanmar’s Dry Zone provided fertile soil and water sources (Aung-Thwin and Aung-Thwin 2012:30, 39-49). The Burmese speaking people of Bagan were likely already settled in this traditionally Pyu...
area by 849 CE (Aung-Thwin and Aung-Thwin 2012:80). Bagan’s location in a central area with surrounding mountains would have protected it from enemies on either side, and provided access to the southern coast. State-administered irrigation networks were created to exploit the rain-fed rivers that litter the area, creating a steady source of irrigation (Aung-Thwin and Aung-Thwin 2012:40). Another possible influence on site selection is Bagan’s location between three agricultural centres of production – Kyaukse, Minbu, and the Mu River Valley – which allowed aggregation of the rice from all resources (Aung-Thwin and Aung-Thwin 2012:80; Taylor 1999:164).

Activities. Although little is known about this time, with few trustworthy historical accounts, the early era of Bagan introduced the beginnings of many important traditions and growing centralization (Aung-Thwin 1985:161). By this time, the monarchy was already in place, though the first known rulers only appear in epigraphies in 956 CE, and Bagan was already growing steadily in power, size, and splendor (Aung Thwin and Aung-Thwin 2012:82; Lieberman 2003:91). Administration in this early period was carried out through both negotiating alliances with other chiefs and through coercion (Lieberman 2003:91). The rulers controlled the religion with the first sasana reforms and legitimization practices began during this time, providing a legitimate right to the throne through ability when lineage could not (Aung Thwin and Aung-Thwin 2012:82).

People were pulled in from surrounding areas to work on the epicentre and the many complexes in and outside of it; they were integrated into Bagan through their chiefs’ loyalties to Bagan (Aung-Thwin 1985:161; Lieberman 2003:91). Construction, maintenance, repairs, and likely domestic activities involved in serving the elite – though
there is little reference to them – were also important activities of the growing epicentre (Hall 2011:204). In the early period, Buddhism was the common religion of the people and monasteries around the epicentre were filled with local monks (Hall 2011:202). From literature and site visitations, it should be noted that funerary evidence is scant in the epicentre, which could be due to the prevalence of cremation across Southeast Asia (Mabbett and Chandler 1995:133.)

**Stakeholders.** Authority, power, labour, and resources were shared between the ruler and the sangha (Aung Thwin and Aung-Thwin 2012:82). Early rulers, such as Kyaung Phyu Min (1001-1021 CE), were noted for continuing the tradition of integrating the religion with the state, linking the epicentre with the Buddhist universe, and seeking recognition from China, the power of the region (Aung-Thwin and Aung-Thwin 2012:82). The elite, bureaucrats, royal family, and guards charged with the protection of the ministers and royal family lived within the city walls during this time. The majority of the common people, however, lived outside the epicentre (Aung-Thwin and Aung-Thwin 2012:80). Farmers and other non-elites, including labourers tasked with maintenance and construction of water management features and buildings, domestic attendants of the elite and royal court, soldiers, artisans, and merchants (foreign and local) tended to live outside the epicentre (Aung-Thwin and Aung-Thwin 2012:80-81; Hall 2011:204; Higham 2002:134; Lieberman 1987:167, 170). Many of the stakeholders lived some distance from the epicentre, as labourers, both hereditary slaves and free people, were imported from surrounding areas and the primary farmers were located in the main rice-growing regions (Aung-Thwin 1985:161; Lieberman 1987:170; Taylor 1994:164). Trade
at Bagan was not considerable, acting only as a supplement to the agrarian economy (Lieberman 2010:534).

**Structures.** Traditionally, it has been accepted that the wall enclosing the epicentre was one of the very first structures built at Bagan, and it was meant to separate the elite from the commoners (Aung-Thwin and Aung-Thwin 2012:80-82). The presence of guards within the epicentre may indicate that fortification was a function of Bagan’s walls (Grave and Barbetti 2001:85). The enduring structures of Bagan were almost entirely religious in nature, including stupas and Buddhist temples, with only very early structures exhibiting Hindu influence (Gutman and Hudson 2004:165). The buildings at Bagan were commonly built of plaster and bricks fired in a kiln, with over 3000 temples from this period being constructed primarily of brick (Aung-Thwin and Aung-Thwin 2012:92; Hudson et al. 2001:48).

Some features are absent from Bagan, such as ephemeral wood buildings that have not been preserved, including monasteries, houses of the elite, administrative buildings, outposts, and palaces (Aung-Thwin and Aung-Thwin 2012:92-93, 103; Grave and Barbetti 2001:83). Wood living quarters for the elite, royal family, and bureaucrats are known to have been constructed in and around the epicentre (Aung-Thwin and Aung-Thwin 2012:80). Roads were not as important at Bagan as at other early epicentres, with most transport focused on the Irrawaddy River (Gutman and Hudson 2004:170; Hills 2014:148). Water management, as well, existed on a much smaller scale, mostly existing in the form of small reservoirs (Marajh 2014:32). Religious institutions drew people to Bagan during this period, which enhanced the treasury of Bagan (Lieberman 1987:171). There is some evidence for roads and a moat surrounding the city walls, as noted from
fieldwork. Archaeology only points to inscriptions being created from the 2nd millennium onward. However, this is not an indication that there were no inscriptions in previous periods, but that no inscriptions from this period have been authenticated as such (Gutman and Hudson 2004:166).

**The Great Rulers and Late Bagan (1044-1234 CE)**

*Activities.* Anawrahta (1044-1077 CE), the first great ruler, enhanced the ideology and infrastructure of Bagan, and is cited as being the cause of the rise of Theravada Buddhism (Hudson et al. 2001:51). He also established the tradition of soldier-kings at Bagan, where kingship and legitimacy were deeply tied with military prowess (Htin Aung 1967:50). However, Narathu (1167-1170 CE) later altered the nature of legitimacy at Bagan by putting a halt to the soldier-king tradition (Aung-Thwin 1985:162; Htin Aung 1967:38-46, 50; Hudson 2004:27-28). Anawrahta’s unification of Buddhism with the legitimacy of the state may be the single most important factor in Bagan’s history, as it allowed for much of its monumental constructions, its advancement to a formidable regional power, and, possibly, also its collapse (Aung-Thwin 1985:165; 2012:85). The administration continued to use governors under the ruler’s power to help manage Bagan’s landholdings (Liebeman 1987:168). Bagan’s hegemony was expanded to its greatest extent, and the kingdom experienced its cultural, administrative, and economic zenith (Aung-Thwin 1985:163).

Several religious structures were important as they housed Buddhist relics, such as a hair and/or a tooth of the Buddha (Aung-Thwin 1985:168; Dumarçay and Smithies 1995:14-17). These structures drew the community to the epicentre and its surroundings,
where the majority of these constructions were being built, both through the need for labour and artisans to work on these places, and as being places of worship for the people that had special religious sanctity due to their grandeur and/or Buddhist relics (Aung-Thwin 1985:164).


Figure 4.26. Shwezigon, built by Kyanzittha (1084-1111 CE), houses a relic of the Buddha – a tooth – and its grandeur is still maintained today (Dumarçay and Smithies 1995:14-17).

Festivals, performances, and feasts occurred in and around the epicentre, sponsored by the sangha and the elite (Hall 1999:241). Food preparation, heating,
cleaning, writing down histories and religious texts, and entertaining elites were some of the domestic activities that took place in the epicentre (Aung-Thwin 1985:176; Hall 2011:204). Farming and commerce, however, took place outside of the walled epicentre (Aung-Thwin and Aung-Thwin 2012:80-83).

**Figure 4.27.** Layout of Nanpaya, a temple built by Anawrahta, with entry to the east and columns depicting Hindu figures marked in red (modified from bagan.travelmyanmar.net).

**Figure 4.28.** Depiction of the Buddhist deity, Brahma, carrying lotus flowers on the interior pillars inside Nanpaya (1060-1070 CE), revealing a distinct Hindu influence (Dumarçay and Smithies 1995:12).

*Stakeholders.* Rulers grew in power and popularity during this period – particularly Anawrahta (1044-1077 CE), Sawlu (1077-1084 CE), Kyanzittha (1084-1111
CE), and Alaungsithu (1111-1167 CE). Anwrahta unified Upper and Lower Myanmar, gaining control of valuable coastal resources for the upland agrarian kingdom by establishing governors from Bagan along the coast (Lieberman 1987:168).

Figure 4.29. Ananda, one of the most monumental constructions at Bagan built by Kyanzittha, which contains four standing Buddha statues and over 1500 images depicting the life of the Buddha (Dumarçay and Smithies 1995:15-16).

Figure 4.30. View of Dhammayangyi, built by Narathu, from the front gate.

The sangha, or Buddhist church, was a prominent group in Bagan, as it was the recipient of a vast amount of wealth that flowed into the state. Originally, the sangha’s wealth enhanced the development of the kingdom, particularly through the employment
of labour and artisans to build numerous temples and monasteries and, reciprocally, by providing religious legitimation of the state (Aung-Thwin 1985:162). Through hefty donations to the sangha, rulers accrued the most merit, which they distributed to others.

Rulers of Bagan also empowered themselves by manipulating and interpreting prophecies in order to appear as the reincarnation – the last life – of the Buddha (Aung-Thwin and Aung-Thwin 2012:85-86). Eventually, the monkhood allegedly became so inundated with wealth and such a threat to the ruler’s authority that the ruler, as in the previous periods, began a sasana reform, condemning the sangha as “corrupted” and declaring their ordinations invalid (Aung-Thwin 1985:165). In this way, the ruler was able to control the sangha’s growing power and balance the necessity of providing lands to accumulate merit with political and state authority (Taylor 1999:166-167).

Commoners were deeply involved with temple patronage and donated 25% of the cost of building to temples (Aung-Thwin 1985:176). These people had an investment in the epicentre, as they were still being imported to farm temple lands and work on monuments necessary for the legitimacy of the rulers and elite (Aung-Thwin 1985:162). The military was also an important facet of Bagan, as it was part of a ruler’s legitimacy, and required the service of the common people (Aung-Thwin 1985:162). Artisans and scholars were vital contributors to the state, as were the merchant class, who had a temple dedicated to their patron god, Ganesh (Aung-Thwin 1985:162; Dumarçay and Smithies 1995:12). Farming was Bagan’s main industry; however, merchants provided important supplemental revenue without depleting the agrarian labour force (Aung-Thwin and Aung-Thwin 2012:83-84). Artisans and other craftsmen – masons, carpenters, wood-carvers, painters, metal workers – maintained religious buildings and their

Structures. Radiocarbon dating of the walls at Bagan attribute the construction or a reconstruction period to the time between the 11th and 13th centuries, during Bagan’s peak (Grave and Barbetti 2001:85). The endowment of the sangha, ever-growing due to the desire for merit among the common people, the ruler, and the elite, resulted in a boom in monumental religious construction beginning in Anawrahta’s reign (Hudson et al. 2001:51). By 1200 CE, the interior area of the city was so densely packed that construction occurred almost entirely outside of the walls (Lieberman 1987:169). Depictions of the Buddha were ubiquitous throughout the structures of Bagan in the form of sculptures, engravings, Jataka ceramic tiles (see Chapter 2) and frescoes and reliefs, all preserved by the dry climate (Aung-Thwin and Aung-Thwin 2012:69, 79). Temples were often modeled after previous forms. The richly-decorated Mahabodhi was based on an Indian temple of the same name, and Htilominlo’s eponymous brick temple is built in the style of the Thatbyinnyu (Dumarçay and Smithies 1995:23-24).

Figure 4.31. Comparison of Thatbyinnyu (right) built by Alaungsithu (1111-1167 CE) and Htilominlo (left)(1210-1234 CE).
Figure 4.32. The front of Mahabodhi in Bagan with a modern structure in front.

Figure 4.33. Ceramic plates at the base of Dhammayazika depicting the Jataka tales.
Figure 4.34. Frescoes at Sulamani, built by Narapatisithu (1173-1210 CE) the top-left showing geometric patterning on the ceiling, the top-right and bottom are both images of the Buddha.

The “Great Palace” of Bagan was possibly built during the Bagan period, likely during the reign of Kyanzittha, though radiocarbon dating sheds some doubt on this attribution (Grave and Barbetti 2001:85; Gutman and Hudson 2004:168; Hudson 2004:225). As only the foundations remain, the functions and activities of the palace are unclear. It may have been a wholly civic-secular structure with the additional function of providing housing for the ruler and royal family, similar to the palace at Angkor.
The construction of water management features was not as integrated with kingship and legitimacy as at Angkor, and therefore not as numerous or monumental (Dumarçay and Smithies 1995:22-24). The epicentral water management features were more extensive in the Kyaukse and Minbu regions, since they provided the majority of food for Bagan (Aung-Thwin and Aung-Thwin 2012:97). Water was collected in reservoirs in the dry season to help feed the water distribution systems for the epicentre (Dumarçay and Smithies 1995:12). Anawrahta’s improvement of irrigation and water systems in Upper Myanmar, empowered Bagan’s economy by simultaneously improving its agricultural yields and enhancing control over the flourishing lands (Aung-Thwin and Aung-Thwin 2012:83; Hudson et al. 2001:51).
Figure 4.36. A small water tank near Dhammayazika still in use by locals.

Additional structures within Bagan’s epicentre included elite living quarters and inscriptions – which began to appear during the 12th century. They did not, however, include the royal treasury, as Bagan’s resources were dispersed between settlements (Aung-Thwin 1985:99; Aung-Thwin and Aung-Thwin 2012:80, 103). There was little need for roads at Bagan, as redistribution took place in the provinces (Aung-Thwin and Aung-Thwin 2012:103).

Decline and Collapse (1234-1287 CE)

Activities. The effects of the flow of wealth and power to the sangha, which had grown to its most powerful, were beginning to take hold during Bagan’s decline, and the state’s power dwindled in the face of rising religious power (Aung-Thwin 1985:164). The intangible aspects of Bagan remained intact during this time of decline – the idea of legitimacy and the religion in particular; however, central authority weakened and people
began to disengage from the state and epicentre in favour of religious leadership (Aung-Thwin and Aung-Thwin 2012:104-107). Administrative activities, such as redistribution, previously controlled by the civil sector, were now taken over by the religious segments of society (Hall 2011:207). As the religious sector grew, it was likely that their needs grew as well, directing lay people to obtain merit by caring for the religious figures and monks, including cooking, cleaning, and tending to temple needs (Kusalasaya 2006:13-14).

Declining royal authority and legitimacy were brought about by power being diverted to administrators protecting Bagan from the Mongols and the sangha, weakening Bagan’s power as an epicentre (Aung-Thwin 1998:53). Mongol incursions shattered and chipped off the fringes of the kingdom (Aung-Thwin and Aung-Thwin 2012:106-107).

*Stakeholders.* This period of Bagan was affected by ineffective kingships marked by laziness, a lack of legitimacy, instability, competition with the sangha, and a general discontent among the people (Htin Aung 1967:64-65). Kyazwa (1234-1249 CE) reclaimed lands given to the sangha in an economically motivated move, and Narithihpade (1173-1210 CE), in order to complete his temple with an empty treasury depleted by the sangha, resorted to forced labour (Htin Aung 1967:65-66; Hudson 2004:28).

The elites of this time, particularly artisans who were raised to elite status by working on temple constructions, were empowered by the wealthy sangha. The sangha became the new economic power as its significant wealth endowed it with more redistributive power. The new sangha was able to split off and become a new entity on its own, controlling more lands and labour than the state (Aung-Thwin and Aung-Thwin 2012:96-97, 107; Hall 2011:207). The sangha controlled a labour force of cleaners,

Common stakeholder groups did not disappear during the decline of Bagan (Aung-Thwin and Aung-Thwin 2012:104). Artisans, craftsmen, and labourers, in the form of masons, carpenters, goldsmiths, silversmiths, firewood suppliers, plasterers, brick masons, miners, sculptors, etc., reached a peak in the 13th century. However, these groups did suffer when temple construction dropped significantly during the latter half of the 13th century (Aung-Thwin and Aung-Thwin 2012:91-94). The economy was shifting to coastal trade, becoming focused on Lower Myanmar, thereby increasing the importance of merchants and traders (Aung-Thwin and Aung-Thwin 2012:109).

*Structures.* By the end of the 12th century, most of the state- and elite-sponsored monumental constructions were completed, with significant drop-off in the successive decades, partially due to a dwindling of resources and a decline in merit-making acts (Hudson et al. 2001:51; Grave and Barbetti 2001:85; Lieberman 1987:171). Trade had declined and the “royal treasury,” referring to the wealth of the kingdom, was likely massively depleted, due to the sangha’s control of most of the kingdom’s land and resources (Htin Aung 1967:63). Building efforts may have shifted from monumental temples to wood structures, including palatial buildings, during the 13th and 14th centuries, with some possible restorations of the city walls (Grave and Barbetti 2001:80-82, 85). A fire appears to have partially destroyed the palace during the 13th century (Grave and Barbetti 2001:80). Roads and water management features continued to be of lesser importance and there were fewer inscriptions in the epicentre at this time (Aung-Thwin 1985:169; Hills 2014:148; Marajh 2014:32).
Bagan “collapsed” in the latter half of the 13th century (Aung-Thwin and Aung-Thwin 2012:106-107). After this time, it still existed as a small city ruled by Narathihpade’s son, Kyawzwa, but was no longer the seat of an empire (Htin Aung 1967:71-75).

**Shift to Ava and Pegu (after 1287 CE)**

*Theories of Collapse.* One of the main causes cited for Bagan’s collapse is the increasing power of the sangha, as it was recipients of tax-exempt land due to the ruler’s need for legitimacy through the accumulation of merit (Taylor 1999:166). Sasana reforms failed to empower the ruler and, instead, empowered the sangha by elevating its status in the eyes of the people since it was now “purified” (Aung-Thwin and Aung-Thwin 2012:104-106). Hall (1999:243) describes this cause:

> “Temple building and religious endowments, initially intended to extend the state’s economy and enhance the king’s prowess, eventually doomed the monarchy to a status of subservience to the sangha when the state’s economic base fell under its control. To challenge the sangha’s control over the state’s economic resources would have led to the negation of the state’s image as the Churches leading patron.”

After the decline and collapse of Bagan, power gradually shifted over half a century to the centres of Ava and Pegu (Aung-Thwin 2011:1). Ava, situated in Upper Myanmar, took the place of Bagan as an upland agrarian centre while Pegu, in Lower Myanmar, was a coastal commercial centre (Aung-Thwin 2011:1, 3). Ava was similar to Bagan in administration, royal authority, economic redistribution, resources, location, and the ideology of legitimacy and the sangha, though it existed on a much smaller scale (Aung-Thwin and Aung-Thwin 2012:110-112). Pegu, formerly ruled by governors of Bagan, adapted to new economic and administrative ideas, as a cosmopolitan centre that
depended on commercial trade (Aung-Thwin 2011:6; Aung-Thwin and Aung-Thwin 2012:120). Bagan, afterwards, was relegated to a place of religious importance and was a monastic and pilgrimage centre, as it still is today (Gutman and Hudson 2004:170).

**SUKHOTHAI**

*General Information*

![Map of Southeast Asia with a focus on Thailand and nearby countries.](image)

**Figure 4.37.** Extent of Sukhothai’s control ca. 1300 CE (based on O’Brien 1999:65; modified from Wikispaces).

*Nature of the Epicentre.* The era of Sukhothai is considered one of the high points of Thai history – being the “golden age” of Thai art and a period of great cultural development – and it was the first Thai-ruled polity in Thailand (Blanchard 1958:25; Chu 1968:32, 71; Dumarçay and Smithies 1995:56; Grabowsky 2010:32). During this time a system of writing was adopted, Theravada Buddhism was widely practiced, and new art
and architecture appeared (Blanchard 1958:26; Pendleton 1963:11). Although the empire was short-lived (1238-1450 CE), this period was marked by rapid advancements, legendary rulers, and advantageous assimilations that lent Sukhothai its power.

Figure 4.38. Map of Sukhothai with notable constructions labeled and the city walls in orange (modified from Sukhothai Historical Park).

Tied to Sukhothai were two very important centres that created a triumvirate of power, Si Satchanalai and Kamphaeng Phet. According to UNESCO, Si Satchanalai acted as the spiritual centre for the kingdom of Sukhothai, though it was strictly under the control of Sukhothai, and also was the centre of ceramic production. Kamphaeng Phet, to the south, was the military centre, protecting the southern frontier. Sukhothai was the administrative and political centre. Together, the three were considered a cohesive political entity (UNESCO 2015a).

The smallest of the case studies, the city walls of Sukhothai measure 1.8 km by 1.4 km and its historical district measures only 70 km² (Rooney 2008:71; UNESCO
Sukhothai was situated on the edges of three different zones of influence – the Khmer of Angkor, the Mons of Myanmar, and the Burmese of Bagan – and it assimilated aspects of political power and material civilization from these places (Blanchard 1958:26; Coedès 1966:124-125, 141; Rooney 2008:17-19). It was not until the 13\textsuperscript{th} and 14\textsuperscript{th} centuries that Sukhothai began to integrate its own styles into its architecture (Coedès, 1966:141; McCloud 1995:31).

Table 4.3 lists the known rulers of Sukhothai. There is more general, unsourced knowledge that details rulers that followed and some that may have existed between other rulers. However, for this thesis, the following rulers are most notable and were the rulers who could be accurately sourced.
### RULERS OF SUKHOTHAI

<table>
<thead>
<tr>
<th>Name</th>
<th>Dates</th>
<th>Notable Constructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si Indradit</td>
<td>1238-1278? CE</td>
<td>Wat Aranyik, Wat Kong Laeng</td>
</tr>
<tr>
<td>Ramkhamhaeng</td>
<td>1278-1298 CE</td>
<td>Wat Si Chum, Phra Achana, Wat Saphan Hin, Phra Ruang Road, part of Wat Mahathat</td>
</tr>
<tr>
<td>Lo Thai</td>
<td>1298-1347 CE</td>
<td>Wat Mahathat, possibly Saritphong Dam</td>
</tr>
<tr>
<td>Li Thai</td>
<td>1347-1368/74 CE</td>
<td>Wat Chedi Chet Taeo, Wat Traphang Thong Long, Thewalai Mahakaset</td>
</tr>
</tbody>
</table>

Table 4.3. The known rulers of Sukhothai, the dates of their reigns, and notable constructions (based on Rooney 2008).

**Nature of the Dataset.** Most of our information about Sukhothai comes from archaeological evidence, inscriptions, and folk histories. However, there is doubt cast on the most famous inscription, Inscription No. 1, which is a major source for understanding life under the reign of Ramkhamhaeng, due to its questionable provenience (Rooney 2008:26).

**Angkor Period and Early Sukhothai (prior to 1278 CE)**

**Site Selection.** Sukhothai is located in a delta region of central Thailand about 12 km from the Yom River, a tributary of the Chao Phraya River, which was integral to trade and the diet of the region (Rooney 2008:15; see Figure 4.37). Due to its location at the apex of the main flood basin, Sukhothai was able to control water allocation over the entire region (McCloud 1995:31; Rooney 2008:15). The mountains surrounding Thailand offered protection from enemies, and the fertile land created an agricultural surplus to provide for larger labour forces (SarDesai 1997:53). From the 8th to the 12th century, Thai people began moving into this area when it was still Khmer territory (Blanchard 1958:25, Chu 1968:31). After the decline of surrounding states, we see a heavy migration to Sukhothai (Blackmore 1960:47; Blanchard 1958:25; SarDesai 1997:53).

**Activities.** Prior to independence from Khmer rule, Sukhothai had a few Hindu temples that served as places of worship, as it was under the control of a Hindu ruler,
Suryavarman II of Angkor. Within and around the epicentre were places of Buddhist worship and shrines to animist figures where people could make offerings (Dumarçay and Smithies 1995:56; Rooney 2008:100). Ritual animal slaughter and religious ceremonies took place during this early period (Dumarçay and Smithies 1995:56). These religious places also served as a way to draw the community into the epicentre. As Sukhothai was a Buddhist kingdom, legitimacy was derived from the ruler’s role as a divine representative (Graves 1995:247).

The presence of a palace during Si Indradit’s reign (1238-1278 CE) is an indicator of administration and the domestic activities of the ruler and court, who would have lived within the palace (Dumarçay 1991:41-42). Prior to this, as Sukhothai was a Khmer outpost, there may have been similar activities occurring here as at Angkor, including cooking and cleaning for the elite and ministers (Higham 2001:123). Inscription No. 1 states there was a sanctuary and archaeological evidence suggests the presence of a throne, which indicates the palace likely had both religious and administrative function, or, at least, acted as a display of power (Dumarçay 1991:23).

*Stakeholders.* At first, the epicentre of Sukhothai was ruled by Khmer rulers, including Suryavarman II and Jayavarman VII, until it declared independence from Indravarman II (1219-1243 CE) (Coe 2003:225; Rooney 2008:100, 110). After independence, administrative power was divided between elites and bureaucrats, while Sukhothai’s rulers were famous for being “fathers” of their people (O’Connor 1983:85). Monks lived outside the epicentre, though they were in close proximity to the epicentre and tied to it through royal patronage and funding (Rooney 2008:139). Artisans and labourers were most certainly around at this time, due to the necessity of these
stakeholders to both build and embellish the structures that were being built in and around Sukhothai, often under commission of the ruler. Servants and donors tended to the monks of Sukhothai, so that they never had to struggle or go without necessities (Kusalasaya 2006:13-14).

Figure 4.40. A portion of Wat Aranyik, built by Si Indradit to house monks, which had a supply of water year round according to local signage, and possessed individual cells for meditation, and a stone-lined path that marked the walkway for monks to meditate between the ordination hall and assembly hall (Rooney 2008:139).

As Sukhothai was mostly agrarian and heavily dependent on wet rice cultivators, the state’s agriculture was a draw for people to migrate to the epicentre in this early period (Evers 1987:754; Lieberman 2003:24; O’Connor 1995:947). Foreign merchants were drawn to Sukhothai, despite the economy being mostly agrarian and commerce being restricted to one main marketplace (Lieberman 2003:255; O’Connor 1983:52).

Structures. The three city walls around Sukhothai were divided by two moats and were constructed during this period as a Khmer outpost (Swearer 2010:98). At early Sukhothai, there were religious structures dedicated to Buddhism, Hinduism, and indigenous animism, including Wat Phra Phai Luang (a Buddhist temple), Ta Pha Daeng
Shrine (a syncretic animist, Hindu, and Buddhist prang), and Wat Kong Laeng (an animist shrine later converted to a Buddhist temple) (Dumarçay and Smithies 1995:56; Rooney 2008:100, 110).

Figure 4.41. Wat Kong Laeng, an animist shrine where animal slaughter may have taken place before Buddhism superseded animism and abolished the practice (Dumarçay and Smithies 1995:56).

The three most popular materials at Sukhothai were laterite, brick (made of kiln-fired clay), and stucco. Laterite covered in stucco was abundant in the area and was often used for foundations, roads, bridges, columns, and walls. Wood was used for windows, doors, pediments, and occasionally roofs. Glazed ceramic tiles often made up the end tiles, finials, railings, and sculptures. While sandstone was not used in constructions at Sukhothai, schist and slate were popular materials for flooring, boundary stones, inscriptions, and some walkways and furniture (Rooney 2008:39-40).
Figure 4.42. Wat Phra Phai Luang, one of the earliest remaining Buddhist temples at Sukhothai, showing several building construction materials – including laterite columns (exposed), some remnants of white stucco on the columns, and brick flooring (Rooney 2008:110).

During Si Indradit’s reign there may have been a palace, as there is evidence of an enclosure and moat in the middle of Sukhothai proper; however, the layout and construction of the palace is unclear as there is only reference to it in inscriptions (Dumarçay 1991:23). There is not much literature on roads in Sukhothai’s early history; however, the presence of four gates indicates multiple roads leading into the epicentre of Sukhothai (Hills 2014:150). In the early period at Sukhothai wells were a main form of water management, such as the one at Wat Aranyik (Marajh 2014:36). Without reference or archaeological evidence, some inferences can be made about other structures, such as the presence of elite housing, tombs, and a treasury, based on similar centres in Southeast Asia (Tambiah 2013:523). However, they should not be presented as absolute fact, rather as plausible components of the epicentre.
Golden Age (1278-1370 CE)

Activities. Administration increased at this time, as Ramkhamhaeng’s subordinate chiefs were required to give an oath of allegiance to the ruler (Dumarçay and Smithies 1996:56-57). The ruler at Sukhothai also paid tribute to Buddha statues, as merit continued to grow in importance, particularly for the ruler and elite (Rooney 2008:141). Ramkhamhaeng (1278-1298 CE) expanded administrative power and legitimacy by creating cultural ties with the Yuan dynasty in China, and possibly introducing the Thai alphabet in 1283 CE by modifying Khmer script, garnering a reputation as a benevolent leader by increasing the prosperity of his kingdom. Part of the legitimacy of kingship at Sukhothai was related to the ruler’s relationship with their subjects – one of personal connection and of being a “father” to their people (Dumarçay and Smithies 1995:58). According to Inscription No. 1, people were happy with Ramkhamhaeng’s rule, as they were provided for, engaged in free trade with no taxations, and could speak to the ruler personally about grievances (Rooney 2008:23-26).

Figure 4.43. One of the most notable monuments of Ramkhamhaeng’s reign is Wat Si Chum, which contains the famous 15 m tall, stucco-coated seated Buddha image, Phra Achana (see Figure 4.44) (Dumarçay and Smithies 1995:56).
Figure 4.44. Phra Achana, the Buddha at Wat Si Chum, situated just outside Sukhothai’s walls, is the source of several legends of religious power, such as claims of the statue talking and accounts of invasion by the Burmese failing because the image of the Buddha forced them to flee (Rooney 2008:117).

The Buddhist temples of Sukhothai, built out of the need to obtain merit, symbolically represented Sukhothai’s political might and position as the religious core of the region (Rooney 2008:31, 40). While the majority of structures in Sukhothai were Buddhist, this practice did not completely usurp traditional animism. According to inscriptions, the ruler needed to worship a local spirit for the prosperity of their kingdom, which symbolizes the syncretism of Sukhothai and the protective role of the ruler (Coedès, 1966:142; Krairiksh 1991:108; Rooney 2008:30).

A main road – Phra Ruang – brought pilgrims and merchants into Sukhothai’s epicentre, which was a source of religious power, and a structure in the epicentre may
have been a place of cremation (Rooney 2008:22, 82). Stupas housed Buddhist relics, such as Wat Mahathat, one of Sukhothai’s largest religious constructions and the centre of worship for the area, which contained a hair and neck bone of the Buddha (Krairiksh 1991:85; Rooney 2008:23, 74). Assembly halls at Sukhothai’s temples were open to all worshippers; ceremonies and sermons were held for the general public as well, bringing the community into the epicentre (Rooney 2008:40-41). Inscriptions mention the roles of several serving groups, which indicates the presence of domestic activities such as cooking, entertainment, and other daily household activities (Terwiel 1983:45-49).

**Stakeholders.** Ramkhamhaeng, a skilled leader and warrior and the most famous of Sukhothai’s rulers, began to layout the city of Sukhothai (Dumarçay and Smithies 1995:56; Rooney 2008:23). Li Thai, son of Ramkhamhaeng’s son and successor, Lo Thai, famously became a monk near the end of his tenure as ruler, which continued into the mid 14th century (Dumarçay and Smithies 1995:58). Under Li Thai, who penned a treatise on morality, the art and architecture of Sukhothai reached its zenith. Princes, such as Li Thai, often ruled the tributary city of Si Satchanalai (Rooney 2008:23-24).

During this time, the elite were involved in building projects and may have worked in conjunction with the ruler to create massive constructions (Dumarçay and Smithies 1995:58). Monasteries were built by rulers to house monks and important religious figures (Dumarçay and Smithies 1995:56). There were officials and their assistants, who helped administrate and supervise aspects of the state (Terwiel 1983:45-49). Labourers, such as masons and carpenters, and artisans were still found within the epicentre for the constructions to occur, likely in an increased capacity considering the increase in monumentality and number of constructions (Rooney 2008:147). Inscriptions
claim there was free trade at Sukhothai, which may have been one of the reasons foreign traders were drawn to the epicentre (Rooney 2008:26). Sukhothai continued to be heavily reliant on wet-rice agriculture and farmers (Evers 1987:754).

Figure 4.45. Wat Mahathat (begun by Ramkhamhaeng and built by Lo Thai and the elite, Si Satha) is massive, with ten assembly halls, five ponds, one ordination hall, 200 stupas, Buddhist relics, and once housed the largest cast Buddha image, now removed (Dumarçay and Smithies 1995:58; Rooney 2008:23, 74-78). Here one of the complexes of Wat Mahathat displays the Thai-style lotus bud stupa in the centre.

Figure 4.46. Thewalai Mahakaset, a brick construction, once housed 1,362 images of Shiva and Vishnu and was constructed as a place of worship for the Hindu subjects under Li Thai (Rooney 2008:147).
Although little information exists on lower classes during Sukhothai’s tenure, there is no doubt servants must have toiled away in the epicentre, as at similar sites in Southeast Asia (Aung-Thwin 1985:176; Daguan 2007:34-37, 41, 52). Words for cooks, craftsmen, free people, servants of the crown, entertainers and musicians, and slaves from inscriptions in pre-15th century Sukhothai time indicate their presence, at the very least (Khairiksh 1991:58; Terwiel 1983:45-49). The presence of inscriptions themselves would also indicate scribes within the epicentre, some of whom would have served the royal court in recording histories (Khairiksh 1991).

Structures. Noen Prasat, located in the heart of the epicentre (see Figure 4.47), is thought by some scholars to have been Sukhothai’s palace, the location for two famous inscriptions – Inscription No. 1 and an inscription from Lithai’s reign – and a throne. Others theories hold that the palace is in a different part of the epicentre and Noen Prasat may be an administrative structure for ceremonies, a place for cremation, or a part of Wat Mahathat (Rooney 2008:82).

Figure 4.47. The layout of Sukhothai with the walls marked in red and the possible location of the palace (Noen Prasat) circled in green (modified from Stratton and Scott 1981 found in Swearer 2010).
The primary structures of the Sukhothai Buddhist temple consisted of an assembly hall, ordination hall, and stupa. An earthen ditch or a brick, earthen, or laterite wall surrounded the structure with two (east and west) to four (the cardinal directions) entrances. In Sukhothai, a water feature usually accompanied a temple, whether in the form of a moat or pond. The assembly hall, or the main assembly hall if there was more than one, was the foremost building in the east, which was open to all worshippers. These one-story structures were usually used for conducting sermons or holding ceremonies for the public (Rooney 2008:40-41).

Figure 4.49. The standing Buddha image at Wat Saphan Hin. One tale tells of Ramkhamhaeng ascending on the back of a white elephant to the temple during a full moon, intending to pay respects to the 12.5 m Buddha (Rooney 2008:141).

Other constructions at Sukhothai include stupas that contain the ashes of rulers, a dais and a stepped pyramid at Wat Mahathat, where the chiefs of Ramkhamhaeng’s
kingdom gave an oath of allegiance to him in 1292 CE, Wat Saphan Hin, a monastery built to house the head of the monkhood brought from the south, and the Phra Ruang Road, which provided transport and a path for pilgrimages (Dumarçay and Smithies 1995:56-57; Kairiksh 1991:88; Rooney 2008:22). The Saritphong Dam, and the extensive water management system that accompanies it, is attributed to sometime after Ramkhamhaeng’s reign, in the 14th century (Rooney 2008:71, 148).

Decline and Collapse (1370-1438 CE)

Activities. By 1378, Sukhothai’s administrative power and legitimacy waned, as did its symbolic power, and it ultimately became a tributary state when the military city of Kamphaeng Phet was captured by Ayutthaya, a maritime trading state in southern Thailand that had been slowly growing in power. However, Sukhothai maintained places of both Hindu and Buddhist worship for its people at this time (Rooney 2008:96-99). The ruler of Ayutthaya focused on legitimacy and power through the traditions and ceremonies created by rulers of Angkor – with links to Mount Meru and Hindu ideologies (Hall 2011:233). As the Ayutthayan rulers modeled themselves after rulers of Angkor, they likely had domestic servants that engaged in similar activities, requiring numerous attendants to see to cooking, cleaning, the guarding of the royal household, and various other activities (Daguan 2007:34-37, 41, 52).

As was common custom across Southeast Asia, the rulers of Sukhothai may have been buried inside the city walls within a stupa (Rooney 2008:94). The epicentre also funded a temple just outside of the city walls that supposedly held important religious
texts, which advertised the centre’s continued religious significance, and drew people into the epicentre (Rooney 2008:124).

Figures 4.50. and 4.51. Wat Chang Lom’s stupa (above) and detail of the elephants (below). The complex may have included a hall of religious scriptures (Rooney 2008:124).


Stakeholders. The rulers of this time were waning in power, and considerably less is known about them. During the decline, elites, including the royal family, were still contributing to the epicentre and its structures (Dumarçay and Smithies 1995:58). However, the elites’ loyalties and interests shifted to Ayutthaya as the kingdom began to eclipse Sukhothai (Lieberman 2003:270). Ayutthaya offered a more enticing role for elites – by integrating Khmer political ideologies – and for merchants, as Ayutthaya was a centre of trade (Evers 1987:754-756; Graves 1995:247). Monasteries and temples were still being constructed in and around the epicentre, indicating a presence of religious figures (Dumarçay and Smithies 1995:58). Artisans and labourers were also still present and active in Sukhothai during the 14th century (Woodward 2005:137).

At Ayutthaya, bound servants were marked with tattoos, prohibiting social movement between classes (Bentley 1986:291). Social hierarchy was stronger than in the previous periods and servants fled the royal court for more promising, personal connections with lesser lords, though they had to participate in construction for the crown six months a year (Lieberman 2003:280; O’Connor 1983:47, 85).

Structures. There were still religious constructions initiated in the epicentre after Sukhothai’s decline in power, including the temples Wat Si Sawai (“temple of the mangoes”) located in the southern part of the epicentre, Wat Chang Lom (14th century) notable for its sculpted elephants around the base of the main bell-shaped stupa, and Wat Sa Si (“temple of the coloured pond”), possibly containing the remains of a ruler (Dumarçay and Smithies 1995:58; Rooney 2008:94). Wat Chetupon was a monastery built during Sukhothai’s decline, sometime before 1417 CE (Dumarçay and Smithies 1995:58).
Figure 4.52. Wat Si Siwai has three Khmer style laterite prangs, a linga, and a lintel with a depiction of Vishnu. It was later modified to Theravada Buddhist temple by adding an assembly hall (Rooney 2008:19, 96-99).

Figure 4.53. Wat Chetupon is surrounded by two moats and a brick wall and consists of a tall brick mandapa with niches for stucco images of the Buddha (Rooney 2008:130).

Figure 4.54. Wat Sa Si’s main stupa, which may contain the ashes of a ruler, and its surrounding pond.
While the original palace likely stood in the epicentre along with any other administrative structures, their meaning would have changed as Sukhothai came under the power of Ayutthaya, with the true palace, i.e., the “residence of temporal power,” having shifted to Ayutthaya (Dumarçay 1991:1). Elites, as well, were moving to Ayutthaya, likely leading to a decline in elite residences in and around Sukhothai (Lieberman 2003:270). The creation of water management continued and can be seen in Sukhothai in the form of moats and ponds associated with temple complexes built during this later period (see also Marajh 2014 and Rooney 2008). Stupas may have acted as tombs for later rulers of Sukhothai; however, burial in the region shifted to non-Buddhist structures (Graves 1995:245; Rooney 2008:94).

*Shift to Ayutthaya (after 1438 CE)*

*Theories of Collapse.* In the 15th century, Sukhothai was eclipsed by Ayutthaya completely, becoming a province ruled by princes of Ayutthaya. The constant military clashes severely reduced the labour force and landholdings of Sukhothai (Evers 1987:755; Rooney 2008:24). The infrastructure was the first and most adversely affected feature, as there was not enough manpower to maintain the complex water distribution system. As the water management system fell into disrepair, the crops began to suffer and could not support the large population of Sukhothai (Rooney 2008:24).

Sukhothai was replaced as the epicentre, but it was not completely abandoned, and it retained some religious and commercial functions for a few centuries until disappearing in the 1500s (Vallibhotama 1986:237). During the last decades of its
existence, vassal princes from Ayutthaya ruled at Sukhothai, exerting a small amount of localized power (Rooney 2008:25).

**SUMMARY AND CONCLUSIONS**

All three charter states underwent a form of collapse by the early 15th century. Theories surrounding Angkor’s collapse range from a shift in trade to environmental problems to discontent among the populace. Bagan’s collapse may have been caused by the amount of power flowing to the sangha, which eventually superseded the power of the ruler. Sukhothai was eventually overtaken by Ayutthaya, after years of decline and military incursions, which left it drained of manpower and unable to support its large population, which was exacerbated by a depleted rice output due to the failing water management system.

In general, there are several theories of decline and collapse for each case study, which is an indicator of the multi-faceted nature of collapse and the necessity for examining charter state collapses using a holistic approach. Each state’s numerous entanglements must be examined to understand how previously resilient systems were degraded into a vulnerable state that fostered a massive change in the system. This chapter made note of many important relationships (or entanglements) between different facets of the society, the implications of which will be explored in the following chapter.
CHAPTER 5: ANALYSIS

Collapses are multi-faceted and complex, with a number of factors weakening a system and its components, making it vulnerable to perturbances. Entanglements make societies vulnerable because they limit the options available to react to unexpected circumstances. If a specific entanglement fails, whether due to negligence or a disturbance, it impacts all things and humans entangled with it, potentially affecting a vast web of dependencies, like a row of dominoes. Looking at a tanglegram is, in many ways, a means for studying and qualitatively assessing a system’s resilience.

The histories of each charter state exhibit varying degrees of resilience and vulnerability. This chapter offers an analysis of the epicentres using tanglegrams, the application of the adaptive cycle to the centre’s history, and an examination of aspects of each epicentre’s resilience, all aimed at determining how high or low its resilience was during the various phases of the adaptive cycle. Each epicentre’s tanglegram is drawn for their K-phase, as this is the time when the centre is most entangled. The goal in examining resilience is to better understand the collapse of these centres and their associated charter states. As such, the potential causes for these collapses will be summarized at the end of each section.
Figure 5.1. Entanglement web for Angkor’s epicentre during the K-phase. Key environmental factors are circled in dark grey, infrastructures and functions are outlined in black, and the stakeholders of the epicentre are in light grey boxes. The royal family, elites, and bureaucrats are combined as they were often one and the same.
Figure 5.2. Entanglement web of Bagan during the K-phase. Key environmental factors are circled in dark gray, infrastructures and functions are outlined in black, and the stakeholders of the epicentre are in light gray boxes. The royal family, elites, and bureaucrats are combined as they were often one and the same.
Figure 5.3. Entanglement web of Sukhothai during the K-phase. Key environmental factors are circled in dark gray, infrastructures and functions are outlined in black, and the stakeholders of the epicentre are in light gray boxes. The royal family, elites, and bureaucrats are combined as they were often one and the same.
General Entanglement Trends of the Case Studies

*Thing-Thing.* Many key environmental factors were heavily dependent on one another in Southeast Asia. These features have the highest quality of entanglements, with numerous important stakeholders and integral infrastructures and functions depending on their predictable operation. For example, the economies and agriculture (which itself was tied to rain) were highly entangled as these were agrarian centres. Building material, which could be entangled with particular structures (e.g., a palace with wood), or have different entanglements at different sites (e.g., sandstone at Angkor), is another environmental feature that both enables and constrains the epicentre. The epicentre’s numerous structures necessitate an abundance of materials, the loss of which results in a failure. Buildings were manifestations of legitimacy and religion, which were also entangled with each other and with administration. Structures were also entangled with certain activities (e.g., tombs with burial practices, water management with rainfall and environmental factors, inscriptions with keeping historical records, administration with the palace). Religions, as well, were entangled with one another through syncretism.

An embellishment, such as a sculpture or bas-relief, was entangled with the temple or palace that it adorned, as it was given meaning through its association. However, it was constrained in that if the temple fell out of use, the sculpture could lose some of its meaning. The building was entangled in the same way. The embellishment gave it a significance and identity, which creates a dependent relationship. The epicentre’s architecture was also dependent on ideas and abstract concepts (things), such as legitimacy, administration, and religion, as discussed in Chapters 2 and 4.
Human-Thing. The common people, particularly farmers, merchants, and artisans, while entangled with many features of the state, were primarily made vulnerable by environmental conditions. Humans depended on the epicentre for their identities, even if they were not the elite citizens or servants living within the city walls. As discussed in previous chapters, people across the landscape depended on the epicentre for their sense of connectedness and community. Humans depended on architecture – the palaces, temples, residences, infrastructure, and water management – for survival and comfort, and for domestic activities, rituals, ceremonies, and the gatherings associated with them. They were also dependent on activities for their statuses, roles, and identity. These places are crucial to human and epicentral power, legitimacy, and authority. Humans also depended on ideas and ideologies, such as religion and social stratification, and the epicentre was a symbolic form of social stratification. The ruler was dependent on legitimacy to effectively rule and maintain their role as ruler, which was often in the form of entanglement with religion.

Physically, it is easy to disentangle from religious structures, decorations, rituals, and ceremonies, and sacred landscapes. However, ideological entanglements brought on by religious and personal significance (due to having a hand in their creation), made it difficult for people to disengage. As ideologies changed, it became significantly easier to disentangle from structures representing previous ideologies.

Thing-Human. Things, in general, depended on people for their creation, maintenance, and use, otherwise, they were not useful, nor could they maintain their identities. Numerous dependencies existed in the epicentre: constructions of the epicentre
were dependent on humans for their creation, administration on officials and rulers, agriculture on farmers, and religion on human belief.

*Human-Human.* Dependences between humans can be direct or occur through an intermediary, such as a ruler’s dependency on architecture, which depended on labourers. The stakeholder with the most numerous entanglements in Southeast Asia was the ruler, leaving them the least resilient, ergo, most vulnerable, in the system. The ruler was tied to every component of the epicentre directly or through intermediaries. Therefore, the ruler had to maintain a very careful balance, and was at the mercy of environmental factors and the will of the people for their authority. According to Ian Mabbett (1978:10), “a ruler lived spider-like at the centre of a huge web of activities, surrounded by an army of clerks, cleaners, attendants, cooks, porters, messengers, carters, valets, maintenance workers, engineers, and so forth.” Indeed, this is entanglement in action!

Servants and elites were entangled with each other for their livelihood, performance of their daily chores, social status, and identity, as were the rulers with the ministers who both had a hand in governance and administration. Farmers and merchants were the least entangled stakeholders of the epicentre. While the epicentre’s economy depended heavily on both, farmers or merchants could disentangle if the consequences of removing themselves from the epicentre were outweighed by the consequences of staying.

*Notable Entanglements of Individual Epicentres*

*Angkor.* The legitimacy of a new Angkor ruler was entangled with numerous people and things, such as the entanglement relating to the practice of building a new
epicentre with each inauguration. The ruler was entangled with the monumentality of new epicentres, which displayed power and legitimacy, and legitimacy depended on the performance of particular activities (e.g., processions and rites), ancestry, and on the presence of spiritual masters (Coedès 1968:110-111; Higham 2001:113). The loyalty of the people, particularly of the elite and the royal court, was important for the ruler to maintain his power, and they provided gifts in exchange for support. Older capitals lost much of their significance when stakeholders relocated to a new capital. People were also entangled with the epicentre through networks of infrastructure – such as hospitals, shrines, roads, and bridges. The monumental structures of Angkor were caught in a web of thing-thing entanglements – from the sandstone building material to the quarries of sandstone at Phnom Kulen, to the canal systems that brought the sandstone to the epicentre (Uchida et al. 2003:222).

Bagan. Since Bagan’s epicentre was located within the Dry Zone, it depended on more fertile, but distant, areas of agricultural production (Aung-Thwin and Aung-Thwin 2012:80). In addition to the Buddhist idea of merit, military prowess was entangled with the idea of legitimacy – the better the leadership of the military and the more successes they had, the more legitimate the ruler’s claim to the throne was considered to be (Aung-Thwin 1985:172-183). Religion and administration, arguably, were more entwined at Bagan than Angkor or Sukhothai, as the religious order eventually overtook the ruler’s authority and began to take on administrative duties, such as redistribution (Hall 2011:207). Merit was deeply entangled with the ruler’s legitimacy. Two powerful stakeholder groups – the ruler and the sangha – were most prominent amongst the entanglements of Bagan. The sangha was extremely entangled with the state, waxing and
waning as the state did. They also received massive landholdings from the ruler and were responsible for many of the structures at Bagan, which were often funded by the people (Aung-Thwin 1985:176). The power dichotomy between the two is important to note as the sangha could exert power over the ruler’s legitimacy, but the ruler could counter this pressure with a cleansing of the sangha (Hall 1999:243). Bagan was particularly notable for the number of temples within its epicentre, which people depended on for worship and for merit-making. However, the entanglement with merit was, at times, more constraining than it was enabling, as it required continued building and construction, which depleted the resource and labour pools.

Sukhothai. The epicentre in general was dependent on the cities of Kamphaeng Phet and Si Satchanalai, where the successors to the throne ruled. Rulers were heavily dependent on their successors due to the nature of Sukhothai’s three-city system (UNESCO 2015a). This allowed the ruler a more secure and widespread rule, but they could be usurped by other powerful officials or lose their power as a result of conflict with other cities in their realm. The ruler’s legitimacy and the ruler himself were entangled with the ideologies of military prowess, the father-connection, and merit. The common people were tied to the notion of the “father-king” who ruled them with fairness and was accessible to them (O’Connor 1983:85). However, the nature of the connection between Buddhism, the ruler, and administration was different from Bagan, as “Thai Buddhism was always subordinate to the Thai monarchy” (Hall 2011:232).
The r-phase of Angkor (802-944 CE)

Larger Context. As discussed in Chapter 2, Angkor was the culmination of proto-state development during the late r-phase. These proto-states were characterized by a period of rapid growth, high mobility, innovative exploitation of resources, and modest epicentres. Epicentres may have begun to develop in the late r-phase, including Funan’s Angkor Borei and Chenla’s Isanapura. However, due to the decentralized nature of these proto-states and the lack of information available on them, it is unclear whether large settlements such as these acted as one of many localized centres, or the principal epicentre for the far-reaching polities of Funan or Chenla.

The r-phase Epicentre. The development of Funan’s epicentre, Angkor Borei (or epicentres, as it is unclear whether Funan was a group of allied settlements or a cohesive state), was facilitated by a number of exploitation phase characteristics. In the “kings” (or chiefs) of Angkor Borei, we see a marked increase in political complexity. These leaders were able to harness power from Angkor Borei’s role as an agrarian centre in Funan (O’Reilly 2007:97). Angkor Borei was entangled with coastal trade settlements and the leader was able to gain his authority from mediating commercial transactions (Hall 1982:85-86). Niche construction and colonized ecosystems appeared with water management in the form of reservoirs, canals, and dykes to protect against flood and in the beginnings of monumental architecture in the form of brick religious structures (O’Reilly 2007:92, 94-99). Funan utilized integrating shrines to pull its scattered communities together and exploited a variety of domestic resources.
The movement of power from the polity of Funan to Chenla in Cambodia demonstrated a degree of mobility and adaptability to changing circumstances, which may have been facilitated by a downturn in trade passing through Funan (O’Reilly 2007:109-111). The Chenla period marked an increase in inscriptions and monumentality, as well as a growth in complexity, both in the epicentre and in political power. Jayavarman I (635-680 CE) strengthened the Chenla kingship and centralized power, particularly through military action, and created the epicentre of Isanapura (O’Reilly 2007:112-117). The granting of governing positions to the royal family and loyal elites created new entanglements and facilitated growth of epicentral power. Despite increasing power, the exertion of state authority was still limited. It is likely that many independent, autonomous chiefs existed in Chenla, and they would have controlled their own epicentres and hinterlands (Higham 2012:285; Vickery 1998:337).

*The Transition from the r-phase.* The transition to the K-phase began with the reign of Jayavarman II (802-835 CE) and the start of the Charter Era. This time period displayed some exploitation phase characteristics with new innovations in construction, including increased – but still modest – monumentality in religious architecture and palaces, and ideologies, such as the beginnings of strong Hindu influence, divine kingship, social stratification, central authority, and vassal chiefs (Coe 2003:101, 135; Higham 2001:61-63). Niche construction and landscape modification was exemplified in the efforts geared towards the construction of religious buildings and barays at the new epicentre of Roluos. Some of the most notable characteristics of this period were the high mobility of courts and the constant shifting of the capital. Entanglements increased, the creation of new epicentres and architectural features creating entanglements between
things and humans, and the increased social stratification and growing population creating entanglements between humans.

*Measuring Resilience.* During the r-phase, the Khmer kingdoms exhibited a significant level of resilience. The high mobility, and the ease of epicentral relocation between Funan, Chenla, Roluos, and Angkor are indicative of its flexibility, diversity, and openness. Entanglements arose in the form of new innovations: the walled settlements at Funan, water management features, centralizing authority, social stratification, claims of royal connections to divinity, and the integrating religious shrines that tied communities to centres. The scattered and allied settlements of Funan and Chenla were indicative of moderate modularity with little top-down control coming from the epicentre. Redundancies and diversities were dominant, as exemplified by the number of communities and possible epicentres. Social capital and top-down control increased under the rule of Jayavarman I, who exerted authority over other settlements, enforced taxations, and expanded his area of rule. These epicentres were in a constant state of transformation for a time, but the numerous redundancies of multiple, possibly autonomous, cities helped offset vulnerability.

From the beginning of the transitional phase, it seemed Angkor had moderate social capital, which waxed and waned depending on the state of the kingship, despite many of the rulers being usurpers. Yasovarman I’s religious integration of the empire as well as Jayavarman IV’s tax enforcements are indicative of intermediate modularity during the transitional phase, creating increased resilience (Higham 2001:63, 72).
The K-phase of Angkor (944-1219 CE)

**Larger Context.** The continuance of tradition, rather than new innovations, indicated a shift in the direction of the conservation stage. The intensification, increased management and investment, and consolidation began in earnest around 1002 CE in constructions like the massive West Baray, Angkor Wat, and the complex of Angkor Thom.

**The K-phase Epicentre.** The administration invested heavily in constructions, with many of the projects during this time being focused on completion, renovations, and replacements of old structures, indicating the condition of path dependency was already active. Population increased, packing the epicentres with elites during Suryavarman I’s reign, and reaching an overall population of over one million (Higham 2001:104). During this time, there were less prominent epicentral movements; new epicentres were still being constructed to establish legitimacy, but these remained in the area of Angkor proper. Monumentality was a very strong entangling force for the people, particularly in regards to Angkor Wat and the structures subsequently commissioned by Jayavarman VII. As monumentality was tied to legitimacy, these efforts were geared towards increased elaboration and monumentality, which enhanced the authority of the ruler.

People were most invested during this time, inputting more labour and resources than previously to augment the size of the epicentre and the constructions within it, and being increasingly drawn to the epicentre by activities for public viewing (such as festivals, ceremonies, and games), the increasing need for servants for the growing elite and other human-human entanglements, and the numerous infrastructural features sponsored by the state. (Higham 2001:104-105). The more extensive constructions not
only required more labour and resources to build them, but, over their lifespans, required more maintenance and ideological investiture from the people. Jayavarman VII was the most prolific ruler of Angkor, creating Angkor’s highest level of entanglements with his vast building projects, introducing a more integrated state than ever before, and increasing the dependence and loyalty of the people to the ruler and epicentre.

The Transition from the K-Phase. The decline of Angkor and the transition to the release phase, where the society became exceedingly vulnerable and began to feel the ill effects of path dependencies and overpopulation, began after Jayavarman VII’s reign. Expansion and monument-building halted, with rulers beginning to occupy old monuments rather than continuing the tradition of new constructions (Higham 2001:138). From 1219 CE until abandonment, Angkor reached a plateau in accumulation and intensification. This time was one of decline and of true conservation – of activities, ideologies, and construction. It was likely that more resources and labour had to be diverted to maintenance rather than to new constructions, and, judging from the disrepair of vital infrastructure during Zhou Daguan’s visit, there was not even enough labour, or more likely, enough ability to marshal labour, to maintain these features (Dumarçay and Smithies 1995:108). However, this was not yet a time of collapse and the Khmer, though legitimizing activities, such as royal processions, still tried to maintain the level of opulence set forth by Angkor’s previous rulers (Daguan 2007:52).

Measuring Resilience. The K-phase increased epicentral entanglements and moved towards rigidity, uniformity, and conformity in the system. Particularly significant was the ability to maintain intermediate levels of modularity and to accumulate ideological and physical resources in the early K-phase. Resilience continued to decline
into the K-phase as reserves diminished in diversity and became locked into the system, and rigidity characterized its functional relationships. Innovation declined as rulers followed a strict tradition in construction, administration, and legitimization. Social capital and top-down control were moderate, though not as high as would be expected of a quintessential K-phase example. While the rulers had moderate social capital, which fluctuated with each ruler, and moderate top-down control management, the Khmer polity was still operating as a mandala. Though still moderate, social capital reached a peak during Suryavarman II and Jayavarman VII’s reigns, as both were able to garner a high level of labour and loyalty from their people.

The epicentral practice of building new temples with each ruler is the prime example of K-phase resilience-negative efficiency, as the constructions bolstered the ruler’s legitimacy by linking him to religious ideologies, strengthening both the ideology of legitimacy and the ideology of the religion. However, the sunk costs associated with such monumental constructions were extremely high due to the extensive maintenance required, the dependence on numerous resources, the required amount of labour and dedication of the people, the strength of the ruler and religion, and available building materials. The temples were extremely entangled with the system, so the society could not disengage from them easily, despite the problematic upkeep. Angkor’s epicentre, at this time, was at peak vulnerability, with a variety and abundance of dependencies needed to keep Angkor afloat.
The Ω-phase of Angkor (1219-1431 CE)

Larger Context. Within the Khmer Empire, rapid destruction over a few generations began in the late 1200s, marked by decline in constructions and the eventual near-abandonment of Angkor itself. Agriculture had become less productive and the water management systems also fell into disrepair. This caused less entangled stakeholders – the artisans, merchants, farmers, and labourers – to disentangle from Angkor, shrinking the already over-extended labour pool at Angkor. Military campaigns taxed the people and parts of Angkor were being chipped away.

Epicentral Collapse. After many years of path dependency and investment, why did people finally disentangle from the epicentre? Why did people leave the temples, palaces, religious features, the protection of the ruler and the walls, and the ideology? One theory is that the shift to Theravada Buddhism, in contrast to the Hinduism or Mahayana Buddhism of the rulers, weakened ideological investment in religious structures that were no longer representative of their religious beliefs (Briggs 1951:258-259). Numerous raids likely dissuaded the people from further believing in the protection of the epicentre and the power of the ruler. As was the general trend across Southeast Asia, the economy, too, had shifted away from inland agrarian centres in favour of coastal trade (Lieberman 2003:263).

Measuring Resilience. The Ω-phase is characterized by diminished social capital and reserves, rigidity and conformity prior to release, resilience-negative efficiency, and rapid unraveling of entanglements. Social capital diminished as, after Jayavarman VII, the leadership faced a downturn. Jayavarman VIII’s clear aversion to Buddhism possibly caused strain with his peoples, most of whom were Buddhist themselves (Daguan
People began to turn their backs on Angkor after a number of events damaged their faith in the ruler and the epicentre. Labour was directed towards the military and maintenance of the architecture and infrastructural elements rather than to new projects. Landscape modification and infrastructural commitments, including water works, roads, and temples, were entangled with overpopulation, topsoil degradation, deforestation, and erosion (Evans et al. 2007:14281; Fletcher 2012:303).

The α-phase of Angkor (after 1431 CE)

Dynamic innovation (or a regime shift) took place in the power transfer to Phnom Penh, as the sunk costs and entanglements at Angkor constrained the possible restructuring of Angkor’s epicentre. Prior to this, there may have been some attempts at dynamic restructuring where, while Angkor was failing prior to the Thai invasion of the capital, the Khmer attempted to stabilize the system back to its former structure and grandeur (Higham 2001:133, 139). The increased unsustainability of a massive epicentral capital and the new vulnerabilities produced by sunk costs in various entanglements made restructuring attempts unsuccessful. After abandonment, however, areas still held some religious significance and continued to be inhabited by monks (Stark 2006a:159).

Measuring Resilience. Resilience improved at Angkor itself in the reorganizational phase, as the major abandonment reorganized the former Khmer capital to a more prosperous location, and removed the population stress from the area surrounding the epicentre (Mabbett and Chandler 1995:212-213). Many of the stakeholders were able to disentangle from much of the web of the K-phase epicentre, including structures (e.g., temples, palaces, residences, sculptures, bas-reliefs), many of
the systems (e.g., administration), many activities (e.g., domestic activities, ceremonies, religious worship), and some ideologies (e.g., legitimacy). But not all of the entanglements unravelled, as Angkor’s religious structures still had significance. With these changes and restructurings, this phase saw an increase in flexibility, diversity, and innovation. Unfortunately, some potential exited the system, as the unsustainable practices had badly damaged soil fertility and the water management networks, leaving the remaining population with degraded landscapes and infrastructure (Fletcher 2012:303).

*Causes for Collapse*

Angkor’s collapse is multi-faceted and tied to matters of sustainability. At Angkor we see the increasing investment over time, and therefore growing entanglements. In an effort to maintain and establish legitimacy, the rulers of Angkor had to engage in numerous activities that created additional, and often unsustainable, entanglements. A K-phase rise in monumentality occurred, as rulers moved to the new capital of Angkor and built new structures that were bigger and better than the ones before to establish their legitimacy. This leaves a question of sustainability: how long can the land, resources, and ideologies provide for the increasing investment in monumental architecture, infrastructure, and the population that these attracted? Land and labour were finite resources being consumed by urban expansion. The ideologies and practices of Angkor, particularly those revolving around increasing monumentality to establish legitimacy, were unsustainable.
Angkor’s collapse can be attributed to a number of causes that weakened the system focused in the epicentre: 1) the practice of building a new capital with each ruler was unsustainable due to diminishing labour and resources pools, and the social capital of the ruler, which granted him the ability to mobilize labour and resources; 2) labour and resource pools were also diverted from the epicentre to military skirmishes with the Thais and Chams; 3) drought at the end of the MCA reduced agricultural yields as they no longer had the water needed to maintain the vast expanses of farmland; 4) the economic shift to the coast from inland, agrarian areas turned less-entangled people away from the capital of Angkor in favour of coastal cities; 5) the fragile barays did not have enough labourers to maintain them, which resulted in silting, which impeded water distribution, thereby reducing agricultural yields; and, 6) the diminishing social capital of late K-phase rulers, due to the loss of faith in the ruler’s ability to centralize and integrate the empire, resulted in a weakened epicentre that was eclipsed by other Southeast Asian epicentres. These factors acted on the other aspects through the various entanglements, creating a weakened state that was further undermined by the attack on Angkor by Ayutthaya.

**BAGAN**

*The r-phase of Bagan (100-1044 CE)*

*Larger Context. The r-phase began with Pyu communities in Myanmar, notably at* Sri Ksetra, *as discussed in Chapter 2. There were several settlements all over Myanmar, with a delimited pattern resembling low-density urbanism with hinterlands within a day’s walk of the epicentre. Modest monument building was occurring due to fewer people being entangled with the epicentre, thus limiting the labour and resources needed for*
construction (O’Reilly 2007:9, 18). This time period of Bagan’s history is marked by the consolidation of growing populations into urban settlements across the unoccupied landscape, as people gravitated to large centres of political and religious significance.

*The r-phase Epicentre.* Sri Ksetra and similar cities were early walled urban settlements, with the beginnings of entanglement in the niche constructions of sophisticated hydraulic structures, irrigation networks, and fortifications. Sri Ksetra contained important features that would appear in later epicentres, including a residence for a leader, demonstrating an increase in power and political complexity (Aung-Thwin and Aung-Thwin 2012:70). Sri Ksetra was also able to integrate the populace through coinage and Buddhist religious structures (Aung-Thwin 1985:160).

*The Transition from the r-phase.* Bagan’s transitional phase began with epicentral formation in 849 CE, after the decline of the Pyu settlements. The time period between the 9th and 10th centuries was one of unification of dispersed settlements in the region, centralizing around the epicentre, and the populating of a formerly sparsely-inhabited landscape, particularly around Bagan. This expansion was, in part, facilitated by the introduction of Minbu, Kyaukse, and the Mu River Valley as the agricultural centres for the region, and the increasing central authority and pull of the epicentre and its rulers. The transitional rulers introduced new forms of governing, including the introduction of legitimization through the sangha (Aung-Thwin and Aung-Thwin 2012:80-82).

*Measuring Resilience.* Decentralized, scattered settlements are indicative of high modularity to moderate modularity when including the integrating structures built across the landscape. The new innovations here increased entanglements through the niche construction activities of water management networks and fortified cities and
monuments. Social capital during this phase is unclear, but was likely increased over time, as there was some political complexity and hierarchy that elevated people of status. Top-down control management was limited, as the power of the chiefs was restricted mostly to Sri Ksetra, Bagan, and their immediate surroundings. The centres, whether allied centres of equal power scattered across the region, or as subordinate towns to a larger epicentre, were open, flexible, and diverse. Innovations, in the form of the building of elite epicentres, centralizing authority, and landscape modification, facilitated r-phase resilience.

The K-phase of Bagan (1044-1234 CE)

Larger Context. During the K-phase, the unification of Upper and Lower Myanmar expanded Bagan to its greatest extent. Intensification of agriculture and irrigation networks was occurring in the regions of Kyaukse, Minbu and the Mu River Valley, and the larger empire began to be integrated. Anawrahta’s reign (1044-1077 CE) was steeped in accumulation of resources, expansion (epitomized in gaining of coastal control), and increased management over infrastructural features (Hudson et al. 2001:51).

The K-Phase Epicentre. The sheer monumentality of this period is indicative of K-phase construction. By this time, the resources became locked up, diverted into a limited number of strategies, particularly in the case of the sangha. There were still new innovations in temple building. However, these were relatively few and minor in nature, as the functions, construction materials and techniques, and ideologies of these constructions were the same as in earlier periods. As time passed, even less innovative

The epicentre was an exclusive locale, meant for the elite of the population – both as a residence and as a place of court gatherings – which created a strong elite entanglement, as well as an entanglement for and with the serving class, and an integral entanglement between the epicentre and the structures that it contained (Aung-Thwin and Aung-Thwin 2012:80). Anawrahta increased entanglement by tying the ruler’s legitimacy to military prowess, so it became equally as important as lineage (though still less important than merit) to establish legitimacy at Bagan (Htin Aung 1967:50).

The Transition from the K-phase. The late K-phase began around the end of Htilominlo’s reign, and is marked by rulers who did not leave significant structures behind. At Bagan it was not unusual to have a succession of inconsequential rulers; however, the ineffective Kyazwa, Uzana, and Narathihpade were the last rulers of Bagan before its collapse, which suggests a decline rather than normal fluctuations. The royal treasury was empty and constructions of the state were halted, though the sangha continued to build religious monuments (Htin Aung 1967:64-65). As the power of Bagan began to wane, the authority and legitimacy of the ministers increased, as did the status of the officials tasked with protecting the empire from Mongol invasions (Aung-Thwin 1998:53). The rising power of such agents implies that they were possible contributors to the decline of the ruler’s authority.

Measuring K-Phase Resilience. From the r-phase to the K-phase, growth and intensification was rapid. However, as growth slowed and the system focused on a smaller number of reserves and consolidation, the once significant reserves of land,
surpluses, labour, and other sources of money diminished until they reached a nadir during the late K-phase. These reserves had been depleted from the state and were locked into a system of diversion to the sangha, which meant fewer reserves were freely moving in the system. Many rulers tended to have varying degrees of social capital during their reigns. However, even rulers with higher social capital and effectiveness were constrained by the mandala nature of the state, which reduced their social capital and top-down control management, especially with increasing distance from the epicentre.

Conformity, uniformity, top-down control management, and rigidity signified K-phase Bagan, beginning most notably with Anawrahta’s reign, as there was a continued upkeep of old structures with which the people were entangled, including maintenance of old water management systems, rebuilding old forts that had fallen into disrepair, and the greater exertion of power over distant territories (Lieberman 1987:168). During this time, we also see redundancy, a resilient trait, in political power in the reigns of rulers whose ministers ruled in their stead, and in the governors and other officials who ruled outer settlements as an extension of the ruler. Further redundancy appears in the form of the sangha, which, as discussed in Chapter 4, fulfills similar roles as the ruler, including agricultural investment, having a serving class to perform domestic activities, creating temples and infrastructure, and acting as an integrating force for the people of the state.

The Ω-phase of Bagan (1234-1287 CE)

Larger Context. Although there is a dearth of reasons behind Bagan’s collapse, it is generally agreed upon that, in the late 13th century, Bagan’s power had profoundly declined, allowing it to become subject to military incursions. Having previously fended
off military campaigns before, Bagan’s system was likely severely weakened and highly vulnerable in the late K-phase. During the Ω-phase, after Bagan was reduced to a city from an empire, a king called Kyawzwa continued to rule in the latter half of the 13th century, albeit in a lesser capacity when compared to his predecessors (Hudson 2004:28).

*Epicentral Collapse.* After the 12th century, constructions took a downturn, particularly the ones commissioned by the ruler. This was, in part, because the ruler’s power and authority was being undermined by the sangha (Aung-Thwin 1985:164-165). The flow of wealth and ideological investment to the sangha had depleted the ruler’s reserves, and the ruler lacked the land and power to expand the epicentre. After a succession of weak and arrogant rulers, and a series of attacks from the Mongols, faith was lost in the power of the ruler and court, and the aspects of the epicentre were no longer centred in the capital (Aung-Thwin and Aung-Thwin 2012:104; Htin Aung 1967:63). The common people began diverting their abilities and service to the sangha rather than the rulers and elites. Aung-Thwin and Aung-Thwin (2012:103) cite the disintegration of the socio-political system of Bagan, particularly the splintering of power between the sangha and the ruler, as a defining feature of state decline. The temples of Bagan were tied to the ruler’s legitimacy and social capital, as they acted as places of worship for the people, places for gatherings and meetings, and as symbolic structures for the ruler’s power. By failing to build temples, the ruler was failing at his duties and negating the needs of the people. Depleted resources, labour, and the ability to mobilize labour hampered the ability to maintain the same practice of monumentality as achieved by the ruler’s predecessors.
Measuring Resilience. Consistent diminished social capital began with the ineffective and unpopular leaderships of Kyazwa, Uzana, and Narathihpade. Top-down control is most exemplified in the forced labour Narathihpade used to build Mingalazedi. Bagan had increased centralization from the former scattered Pyu settlements, to the unification of much of Myanmar under one ruler. However, as it declined, political power became split among several different stakeholders: the ruler, the sangha, and other leaders (including ministers, governors, and local leaders), both in the epicentre and at outer settlements. Redundancies shrank in favour of the sangha becoming the main beneficiary. Innovation and diversity were low, with the system already being locked into different path dependencies. The aspects of the late K-phase – the conformity, uniformity, and rigidity – were causes for the collapse of the epicentre, though these aspects would change during reorganization.

The α-phase of Bagan (after 1287 CE)

Bagan’s attempt at reorganization may have first been an attempt at dynamic restructuring. By placing Kyawzwa, a son of Narathihpade, on the throne, they may have hoped to re-establish Bagan’s sovereignty after collapse (Htin Aung 1967:71-75). After this failure, Bagan’s remaining power was dispersed between the two cities of Ava and Pegu. Ava, as a rice-growing polity in Myanmar’s Dry Zone, acting as a “lesser Bagan,” may indicate some form of successful dynamic restructuring (Aung-Thwin and Aung-Thwin 2012:110-112). The possible reason behind the restructuring success is the partnership with Pegu, an example of dynamic innovation, as it invested in a new, more
lucrative coastal trade economy. Bagan did not disappear completely, however, as the centre still has religious importance even into modern times.

*Measuring Resilience.* There were still some path dependencies that continued in Bagan’s epicentre with regards to religious structures. While new temples were not constructed, ideologies were still invested in and entangled with Bagan’s existing temples. Epicentral power and kingship were shifted to two cities, Ava and Pegu, the combination of which was able to exploit multiple resources, despite the fact that they only lasted 200 years (Aung-Thwin 2011:2). They were entangled with each other, as Pegu relied on rice production from Ava and Ava relied on Pegu’s coastal trade products. Ava still struggled with exited potential in agricultural yields and the less propitious monsoons after the MCA (Lieberman and Buckley 2012:1079). However, due to these new strategies, this period was marked by an increase in diversity, innovation, flexibility, and openness.

*Causes for Collapse*

Bagan’s lack of diversity, unsustainability, and numerous entanglements proved problematic by the 13th century, and collapse was driven by a lack of social capital of rulers and the constraining relationship with the sangha. The causes for this system change is due to a combination of factors: 1) the rising power of the sangha and shared power with ministers reducing the power of the epicentre and the ruler through the diversion of resources; 2) the Southeast Asian trend discussed earlier, involving the shift from inland agrarian centres located in “Dry Zones” to coastal trading entrepôts; 3) environmental change and droughts at the end of the MCA diminishing the agricultural
yields and surplus; 4) vassal cities growing stronger due to military successes, which brought about strengthened faith in these cities (ergo, stronger social capital) and diverted investments away from the epicentre; and, 5) military campaigns leeching funds and labour away from infrastructure maintenance. This all led to the diminished power centre with the Mongol raid, if it existed, acting as a further catalyst for collapse.

SUKHOTHAI

The r-phase of Sukhothai (500-1278 CE)

Larger Context. While it is debated whether Dvaravati was an early kingdom, a complex chiefdom, or a region comprised of several polities sharing one culture, political power was relatively limited. Aspects of early state formation were relatively restricted and the state was integrating and cohesive only in its culture and art, which gave the people a Dvaravati identity (O’Reilly 2007:65-67). The Dvaravati exploited several resources and were characterized by rapid movement into sparsely populated landscapes, rapid population growth, and new innovations.

The r-phase Epicentre. Nakhon Pathom, the possible epicentre of Dvaravati, does exhibit monumental architecture in the form of several religious structures, including Phra Pathom Chedi, a massive stupa typically dated to the Dvaravati period (Kusalasaya 2006:4; O’Reilly 2007:79). The people of this culture were likely drawn to a centre like Nakhon Pathom due to its monumental and significant religious places structures. Larger settlements were probably places of residence for chiefs, as political complexity was increasing during this time. Social stratification and hierarchies existed at smaller scales, but the leader had enough power to enter trade arrangements with China, facilitate trade
along waterways, fund monumental constructions, and produce coinage (O’Reilly 2007:66, 80, 88-90).

The Transition from the r-phase. The time period that followed was one of Khmer control over Sukhothai, particularly under the reign of Jayavarman VII. After claiming independence from Khmer rule, Sukhothai remerged as an independent polity. This phase is characterized by modest constructions, low population, and lack of extensive water management features or inscriptions. Si Indradit’s reign is marked by the first important epicentral features, such as a palace and religious monuments dedicated to Buddhism and local animistic beliefs (Rooney 2008:100, 110). The location of the palace in the epicentre, compared to the religious complexes to the west of the epicentre, indicates some amount of mobility.

Measuring Resilience. As it was characterized by high modularity, flexibility, diversity, innovation, and redundancies, the r-phase of Sukhothai was highly resilient. The Dvaravati’s high modularity comes from the independent communities and the lack of continuity between settlements, as seen in the lack of a cohesive coinage and political structure over the region, which also indicates low top-down control, high diversity, and high redundancy. However, there was some social stratification and hierarchies, which may signify a small degree of top-down control. The epicentres at this time may have simply been a number of settlements that exerted a limited amount of control over small regions, which is indicative of low social capital, but a redundant system with several centres of power. Innovation in the form of these new hierarchies, monumental constructions, and trade relationships are indicative of a flexible and open epicentre.
The transitional phase of Sukhothai is characterized by moderate modularity, as seen in the lack of water networks and the distance between the palace and religious structures, though they were gathered around a general epicentral area. Si Indradit had moderate social capital, as he was able to begin the unification of a kingdom, establish himself as a ruler, and build his own constructions at Sukhothai.

*The K-phase of Sukhothai (1278-1370 CE)*

*Larger Context.* This time was characterized by consolidation and intensification, with focus on the expansion and centralization of Sukhothai. During Ramkhamhaeng’s tenure (1278-1298 CE) he fostered new innovations and saw rapid growth and accumulation, along with a significant increase in power. Monumentality increased significantly, and the construction of the permanent epicentre indicated a lack of mobility. The Phra Ruang road, an important integrative mechanism, enhanced trade through transport and provided a route for pilgrimages (Rooney 2008:22).

*The K-phase Epicentre.* Sukhothai was inclusive of Buddhism, Hinduism, and to some extent animism, which acted as a means to further entangle the citizens of Sukhothai through varied religious beliefs, practices, and edifices. Tolerance and celebration of Hinduism garnered the loyalty and appreciation of the minority population (Dumarçay and Smithies 1995:56; Rooney 2008:147). Religious artefacts helped strengthen ties between the people and the epicentre, and also entangled individual structures and complexes with specific items of material culture. Human-human entanglements reached a height. The faith of the rulers played a role in the satisfaction and the love of their people, as many stories about the extent of their religious dedication
and their good will enhanced their personalities in the eyes of their people and increased their legitimacy. The ruler also depended on the royal family and the court for their support and loyalty to help administrate the vast landholdings, and they also fostered a strong relationship with their people, possibly on a personal level (Rooney 2008:23-26).

*The Transition from the K-phase.* The later K-phase kings, Lothai and Li Thai, were responsible for the massive water network consisting of the Saritphong Dam and the Sao Ho Canal (Rooney 2008:71, 148). Li Thai’s reign saw additional expansion of the powers and extent of Sukhothai, as he established Kamphaeng Phet to the south and made it an important military location. However, Li Thai’s reign was also characterized by the loss of some territory to enemy states (Rooney 2008:23-24). Neither succeeding ruler was as prosperous and successful as Ramkhamhaeng, but there was not a severe downturn until after Li Thai’s reign. The elites and those who served them began to move elsewhere as power shifted (Lieberman 2003:270).

*Measuring Resilience.* One of the reasons behind the success of Ramkhamhaeng might have been his reign, which coincided with “the sweet spot” of the adaptive cycle. During his reign, the accumulated resources were not completely locked in, there was still moderate room for innovation, the system had limited openness, and there were enough significant reserves remaining from the r-phase to stimulate intensification. Growth during his reign was rapid. Ramkhamhaeng had relatively high social capital and his military conquests expanded Sukhothai’s hegemony. His reign was also the beginning of a high level of top-down management at Sukhothai. Lothai and Li Thai both worked under a system of conservation and diminished redundancies in regards to water
management, with the epicentre fully entangled with and dependent on the Saritphong Dam and Sao Ho Canal.

_The Ω-phase of Sukhothai (1370-1438 CE)_

**Larger Context.** Few inscriptions exist from the following period, and the rulers of this time are unknown. Sukhothai was struggling, losing power as it slipped from being a powerful empire to a tributary state (the transition to subordination and sending tribute to Ayutthaya, while still being its own semi-independent entity), and eventually to a province of Ayutthaya (Evers 1987:755; Rooney 2008:24-25). Sukhothai lost territory and power over decades until its final loss, which was not in the form of a battle, but a moderately peaceful, political changeover.

**Epicentral Collapse.** There were still structures being built at Sukhothai in the 14th century, though monument building was in decline (Dumarçay and Smithies 1995:58). The authority of the ruler was therefore waning as the kingdom was slowly reduced in size and power. Epicentral power was being transferred to Ayutthaya as economic power shifted to coastal trade. The loss of the Sukhothai elites and their “service” class meant their resources and loyalties were removed from the epicentre, which degraded its religious significance and authority. Sukhothai had lost its power as an epicentre as a larger authority took its place, but people did not draw away from it entirely, and it was not completely abandoned (Rooney 2008:24).

**Measuring Resilience.** Later rulers had diminishing social capital, as there are no historical records attesting to their deeds and glories, and both territory and power were progressively lost. The water management network augmented the rigidity and resilience-
negative efficiency of the late K-phase, tying the epicentre with one main form of high maintenance water management, which contributed to the decline. As the labour was diverted towards the military, the infrastructure and monuments of the epicentre were neglected, and there was a downturn in crop output, which itself resulted in the inability for the epicentre to provide for the population and maintain its various epicentral activities.

*The α-phase of Sukhothai (after 1438 CE)*

Sukhothai responded to the change with dynamic innovation politically and ideologically, reorganizing itself as a province of Ayutthaya. People did not have to completely disentangle from their investment in the epicentre and religion at Sukhothai. However, as the political power of their own rulers failed, they were forced to disentangle from Sukhothai-centred administration in favour of a more distant administrative power.

*Measuring Resilience.* This phase of Sukhothai’s cycle was open and diverse, with flexibility and innovations increasing its resilience. The latter was due to Sukhothai’s reorganization as a province, which marked a change to a new system, though still maintaining some of its potential. While both people and administration left the epicentre, being absorbed by another kingdom, Sukhothai retained and maintained some of its resources, including its temples and religious ideologies, at the same time as it promoted infusion of new innovation into the system.
Causes for Collapse

Sukhothai’s collapse was brought about due to the following factors that weakened its system: 1) the general shift to maritime trade over inland agrarian centres empowered the commerce of Ayutthaya while damaging Sukhothai’s economy; 2) labour and resources were diverted to military operations and away from epicentral maintenance and expansion due to constant attacks from surrounding states; 3) military losses depleted the labour and resources both in populations lost to warring states and these finite labor pools being diverted from the epicentre; 4) drought at the end of the MCA diminished crop yields; 5) declining social capital caused by the loss of the elite and the loss of territories bred an ineffective kingship that the people could not trust; and, 6) failing infrastructural systems – harmed by the lack of maintenance – impeded epicentral activities and led to a loss of integration.

SUMMARY AND CONCLUSIONS

The r-phase of the charter states exhibited high flexibility brought on by high diversity, innovation, redundancy, and moderate to high modularity. Social capital changed with each ruler, but was moderate overall, with little top-down control and management due to the emergent nature of kingship and epicentral power. In the transitional and earliest portion of the K-phase, the centres were still rapidly expanding, but they subsequently began slowing in terms of growth and innovation capacity as focus shifted to conservation and intensification. Centralization reached a peak during the K-phase. However, the political powers still managed to have relatively low top-down control management and power was split between religious institutions, government officials, and the ruler. The peak K-phase of the charter states was characterized by high
rigidity brought on by uniformity, conformity, diminishing reserves, and increasing resilience negative efficiency in the form of path dependencies. These closed systems, however, were unusually redundant for a K-phase society, many facets of the entangled epicentre overlapping in responsibilities, and they possessed higher modularity than expected due to the mandala nature of the empire and epicentre, thereby deviating from the expectations of a typical K-phase society (Iannone 2015).

Angkor, Bagan, and Sukhothai all suffered from environmental changes acting on a vulnerable system. The end of the MCA was marked by drought and less predictable rainfall, for which these agrarian centres suffered. The general shift to maritime trade-based economies put a strain on these states and the ruler’s legitimacy, which was tied to the success of the epicentre and state as a whole. Angkor created an unsustainable pattern of legitimization through monumentality, and the failing social capital of the late K-phase rulers may have been a source of discontent for its people. Bagan’s donations to the sangha were responsible for depleting its resources, as were its defences against the Mongols. Similarly, Sukhothai’s constant battles with neighbouring states depleted its labour force, and its integral systems also began to fail as a result.

Charter state collapses are complex and multifaceted, being the result of over-entangled and vulnerable socio-ecological systems. The charter states “came under mounting internal and external pressures. In the second half of the fourteenth century these culminated in a generalized economic, political, and in some cases cultural collapse, an era of fragmentation and disorder” (Lieberman and Buckley 2012:1068). This thesis has discussed the definition and features of the epicentre, the entanglement and resilience of these, and made conclusions about vulnerabilities that led to collapse.
The concluding chapter will sum up the research questions and examine the effectiveness of the model used.
CHAPTER 6: CONCLUSIONS

The goal of my thesis has been to examine a sample of charter state epicentres, using resilience and entanglement theory, to better understand their collapse. This approach served not only as a way to discover how entanglements at these epicentres made them vulnerable to collapse, but was a way to test the validity of this interpretative model. By examining the features of Southeast Asian epicentres, including the structures, stakeholders, and activities associated with them, and contextualizing this information within the broader intellectual understanding of the charter era itself, I was able to come to some conclusions about the probable factors that led to each collapse. In the next sections, I will address the interpretive model’s effectiveness, and provide some answers to the research questions posed in Chapter 1.

THE INTERPRETIVE MODEL

The interpretive model is a combination of resilience and entanglement theories, entanglement acting as a bridge between resilience theory and the archaeological evidence. Tanglegrams were drawn for each epicentre based on the data for different features making up the epicentre, so that the highly-connected and highly-dependent systems prior to charter state collapses could be examined. Then the adaptive cycle was applied to the histories of the region based on the characteristics set forth in Chapter 3. As these adaptive cycles were addressed, the continua of resilience, which indicate how resilient a society is, were examined for each phase. Entanglements, in conjunction with the continua, were determining factors in each phase’s resilience.
This application of resilience and entanglement theory works best when coupled with a society that has extensive historical records, as many of the entanglements are ideological or otherwise not easily visible in the archaeological records. Nevertheless, without historical evidence, some inferences can still be made from archaeological findings. Some continua of resilience may also not be applicable due to a lack of information. Still, even incomplete entanglement webs can prove useful for examining socio-ecological systems. The adaptive cycle, though based on ideals, is also equipped to deal with deviations, as long as they are understood and addressed as such, including the apparent redundancies in charter state systems that are atypical of an ideal K-phase society. Over all, this method is useful for understanding the collapse and resilience of past societies, particularly when coupled with extensive historical and archaeological records that are able to demonstrate the numerous facets of the epicentre.

THE RESEARCH QUESTIONS

1. **What architectural features makeup the epicentres?**
   a. **Did the architectural inventory change over time, and if so, how and why?**

   The epicentres of Southeast Asia were comprised of the palace, living quarters for the elite, religious structures, administrative structures, water management features, roads, the royal treasury, tombs, and inscriptions. That is not to say that these features were ubiquitous through time and space; at each epicentre, these architectural features varied. As a general trend, architectural features increased in monumentality and frequency from the r-phase through the K-phase. After the K-phase, construction waned until no new structures were being erected.

   *Angkor.* Palaces and elite residences were present in the epicentre from the r-phase of the Angkor sequence, which grew in monumentality and frequency over time
(given the increase seen in occupation mounds in the cities), as more elites moved into the growing epicentres. Religious structures, as well, were one of the features continuously present in the epicentre. These structures changed from r-phase shrines to temples, which later became specialized (monasteries and ancestral and state temples, the latter of which became tombs starting with the transitional r-phase), more monumental, more embellished, and more frequent into the peak K-phase. Buddhist structures became more frequent during and after Jayavarman VII’s rule (1181-1219 CE), as opposed to previously Hindu forms. Administrative structures, only known to be present from the transitional r-phase, became more permanent and more heavily adorned in the peak K-phase. Roads, inscriptions, and the treasury became more prominent during the K-phase. Water management in and around the epicentres changed from dykes, small reservoirs, and canals to massive barays (culminating in the West Baray and decreasing in size, even during the K-phase) and more extensive systems of transportation and irrigation.

Afterwards, stakeholders carried out their activities with the architectural inventory already in place, rather than creating new features.

Bagan. In the r-phase at Pyu settlements, the palace, elite residences, religious structures, water management features (in the form of wells, moats, reservoirs, and drainage channels), storage houses, and burial grounds were all present. However, as power transitioned to Bagan, the architectural inventory changed. There is little evidence for inscriptions and tombs at this time, though administrative structures, stupas, evidence of Hindu influence, and a change in water management features (now primarily reservoirs) are evident. Monumentality and frequency of religious structures and inscriptions increased into the K-phase with the growing wealth of Bagan. However,
most significant water management features were in rice-growing regions, roads were not prominent at any period due to the lack of trade and widespread redistribution, and there was no central treasury or storage in the epicentre. As the state moved into decline, wooden structures, such as palatial constructions and monasteries, became more frequent, and new permanent, monumental religious structures were not built.

Sukhothai. Sukhothai’s r-phase predecessor, the Dvaravati settlements, suffers from a lack of scholarship and it can only be noted that brick religious monuments were being constructed, waterways facilitated trade, and elite residences were present at capitals, but may not have been exclusively featured. The transitional phase had varied religious structures (Hindu monuments, stemming from Hindu Khmer rule, animist shrines, and Buddhist monasteries), a palace, wells, and roads. Into the K-phase, we see the introduction of monumental Buddhist temple complexes. Water management appeared mostly in the form of moats and ponds associated with temples. The palace, monasteries, inscriptions, administrative structures, and roads were present. However, cremation appears to have increased in popularity (though the ashes of a ruler may have been enshrined in a later stupa). As Sukhothai passed the peak K-phase, epicentral water management saw an upturn with the Saritphong Dam and the Sao Ho Canal, a much-needed feature if Sukhothai was growing some crops in the centre. Temples and monasteries were still being built, even in the release phase, as Sukhothai still continued to hold religious significance.

2. How were the various architectural features organized vis-à-vis each other? a. Did these change over time, and if so, how and why?

For all states, the epicentre was the most densely packed node, as the centre of the mandala, with the structures outside becoming more sparse and scattered. We have
already noted the features located within and outside the city walls over time and the change of the inventory would have altered the layout of the epicentre. The following further explains the changing architectural layout.

**Angkor.** Angkor Borei and the epicentres of Funan were less spatially organized, though organization increased in the r-phase with Chenla. Chenla’s walled precincts, in particular, showed an organization that had a Hindu sanctuary in the centre and further temples arranged on a more orthogonal pattern. Although the epicentre moved with each ruler beginning with the late r-phase and becoming more frequent in the K-phase, the architectural arrangement followed a typical pattern. In the transition to the K-phase, the state temple became the centre of each epicentral complex with ancestral temples typically in their own complexes outside of the epicentre. The K-phase marked the disappearance of irrigated fields from the epicentre and Buddhist monuments appeared in more central spaces. The palace, it should be noted, was not the centre of the city in K-phase Angkor and large water management constructions were usually, since the r-phase, outside of the city walls. The enclosure of Angkor Thom, the lasting epicentre for the later K- and Ω-phases, had a central state temple (Buddhist), a royal sector in the northeast, and several older epicentres, which made their temples no longer as central.

**Bagan.** Compared to Angkor and Sukhothai, Bagan’s layout is more scattered. From the r-phase transitioning into the K-phase, fewer hydraulic constructions appear in the epicentre with a preference for numerous temples arranged quite close in proximity. Most water management features, save for small reservoirs near temples, were located in agricultural regions. The palace, likely built in the transitional or K-phase, was a centrally located structure. Elite residences would have been in the epicentre, though hopefully
future surveys will reveal more about the occupational layout. The epicentral complex was small, meaning the elite residences, the palace, religious and other structures would have been in close proximity, particularly as the epicentre began to fill with monumental constructions. Into the K- and Ω-phases, constructions, particularly monumental temple constructions, moved outside city walls, in part due to a lack of space.

_Sukhothai._ The Dvaravati settlements and epicentres of the r-phase were less densely clustered, were usually located near rivers, and had agriculture plots in their settlements, amongst residences and religious structures. Unfortunately, there is considerably less information on these scattered settlements and it is unclear what might have been a typically arranged epicentre. The early Khmer outpost of Sukhothai was also more sparsely populated, with some Hindu constructions in the epicentre. As the state transitioned to the K-phase, monasteries were constructed outside of the city walls and the epicentre was home to the palace. By the K-phase, however, the palace might have been moved from the very heart of Sukhothai to a different location (depending on the actual function of Noen Prasat). Religious structures, such as Wat Mahathat, took up prominence at the centre of the epicentral complex. The typical Sukhothai Buddhist complexes were always composed of an assembly hall, an ordination hall, and a stupa and were usually accompanied by a water management feature.

3. What symbols, statuses, roles, and activities were situated in the epicentres?
   a. Did these change over time, and if so, how and why?

   The epicentre housed not only elite statuses and roles, which included the ruler, the royal family, the court of officials and bureaucrats, and elites, but also the attendants who served them, such as cooks, scribes, pages, cleaners, concubines, people who maintained the structures of the epicentre, and guards. The activities of the epicentre
included domestic activities, administration and justice, ceremonies, games, festivals, religious activities (including worship, offerings, and the housing of relics) burials for royals, and record keeping, and as a whole the epicentre stood as a source of legitimacy, symbolism for religious and political might, and a force for connecting the wider community.

Angkor. The Angkor sequences r-phase rulers were less powerful rulers, possibly “chiefs,” with decentralized authority. Angkor Borei and Chenla were places to worship Hindu gods and may have been home to both elites and non-elites. However, the trend continued towards centralizing authority, larger capitals, more powerful rulers, and more monumental displays of power and legitimacy. The idea of the epicentre being representative of ritual and political power led to an increase in monumentality and elaboration (such as bas-reliefs). Burial of rulers in state temples began, and increased social stratification led to an expansion of those people serving the elites by engaging in domestic activities such as cleaning, cooking, and entertainment. From the beginning of the r-phase, the community was connected through a system of buildings across the state, which reached a zenith during the peak K-phase. The Ω-phase saw a conflict of religion between the state and its people (the former being Hindu and the latter being Buddhist). Authority was declining, though administration was done publicly. Royal processions acted as a display of power when monumental constructions were on the decline.

Bagan. Sri Ksetra administrated over regional territories, contained burials, storage, and agriculture, was a place of Buddhist worship, and was maintained by the domestic activities of the royal court, which was facilitated by servants. Early Bagan had an established monarchy and it grew in centralization through alliances and coercion.
Early religious activities included the first sasana reforms, which would grow in significance, but saw few burials and cremations. At the start of the K-phase, legitimacy was tied with military prowess. Onward, there was increasing administration and centralization, and growing emphasis on Buddhism and merit. Festivals were held for the common people and domestic activities continued primarily in the serving of the sangha and to some extent, the elite. However, as opposed to the r-phase, there was less emphasis on commerce in the epicentre and agriculture grew outside it. By the Ω-phase, administration had shifted from the ruler to the religious sector. Epicentral authority weakened as it was divided amongst different stakeholders.

*Sukhothai.* The early Dvaravati settlements were both Hindu and Buddhist and the epicentres may have been home to rulers with some form of central authority. Hinduism, Buddhism, and animism were all worshipped simultaneously at early Sukhothai, and all had ceremonies related to them. Legitimacy of the ruler became steeped in Buddhism and the ruler was to act as a divine representative. During this time, domestic activities were occurring, revolving around the ruler, court, and monks, all served by the common people. Trade waned in importance somewhat from the previous Dvaravati model. Buddhist practices eventually became prominent in the K-phase, though there were some residual animist practices tied to legitimacy. Worship at the temples of the epicentre was for all people – elite and common – and this acted as a centralizing force for the community. The K-phase epicentre saw an increase in administration, merit, and domestic activities. Into the decline, some activities continued, such as burials, religious worship, and the recording of histories. However, legitimacy and administration changed in Ayutthaya to reflect Angkor models.
4. Who invested materially and ideologically in the epicentres?
   a. Did this change over time, and if so, how and why?

   The various stakeholders – the ruler, royal family, bureaucrats, elite, monks, religious figures, servants, artisans, merchants, labourers, and farmers – all invested in the epicentres in some manner. Materially, the elite, government officials, and religious figures typically invested their resources and wealth, while merchants, farmers, labourers, and artisans invested their labour and resources. Ideologically, all stakeholders were invested in epicentres.

   **Angkor.** As the rulers grew more powerful and expanded the epicentres, more people were drawn into investment. The elites were given administrative roles and commoners saw more benefits and opportunities arising from the epicentre. Spiritual masters and servants were tied to the epicentre and ruler through their service to them, and the commoners were tied through religious sanctity, their roles, and their labour. Into the K-phase, religious figures and court officials grew more invested, the former growing in power at Angkor as the religion changed to Buddhism and became funded by the state, and the latter gaining more of a hand in administration as the empire grew. Merchants and artisans could now ascend the ranks to become wealthy elites, and a growing number of labourers and artisans were needed for projects while more servants (including doctors), attendants, and farmers were needed. However, after Jayavarman VII, unsuccessful rulers withwaning social capital put less material investiture into the epicentres. The people were still invested in the epicentre, but were overextended.

   **Bagan.** From the earliest period, the rulers invested in their epicentres, as did the administrators who kept control over distant territories. Elites and commoners (particularly guards) may have both called the epicentre home. From the transitional
period onward, farmers and labourers were less invested, as the farming regions were far away from the epicentre, and many labourers were imported to the epicentre from surrounding areas. However, the labourers would have felt connection to the epicentre through the structures they helped build. The sangha and the ruling elite grew in power into the K-phase, and increased patronage to the construction of monumental temples due to increased investiture in the concept of merit and legitimacy. Common people, too, increased temple donations and labour. Merchants were less involved in the K-phase, but provided supplemental revenue to the epicentre. The shift to Ava and Pegu, however, brought with it increased importance for merchants. During the decline, people began to disengage with the epicentre and the ruler in favour of the sangha and far-reaching, more successful administrators.

* Sukhothai. Merchants, farmers, and rulers/chiefs were most engaged with the Dvaravati epicentres. When Sukhothai was a Khmer outpost, Khmer rulers were invested in the centre and built structures and fostered Hindu ideologies. However, when Sukhothai gained its independence, Buddhism became the religion of the state and monasteries were built by the epicentral stakeholders. Servants to the elite (including scribes, cooks, etc.), artisans and labourers involved with construction, farmers, and merchants providing the basis for the economy were all becoming more invested in the epicentre they were charged with building and supporting. Merchants, though not as prominent as farmers, could enjoy free trade in the epicentre, and some farming was occurring inside the city walls. As Sukhothai fell into decline, however, epicentral stakeholders, especially elites and merchants, shifted their interest to Ayutthaya, which had more lucrative opportunities than a declining Sukhothai could offer. Ayutthaya’s
rulers, however, did invest some in Sukhothai, which was a place of religious significance.

5. Who maintained and modified the epicentres?
   a. Did this change over time, and if so, how and why?
   b. Did construction practices change over time, and if so, how and why?

Material maintenance and modification was achieved through repair, embellishments, and adaptations, but centres required ideological maintenance as well. All those who invested in the epicentres, as stated above, were maintainers of the epicentre. As their investitures changed, so too did their maintenance. Maintenance and repairs declined as stakeholders disengaged.

_Angkor_. Constructions were primarily modest religious monuments made of brick in the r-phase, but they grew more monumental and began to shift to sandstone in the 10th century. The use of sandstone in secular constructions began in the K-phase, and bas-reliefs began to include a larger variety of topics, including imagery of the lower classes and daily life that flourished with Jayavarman VII. The most notable construction change in the release phase is the loss of the creation of the new-epicentre tradition for each ruler, and the overall decline of new permanent structures. During the decline, the Jayavarman VIII invested in embellishments and modifications to Buddhist imagery to change their properties to align with his Hindu beliefs.

_Bagan_. At Bagan, in particular, the role of the sangha in epicentral maintenance shifted from a more modest role in the r-phase to a shared role with the ruler (primarily achieved as a result of the ruler funding the sangha) to being the predominant builders and maintainers of construction. Brick Buddhist architecture characterized Sri Ksetra and early Bagan. Over time, while brick was still the primary construction material, more
monumental temples were constructed and new forms were innovated, including the pentagonal temple structures. In the K-phase, constructions often mimicked older forms, and the majority of construction moved outside the city walls as the epicentre became packed with structures. Civic structures and decorative features such as frescoes, increased. Construction funding during the decline was primarily provided by the sangha, and monumental brick constructions ceased and wood structures became more popular.

Sukhothai. At Sukhothai, as at Angkor, some structures were refitted to reflect a change in religion. For example, the Hindu Wat Si Siwai was modified into a Buddhist temple.

The Dvaravati settlements primarily built brick religious monuments dedicated to Buddhism and Hinduism. At early Sukhothai, laterite, brick, and stucco, with a combination of wood, ceramic tiles, and rock as decoration, were used in epicentral constructions. Monumentality increased and, in the late K-phase, massive water management features were created when previously, modest reservoirs, moats, and ponds had been the norm. The most notable construction change during this time was the creation of a distinct Thai style, and the end to mimicking the art forms of other states. Buddhist structures were predominant, but there was also construction of civic buildings. After being absorbed by Ayutthaya, some architecture continued to be built both in and outside the epicentre.

6. What role did city walls play in defining epicentres?
   a. Did the role of city walls change over time, and if so, how and why?
   b. Did the meaning of city walls change over time, and if so, how and why?
   c. Were there significant differences between the symbols, statuses, roles, and activities found within and outside the city walls?
City walls separated the epicentre from the rest of the state, restricting access to the most important epicentral activities, structures, and stakeholders. City walls had a number of functions and roles. They served as fortifications, modification of natural landscapes, a display of elite status, and/or a showcase of the kingdom.

*Angkor.* The r-phase of the Angkor sequence saw the presence of city walls accompanied by moats. These walls, which may have been intended, at least at the very beginning, to divert flood waters, increased in number as precincts became walled off and, in the transitional r-phase and K-phase, walls were built around temple enclosures. During the K-phase, the epicentre was separated from the fields by the walls and, eventually, Angkor Thom’s walls became the permanent epicentral markers and encircled older structures and previous epicentres. However, when power shifted from the epicentre, the meaning and role of the walls changed. These walls no longer sectioned off administration and elite statuses. Rather, they marked important religious structures. In general then, the area within the city walls was primarily restricted to the royal household, elites, bureaucrats, and the servants who tended to these stakeholder groups. Farmers, labourers, artisans, and merchants – while at times being able to enter the kingdom to view proceedings or perform tasks – were not considered occupants of the epicentre. Agriculture and commerce, too, were activities that occurred primarily outside the epicentre.

*Bagan.* The first city walls and moats at Sri Ksetra seemed to have served a fortification function. At Bagan the walls served as a way to separate rulers and elite from common people, and they acted as a showcase for the kingdom. The walls therefore served as a display of differentiation and separation. As religious constructions occurred
outside and inside the walls, the walls were primarily a reflection of elite status and civic-secular activities. However, these walls eventually changed, and lost significance as power shifted and Bagan fell from epicentral status.

Sukhothai. The first fortifications around Dvaravati settlements were likely defensive in nature. At early Sukhothai walls demarcated the civic part of the epicentre, as many of the earliest structures (such as the monastery Wat Aranyik) were built outside the walls while the palace was inside. Religion, though, began to be more predominantly incorporated into the epicentre over time, although it retained its administrative and elite function. The ruler’s status as a “father” to their people, and the ability for the common people to approach the palace about grievances indicates the walls were less divisive than at other epicentres. However, as elite power waned, the walls no longer signalled separation.

7. What was the overall significance of the epicentres?  
   a. Did this change over time, and if so, how and why?

Epicentres were the centre, gravitational force for the state, acting as the seat of government, administration, political power, and religious sanctity.

Angkor. At the less powerful, smaller epicentres of Angkor Borei and Chenla, the epicentre became the source of unification and centralization, helping to shift the society towards statehood. This centralization and authority increased over time, the epicentre becoming the benefactor of investments. The epicentre was the source of unification for the rest of the state. The epicentre later became the religious centre of the state and housed the linga for the state cults. In a way, the epicentre was also representative of the power of individual rulers (which was a way for the ruler to establish themself and the state as more powerful and successful than that of their predecessors). However, the last
phases of the epicentre saw a change as the rulers no longer built individual epicentres. Rulers instead turned to displays of grandeur, like royal processions, to indicate power.

*Bagan.* In the r-phase, the epicentre was home to the central authority that exerted hegemony over lesser principalities. The epicentre during this time was less elite, being a place for agriculture and possibly common residences. Eventually, however, the epicentre became an elite status marker and a showcase for the kingdom. As the state began to decline, the epicentre shrank to become a place with a small amount of local control, and it was later relegated to religious significance, but no longer functioned as a powerful showcase of elite status.

*Sukhothai.* The Dvaravati settlements may have not been true epicentres. Rather, they were small ceremonial centers that ruled equally small hinterlands. The Khmer period at Sukhothai, as well, was not a reflection of a true epicentre. During the transition into the K-phase, Si Indradit instated Sukhothai as the epicentre, building civic structures within it so that it became the new centre of administration. However, this changed as Sukhothai lost its authority and administration shifted to Ayutthaya. Sukhothai became a lesser centre and Ayutthaya focused on building a model of administration and rule after Angkor.

**8. How were these centres entangled with the landscape, environment, and society as a whole?**

The centre relied heavily on the environment and the stakeholders for its functioning and upkeep, and the stakeholders, in turn, became entangled with the centre. While the epicentre depended on the environment to fulfill its role to maintain the water management and agriculture systems, the environment was, in turn, affected by entanglements with the epicentre as the state extended, overpopulated, and over-used the
resource base. The stakeholders of the epicentres modified the landscape to accommodate a sensitive infrastructure that depended on a slim set of environmental parameters for proper functioning. The shift after the MCA to less beneficial climate patterns negatively impacted each agrarian centre’s agriculture, as they had become entangled with the predictable monsoons of the MCA.

At Angkor specifically, further entanglements existed, such as the entanglement with the sacred sandstone at Phnom Kulen, entanglement with the rulers and their construction of the epicentre, and entanglement with changing state religions. At Bagan, in addition to the general trends noted above, the centre was dependent on funding through the sangha and on the ideology of merit held by its people. The centre was also entangled with the rice growing regions since it was in the Dry Zone. As epicentres were entangled with rulers in Southeast Asia, they can only be defined as epicentres because of the power that emanated from them. Sukhothai’s epicentre was notably entangled with its rulers. Whether it was the Khmer rulers at Angkor, the rulers residing in Sukhothai, or the rulers in Ayutthaya, the meaning of the epicentre of Sukhothai changed significantly depending on the residence of the ruler.

9. **How did entanglements affect resilience and vulnerability of specific segments of the society?**

As discussed throughout this thesis, particularly in Chapter 5, increased entanglements mean increased vulnerability and a loss of resilience. The ruler was most entangled, being affected by nearly all epicentral entanglements. In particular, the ruler’s legitimacy depended on the proper function of the epicentre, otherwise they might be considered to not be fulfilling their duties. The royal family, elites, bureaucrats, and the ruler were all heavily dependent on various elements for their power and identity and,
therefore, were extremely vulnerable to perturbations. These stakeholders’ powers depended on many different entanglements, including their relationships with each other. The elites’ relationships with the ruler, and with their various servants, was imperative to their identity, as they relied on each other for their status. The sangha or priesthood, particularly at Bagan, was an integral part of the epicentre. However, despite numerous entanglements, the religious figures were usually fairly resilient. In general, many aspects of the epicentre depended on the religion. The religious figures were not, however, as entangled with other features. Religious figures did depend on popular support for their existence, and the entanglement with other stakeholders enhanced their power and legitimacy. The common folk, in general, were the least entangled, and therefore most resilient, as they could disentangle from the web of entanglements focused on the epicentre. The merchants, artisans, labourers, and farmers all depended on one another, but they could disentangle easily and reengage with another epicentre and/or state.

10. How did epicentral entanglements contribute to charter state collapses?

Due to the high quantity and quality of entanglements, charter states were made vulnerable in the late K-phase. Many entanglements were dependent on a small set of fixed parameters. When these systems failed, the problem cascaded through the over-connected web, affecting all of the aspects within it. Labour and resources were diverted away from the epicentre, often to the state religion as a way of merit-making, and to military incursions. Wavering social capital also caused stakeholders to begin to withdraw from the epicentre. As the labour and resources were tied up with the entanglements, the loss of a significant portion of these began to affect maintenance of infrastructural features, crop yields (to feed the massive populations), and the legitimacy
and power of the ruler. The web of entanglements at each epicentre, as demonstrated in Chapter 5, made the system vulnerable to any negative perturbances, which could trigger an epicentre’s collapse.

CONCLUSIONS

The charter state datasets for this thesis are comprised of diverse historical and archaeological evidence. This allows for the application of the resilience theory methods of analysis that are employed. This approach is relatively new, and, as such, requires more testing to assess the extent of its usefulness as a heuristic device. One of the weaknesses of my dataset is that there are things that cannot be seen. For example, the myriad structures did not withstand the tests of time because of the nature of their construction materials. Wooden buildings, once very common, are now lost to us, along with any other perishable or ephemeral part of society. Fortuitously, however, with recent LiDAR surveys at Angkor, we are beginning to see house mounds and structures not previously discernable using traditional survey methods (Evans et al 2013:1). Unfortunately, there are no similar surveys being done in Bagan and Sukhothai. Another issue concerns the fact that conflicting sources of information, including histories that are contradicted by the archaeological record, make some aspects of the epicentral entanglements unclear. Still, some conclusions can be drawn based in the available data.

Epicentral entanglements apparently weakened the resilience of the epicentres of Angkor, Bagan, and Sukhothai over time. The optimal monsoon regime of the Medieval Climate Anomaly allowed these centres to thrive because of the more predictable rainfall. Combined with a series of water management and agricultural innovations, abundant agricultural yields were made possible. An ideology based on notions of fertility and
prosperity reinforced the legitimacy of the ruler and the state as a connected community, at the same time that they decreased resilience as these links became part of a web of dependence. The main causes of weakened systems states towards the end of the Charter Era were: 1) the end of the MCA diminished predictable rains, which adversely affected agricultural yields; 2) military incursions with other states utilized a large portion of labour and resources; 3) architectural and infrastructural practices became unsustainable and labour and resources declined; 4) due to the agricultural failings of inland, agrarian centres, the economy shifted to maritime trade and to coastal cities; and, 5) these failings led to diminishing social capital of late K-phase rulers, dramatically degrading their ability to centralize power.

The systems were suited to a limited set of conditions, which, while in the restricted settings in which they can function, supported populations with vast amounts of irrigated and farmable land, protection the populace from enemies, and fostered a broader state identity and degree of loyalty. This reliance created rigidity, which caused significant strain when faced with disturbances to the system. Various external and internal factors were therefore able to stimulate instability. Ultimately, the very aspects that made these epicentres successful at supporting massive populations are the same traits that made them vulnerable to collapse.
REFERENCES CITED

Acker, Bob

Asia Watch: Physicians for Human Rights

Aung-Thwin, Michael
2011 A Tail of Two Kingdoms: Ava and Pegu in the Fifteenth Century. Journal of Southeast Asian Studies 42(1); 1-16.

Aung-Thwin, Michael and Maitrii Aung-Thwin

Baron, Natalie

Bentley, G. Carter

Bishop, Paul, Dan Penny, Miriam Stark, and Marian Scott

Blackmore, M.

Blanchard, Wendell

Briggs, Lawrence
Buckley, Brendan M., Kevin J. Anchukaitis, Daniel Penny, Roland Fletcher, Edward Cook, Masaki Sano, Le Canh Nam, Aroonrut Wichienkeeo, Ton That Minh, and Truong Mai Hong.  

Chu, Valentin  

Coe, Michael  

Coedès, G.  
1968 *The Indianized States of Southeast Asia*. East-West Center Press, United States.

Coningham, Robin, Prishanta Gunawardhana, Mark Manuel, Gamini Adikari, Mangala Katugampola, Ruth Young, Armin Schmidt, K. Krishnan, Ian Simpson, Gerry McDonnell, and Cathy Batt  

Coria, Melissa Jo  

Cumming, Graeme S.  

Daguan, Zhou  

2007 Group Report: Integrating Socioenvironmental Interactions over Centennial Time Scales. In *Sustainability or Collapse? An Integrated History and Future of People on*

de Bruin, H. A. R.

de Casparis, J. G., and I.W. Mabbett

Dellios, Rosita

Demarte, Pete

Diamond, Jared

Drennan, Robert and Peterson, Christian

Durmarçay, Jacques

Dumarçay, Jacques and Michael Smithies

Evans, Damian, Christophe Pottier, Roland Fletcher, Scott Hensley, Ian Tapley, Anthony Milne, and Michael Barbetti
Evans, Damian, Roland Fletcher, Christophe Pottier, Jean-Baptiste Chevance, Dominique Soutif, Boun Suy Tan, Sokrithy Im, Darith Ea, Tina Tin, Samnang Kim, Christopher Cromarty Stephane De Greef, Kasper Hanus, Pierre Baty, Robert Kuszinger, Ichita Shimoda, and Glenn Boornazian

Evans, Damian, and Arianna Traviglia

Evers, Hans-Dieter

Ewel, John J., and Seth W. Bigelow

Fischer-Kowalski, Marina,

Fletcher, Roland

Fletcher, Roland and Christian Pottier

Freeman, Michael and Claude Jacques

Gerini, G. E.
1905 A Trip to the Ancient Ruins of Kamboja. The Imperial and Asiatic Quarterly Review 19(37-38):361-394.

Gladwell, Malcolm
Glaize, Maurice

Grabowsky, Volker

Grave, Peter, and Mike Barbetti

Groslier, B. P.

Gunderson, Lance H.

Gunderson, Lance H., and C.S. Holling (editors)

Gutman, Pamela and Bob Hudson

Haberl, Helmut, Marina Fisher-Kowalski, Fridolin Krausmann, Joan Martinez-Alier, and Verena Winiwater

Hall, Kenneth

Higham, Charles

Hills, Kendall

Hodder, Ian

Holling, C.S.

Holling, C.S., and Lance H. Gunderson

Holling, Craford S., Lance H. Gunderson, and Garry D. Peterson

Htin Aung, Maung

Hudson, Bob, Lwin Nyein, and Win Maung

Hudson, Bob
Hudson, Bob and Terry Lustig  

Iannone, Gyles  

Janssen, Marco A., and Marten Scheffer  

Khunsong, Saritpong, Phasook Indrawooth, and Surapol Natapintu  

Koeppen, Wladimir  

Krairiksh, Piriya  

Kricher, John  

Kusalasaya, Karuna  

Le, Huu Phuoc  
2010 *Buddhist Architecture*. Grafikol, Minneapolis.

Lieberman, Victor  

Lieberman, Victor, and Brendan Buckley

Mabbett, I. W.

Mabbett, Ian, and David Chandler

MacDonald, Malcolm

Macrae, Scott

Marajh, Leah

Marcus, Bernard A.
2009 Tropical Forests. Jones and Bartlett, Toronto.

McCloud, Donald

Middleton, Guy
Miksic, John N.

Mishra, Patit Paban
2010 *The History of Thailand*. Greenwood, Santa Barbara.

Moore, Elizabeth

Müller-Herold, and Rolf P. Sieferle

Myanmar Travel Information

Nelson, Margaret C., Michelle Hegmon, Stephanie R. Kulow, and Karen Gust Schollmeyer

Nelson, Margaret C., Michelle Hegmon, Stephanie R. Kulow, Matthew A. Peeples, Keith W. Kintigh, and Ann P. Kinzig

O’ Brien, Richard

O’Connor, Richard

O’Reilly, Dougal J.W.
2007 *Early Civilizations of Southeast Asia*. AltaMira Press, Lanham, Maryland.

Orians, Gordon H., Rodolfo Dirzo, and J. Hall Cushman
Pelliot, P.  

Pendleton, Robert  

Ponting, Clive  

Pym, Christopher  

Redman, Charles  

Rooney, Dawn  

Sak-Humphry, Chhany  
2005 The Sdok Kak Thom Inscription (K. 235), With Grammatical Analysis of the Old Khmer Text. The Buddhist Institute, Phnom Penh.

SarDesai, D. R.  

Scheffer, Marten  

Schumpeter, P.  

Shirkey, Lindsay  

Sieferle, Rolf. P.  
Sodhi, Navjot, Mary Rose Posa, Tien Ming Lee, David Bickford, Lian Pin Koh, and Barry Brook  

Stark, Miriam T.  

Surjan, Akhilesh, Anshu Sharma, and Rajib Shaw  

Swearer, Donald  
2010 *The Buddhist World of Southeast Asia*. State University of New York City Press, Albany

Tainter, Joseph A.  

Tambiah, Stanley  

Taylor, Keith W.  

Terwiel, Barend Jan  

Trewartha, Glenn, Arthur Robinson, and Edwin Hammond  
Trigger, Bruce

Uchida, E., O. Cunin, I. Shimoda, C. Suda, and T. Nakagawa

Uchida, Etsuo and I. Shimoda

UNESCO

Vallibhotama, Srisakra

van der Leeuw, Sander E.

Vickery, M.

Walker, Brian and David Salt

Weisz, Helga, Marina Fischer-Kowalski, Clemens M. Grünbühel, Helmut Haberl, Fridolin Krausmann, and Verena Winiwater

Woodward, Hiram