# The Impact of Religious Tourism on Buddhist Monasteries: An Examination of Nine Temples in Ang Thong

by

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**Abstract**

In this research, the impact of religious tourism development on the cultural heritage of sacred Buddhist places is analyzed through an examination of nine temples in Ang Thong and their communities. The research considers strategies that might allow religious tourism development while conserving the cultural heritage significance of the places and explores the important factor determining impacts of religious tourism on these nine sacred temples in Ang Thong. A review of the evolution of temple development and tourism development by assessing and studying nine sacred temples' cultural heritage was undertaken to develop a practicable approach to supporting and managing tourism sustainably. These sacred nine temples' first stage was emerged from the connection between religion, monarchy and communities as the temples were well patronized by the monarchy and their communities. A cause of changing in cultural significance of nine temples in Ang Thong is ecclesiastical honorific title award or *Samanasak*. The qualification of the selection of monk for the Samanasak is attached with the ability of the monk who has the ability in promoting construction development process inside his temple compound and it is the important factor that is caused the change of cultural heritage significance of the temples. Tourism brings positive and negative impacts on Buddhist monasteries and their communities. The major positive impacts are contributions to local development in transportation infrastructure, generation of income and employment, and promotion of local culture. The major negative impacts are inequality of income distribution, seasonal jobs and commercialization or commodification of Buddhism. Cultural heritage education and conservation awareness is needed by abbots, monks and communities. it should be strictly applied as a policy. Moreover, the qualification of selection of monk for the Samanasak must be revised and ability in constructing and promoting material things in the temple compound should not be considered. Furthermore, abbot, monks, host communities, the government sector, tourists, media and the voluntary sector must be involved in safeguarding the culture heritage significance of the nine sacred temples and their communities in order to manage the tourism more sustainably. Local cultural heritage could be sustained for the next generations by adopting these relatively modest changes.

**Keywords:** Tourism Impact /Religious Tourism /Buddhist Monastery

## 1. Background and Siginificance of the Problem

Tourism is an important source of income for Thailand nowadays because Thailand is known for its strength in beautiful cultural and natural resources. Theravada Buddhism is the core of Thai culture because it influences the way the Thais believe, their tradition, their culture and their art. Furthermore, it has inspired a passion to build for Thai Buddhist's architectural sacred as well. The

Thai temple, or wat, is actually a complex of architectural sacred buildings and religious monuments within a single compound. Thai temples are the source of cultural and religious tourisms which are now famous among foreign tourists who travel to Thailand and also Thai tourists who travel to the temples for cultural and religious motives. Religious tourism refers to various forms of travel undertaken exclusively or dominantly for religious motives (Rinschede 1992; 1999, 197-221). This niche market not only brings international tourists into Thailand, but also rises domestic travel and contributes significantly to the local economy.

Ang Thong is located in the central part of Thailand. This province has more than two-hundred magnificent and interesting Buddhist temples so, that is why this province is popular for cultural study and religious tourism for both Thais and foreigners. In 2010, the provincial administration in Ang Thong in cooperation with Tourism Authority of Thailand (TAT)launched the tourism campaign as "Paying Homage to Nine temples in Ang Thong". This campaign aimed to motivate Thai tourists to travel to Ang Thong because this province was not famous in the perception of Thai tourists in the past. However, this province has its strength in cultural resources by having more than two-hundred interesting temples. Thus, nine temples of two-hundred temples have been chosen to promote to the tourists as the destinations for religious tourism. These nine temples are Wat Chaiyo Worawihan, Wat Khun Inthapramoon, Wat Pamok Worawihan, Wat Tonson, Wat Mahanam, Wat Thasutthawat, Wat Siroi, Wat Khian and Wat Muang.

The reason for choosing these nine temples is because these nine temples have their own significances in cultural heritages for religious tourism. Wat Chaiyo Worawihan, Wat Muang and Wat Tonson are famous in their large sitting Buddha images especially the Buddha image of Wat Muang, Phra Buddha Maha Nawamin Sakkayamunee Sriwiseschaicharn, is the largest sitting Buddha image in Thailand. Wat Pamok Worawihan and Wat Khun Inthapramoon are famous in their large reclining Buddha images. Wat Thasutthawat and Wat Khian are famous for their beautiful mural paintings. Last but not least, Wat Mahanam and Wat Siroi are the temples which are associated with Thai history and local heroes. Considering the historic background of these nine temples, an evolution process of cultural transformation of the sites has been continued from local temples that developed to be temples for Buddhists' pilgrimage for meeting the needs of domestic tourists who travel for religious purpose.

However, the rapid growth of domestic mass tourism in Ang Thong, along with the modernization and urbanization of the local communities, has been a significant source of problems. Tourism plays a vital role in generating local revenue in Ang Thong, but it also has adverse impacts on the cultural heritage values of the temple. The temples' local communities are enjoying tourism activities while being less and less concerned about their local heritages. The other concern about generating local revenue is its negative results toward the contexts and fabrics of the temples and their heritage, both tangible heritage and intangible heritage. The local communities continue to expand tourism industry into their areas by converting their agricultural lands and temple sites for tourist parking or new commercial activities. Moreover, they have gradually developed their local settings including village, markets, temples or old buildings into new tourism forms corresponding more to emerging new needs of tourists and visitors. Consequently, the cultural heritage sites and natural resources have all been exploited in order to attract tourists. Furthermore, village abbots, monks and local communities often fail to see the value of local Buddhist art and architectural styles. Instead they encourage their replacement with new buildings and they replace natural greenery with artificial materials and surfaces. In other words, the local communities and their local temples are now in the process of transformation for tourism. Under this influence the cultural heritage and environment assets are converted into economic commodities and putting the community's spiritual welfare at risk.

### 1.1 Research Objective

The objective of this research is to map the changes in cultural significance and value of nine sacred temples in Ang Thong and their communities through documentary and oral resources for considering policies that could assist in safeguarding the cultural heritage significance of nine sacred temples and their communities to manage the tourism sustainably.

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### 1.2 Research Questions

How have these nine temples been transformed through the periods of time and by which factors that determining the change of cultural heritage significance of the temples through the religious tourism ?

### 1.3 Scope of the Study

1.) The area of study covers five districts in Ang Thong where these nine sacred temples are located. The scope of the study includes the assessment of these nine sacred temples' cultural significance and values. This involves observing and exploring transformation of the fabrics of temples and also local communities relating with them.

2.) The scope of study focuses on the evolution of nine sacred temples through the periods of time and impact of religious tourism development in both positive and negative impacts, and the cultural heritage management for sustainable tourism of the temples and their communities.

## 2. Research Methodology

This research is focused on qualitative method. The method also aims to investigate the why and how of decision making on the specific issues. In this case, research instruments of this research will be carried out as follows:

(1) Literature research
(2) Field observation
(3) In-depth interview
(4) Interview / focus group meeting / participatory research

### 2.1 Literature Research

The researcher has conducted a through literature search from books, academic journal, research reports, government data, daily newspapers and the Internet. The research will focus on topics relevant to the study.

### 2.2 Field Observation

The research has made an inventory of cultural heritage significance that has relevance to religious tourism at these nine sacred temples and their communities by observation and photographic recordings.

### 2.3 In-depth Interview

This was undertaken with the abbots, monks, leaders of local communities, government organizations' officers, academics, private-sector operations, visitors and people working in architecture.

### 2.4 Interview/Focus Group Meeting/Participatory Research

The research approaches local residents in the communities that are nearby the temples to solicit their personal opinion about the cultural heritage significance and values of the temples.

## 3. Results

These sacred nine temples' first stage was emerged from the connection between religion, monarchy and communities. In this early stage, the temples were well patronized by the monarchy and communities as we can see from two of nine temples were developed as the royal monasteries and all the rest were supported by the communities. Those two royal temples are Wat Chaiyo Worawihan and Wat Pamok Worawihan. These two temples have been well-known by Thai Buddhist since in the past. However, all the rest were the common temples where designed to serve a number of religious and practical purposes in the surrounding communities without any kinds of reputation on such things that would make them famous among the outsider people.

A cause of changing in cultural significance of nine temples in Ang Thong is ecclesiastical honorific title award or *Samanasak*. Samanasak represents the status of an individual monk in the Sangha hierarchy. The monks who have Samanasak titles can receive privileges of connecting with the secular persons, authority, social status and wealth which are better than the monks who do not have any honorific titles. The process of giving the honorific titles has been continually developed and involved in the Sangha administration since in the past. Actually, Samanasak was established for representing the relationship between religion and monarchy as the king's concern for the healthy condition of Buddhism. Normally, the criteria adopted for selecting recipients for honorific titles in the past depended on monk's competence in ecclesiastical education, knowledge of Dhamma and Buddhist scriptures, and good behavior. Moreover, the king had a direct authority to appoint monks to high offices in the Sangha hierarchy and confer Sammanasak. In the reign of King Rama V, the administrative structure of the Sangha was changed because of the need for administrative modernization in the late nineteenth century as national integration and the unification of the Sangha itself. So, promulgation of the Sangha Act in 1902 was appeared.

The Sangha Act in 1902 was a emergence of the Mahatherasamakom or Council of Elders. This was the highest authority in the Sangha hierarchy, performing as an administrative body and an ecclesiastical tribunal. The Mahatherasamakom was also acted as an advisory committee to the king in ecclesiastical affairs and administration. But, all the decisions from Mahatherasamakom had to be approved by the king. In 1932, the evolution was a cause of the end of absolute monarchy and replaced it with the institution of constitutional government. The Sangha administration was also changed into the democratic reformation by the Sangha Act in 1941. This act was aimed to separate the power of the Mahatherasamakom for the sake of balance in power by having the Sangha Sapha and the Kana Sangha Montri for issuing ecclesiastical regulations and exercising judicial power. However, this democratic administrational bodies were not stayed for long lasting. In 1962, the new Sangha Act was created by canceling two administrative bodies as mentioned above and creating a single administrative body of Mahatherasamakom. Thus, Mahatherasamakom is mainly responsible

for the administration of the whole Sangha and also issue the regulations and orders, and acts as adviser to the Supreme Patriarch. As for this reason, the current Sangha Act, enacted in 1962 with the revised 2nd edition in 1992, in clause 37 determines that the abbot of each temple has the main duty in caring for and maintain the temple, and organize the activities and possessions of the temple. So, the abbot has his own right in making his decision to develop any buildings inside his temple compound. Furthermore, the qualification of the selection of monk for the Samanasak is attached with the ability of the monk who has the ability in promoting development process inside his temple compound. This development process is focused on his working portfolios in the construction of material things such as a new ordination hall or new preaching halls. So, this is the main reason for the changing in cultural heritage in the nine temples in Ang Thong.

All the abbots of those nine temples have the honorific titles especially the temple where develops many construction of material things. Wat Chaiyo Woravihan and Wat Pamok Woravihan are second class royal temples which have the titular suffix as woravihan. These two temple have been the main attractions in Ang Thong for Thai Buddhists' pilgrimage since the past. A group of assembly hall and ordination hall, a square-based stupa with twenty indented corners and a bell tower of Wat Chaiyo Woravihan have been registered as Ancient Monuments on 8 March, 1935. As the same with Wat Chaiyo Woravihan, the ancient buildings of Wat Pamok Woravihan which consist of a group of an assembly hall housing the reclining Buddha image and an ordination hall, a square-based stupa with twelve indented corners, a bell-shape stupa and two corn shaped stupas**,** a pavilion (Sala Kan Parian), a group of residences for monks, a bell tower, the mondop of Buddha's footprint and a assembly hall which is named "Wihan Khian have also been registered as Ancient Monuments on 8 March, 1935. So, there is not much change in the area of Buddhvat section of these two temples. The advantage of conservation of ancient buildings of Wat Chaiyo Woravihan is to promote the conservation of valuable architectural heritage which can serve as a reference for historical and architectural conservation. The ancient buildings of Wat Chaiyo Woravihan are the result from the integration of Western and Eastern arts, including even the interpolation of Thai style into the design. These processes may be called "Eclecticism". However, the area of monk's living quarters at Wat Chaiyo Woravihan is now renovating. A new prayer hall which the present abbot of this temple orders to demolish and make a new one which is looked like the pavilion at Wat Yai Suwannaram in Phetchaburi. Moreover, the cloister beside the assembly hall and the car parking with shelter have also been built to facilitate the tourists. Erecting tall cloister and car parking has been caused the problem of blocking and threatening the view of the temple also. To be concluded, the present abbot's personal favorite and is the main reason to demolish the old buildings in the area of monk's living quarters at Wat Chaiyo Woravihan and buildings for facilitating the tourists are the cause of visual impact.

For advantage of conservation of ancient buildings of Wat Pamok Woravihan, the ancient buildings of this temple are represented by the traditional Thai and vernacular. These building styles have been handed down since ancient times. Architectural characteristics have evolved to serve basic requirements of a particular location most straightforwardly. Thus, these ancient buildings are significant for their roles as archetypes which can be described according to the period. Consequently, the value of such intentions is retained in each work of architecture. However, the problem of architectural conservation at Wat Pamok Woravihan is the present abbot has less careless in architectural conservation by adding and alteration to the ancient buildings inside the temple. His action can bring the cause of devaluation to cultural significances of the temple.

Wat Khun Inthapramoon and Wat Khain have also been registered as Ancient Monuments**.** These two temples are now common temples or Wat Ratsadon. Wat Khun Inthapramoon has been the main attraction in Ang Thong for Thai Buddhists' pilgrimage since the past as well. A group of

reclining Buddha image's assembly hall and the old ordination hall, and a bell- shaped stupa on octagon based have been registered on 8 March, 1935. So, the area of Buddhvat section of this temple is protected by the Act. However, when Phra Kru Wiset Chaiwat became a deputy-abbot of this temple, the big change of this temple has been noticed since 2006. He has transformed this common temple for the surrounding communities to be the temple for Thai Buddhist pilgrimage. The areas behind the reclining Buddha image and on the west side of the temple have been transformed into the places for facilitating Thai Buddhists' pilgrimage such as the brand-new and hi-tech ordination hall and meditation centers. Moreover, National Office of Buddhism in Ang Thong Province promoted the temple's compound of Wat Khun Inthapramoon to be a Phutthamonthon of Ang Thong Province in 2006 for setting Buddhists' activities on the Buddhist days. The results from these actions can cause the problem of replacing natural greenery with artificial surfaces for tourists' parking area and erecting new commercial areas. Therefore, the new buildings for facilitating the tourists can be also the cause of visual impact and devaluation of the temple's cultural significances.

The ordination hall and a group of five stupas on pedestal of Wat Khain have been registered as Ancient Monuments on 19 May, 1998. This temple is not changed much because of the great goodness of H.R.H. Princess Maha Chakri Sirindhorn which has drawn together in a spirit of good cooperation government officers and people in Ang Thong for preserving the exquisite mural paintings inside the old ordination hall. Nowaday, these two temples are places for the tourists who are interested in cultural tourism. This situation is the same as Wat Thasutthawat. Even Wat Thasutthawat is not registered as Ancient Monuments, a serious state of deterioration of old ordination hall has been initiate helped by the great goodness of H.R.H. Princess Maha Chakri Sirindhorn. The old ordination hall is replaced by the new one as a fine religious and historic edifice. The advantage of preserving the mural paintings at Wat Khain and creating new mural paintings at Wat Thasutthawat to religious tourism are the mural paintings play their roles in transmitting essential Buddhist teachings, which they do by depicting not only religious stories but also local participation in the enactment of these stories. In this way the murals take the viewer on a Buddhist pilgrimage. These murals are educational and experiential, participatory and transformative. As reflections of local practice, these murals invite and tempt the viewer sometimes to get into the reenactment of local texts that propound the Buddhist Dharma.

Wat Mahanam, Wat Si Roi, Wat Tonson and Wat Muang are in the same situation. These four temples are common temples and they used to be the temples for their surrounding communities. Religious tourism has made these four temples to be the temples for Buddhist pilgrimage. The results from turning community temples to be the temples for Buddhist pilgrimage are many buildings inside the temples' compounds have been built for facilitating the local Buddhists to pray and make merit. Moreover, some religious activities that are available at these four temples are seemed to be "selling points" in marketing strategy for bringing pilgrims to visit the temples such as paying homage to Phra Buddha Maha Nawamin Sakkayamunee Sriwiseschaicharn, the largest Buddha image at Wat Muang, paying homage to the biggest Phra Sangkachai in Ang Thong at Wat Mahanam, and paying homage to Somdet Phra Si Mueangthong, the largest metal moulded Buddha image in Thailand at Wat Tonson. These can be caused to the commercial Buddhism which is considered as a negative socio-culture impact. Some new buildings are the cause of visual impact and devaluation of ancient buildings as well. For example, the new ordination hall at Wat Mahanam has been built beside the old assembly hall of Luang Pho Khao and the new status of Guanyin is blocked the view of ancient stupa of Wat Si Roi.

Nevertheless, the case of Wat Mahanam can be a good example of the community's participation in safeguarding of cultural significances. The old ordination hall of Wat Mahanam which has the cultural significance in local aesthetic value has been protected by the community as

the present abbot ordered to demolish it. The power of community's participation can also see from Wat Thasutthawat as they come together for conserving the natural environment inside the temple and also the ancient buildings in the area of monk's living quarters which consist of the old prayer hall and the old Buddhist scripture library.

To be concluded, the main reasons of the change in cultural heritage significances of nine sacred temples in Ang Thong and their communities are as below.

- The abbots and monks lack of knowledge in cultural heritage conservation and they don't foresee the values of cultural heritage significances.
- There is no any action-oriented policy in cultural heritage conservation in the province. The idea of cultural heritage conservation is not interested by the public. It is only given an interest by some local groups which have no authority for persuading the public.

After promoting the campaign in 2010, the growth of domestic mass tourism in visiting these nine temples in Ang Thong has been increased rapidly. Also, it has been brought the modernization and urbanization to the temples and communities around the temples and these modernization and urbanization have been a significant source of problems to temples and local communities. Generating local incomes to the local people and infrastructure development to the local are the positive economic impact which these modernization and urbanization have been brought to the temples and communities. Moreover, some temples of these nine temples are involved with local heroes in Thai history, local handicrafts and local folkdances. Therefore, promoting the local culture of the host population in which local culture can be packaged to the tourists while travelling in the province can be the other positive social impact to the local. Promoting religious tourism into these temples can be also provided negative impacts. Inequality of income generating and seasonal character of jobs are two negative economic problems. On the other hand, commercial Buddhism is the negative social impact that is caused many following problems especially devaluation of cultural heritage. The cultural heritage sites and natural resources within these temples have all been damaged in order to attract tourists by turning the temple sites and agricultural lands for tourist's facilitating areas such as tourist parking, areas for new commercial activities and modernized buildings to attract the tourists' interest. When the tourism campaign which is the collaboration between the provincial administration and Tourism Authority of Thailand are combined with the responsibility of abbot in maintaining the temple which is identified in the Sangha Act, these two factors motivated the abbots of these nine temples develop their temples to be more interesting sites for Thai Buddhists while travelling to Ang Thong. This development projects are seemed like "selling points" in marketing strategy for attracting pilgrims to visit the temples for making merits. The selling points in this case are shown in the form of constructing a large Buddha image in each temple such as Somdet Phra Si Mueangthong at Wat Tonson, Phra Buddha Maha Nawamin Sakkayamunee Sriwiseschaicharn at Wat Muang and the biggest Phra Sangkachai at Wat Mahanam. The successful result in promoting these selling points to the tourists can bring wealth and richness to abbots, monks and monasteries. It can also bring negative social problems such as monks partying and drinking in monasteries, monk watching pornographic videos and having sexual harassment with young women and men. In addition, local abbots and local communities often fail to notice the values of local Buddhist art and local architectural styles also. This can be seen from deleting the old mural painting inside the ordination hall at Wat Si Roi, and adding new shelter and constructing a new ordination hall which are blocked the view of ancient monuments at Wat Mahanam. These activities are caused of devaluation of ancient monument.

Four temples of these nine temples have been protected from the legal instrument. This legal instrument is in the form of the Act on Ancient Monuments, Antiques, Objects of Art and National Museum. This act is enacted by the Thai Fine Arts Department. However, this act is not enacted

efficiently and strictly by the Fine Arts Department. So, some temples do not follow the regulations which are identified in the Act. That is caused of the devaluation of ancient monument also. The example of this case can be seen from Wat Pamok Worawihan that the abbot has ordered to add and modify the ancient buildings on the temple compound.

In this regard, considering policies that could promote in safeguarding the cultural heritage significance of nine sacred temples and their communities to manage the tourism sustainably have to be involved five key stakeholders. These five key stakeholders consists of abbots, monks, and host community, government sector, tourist, media, and voluntary sector. Abbots, monks and host community are considered as the main important key stakesholders in responding for conserving the cultural heritage significances. First of all, the abbots and monks must have the awareness on the importance of cultural heritages which they occupy because this awareness will build a sense of belonging that assists in safeguard the cultural heritage inside the temple compound. Whenever they want to reconstruct the ancient buildings which are registered or are not registered as national monument, the abbots and monks should consult the Department of Fine Arts and work closely with expert architects to protect the local cultural heritages. Moreover, the abbots and monks should support more educational, economic, and socio-cultural spheres in the communities for social good for managing the tourism sustainably. This is because this important role has disappeared from Thai society nowadays as many abbots and monks emphasize on merit-making, commercialization of Buddhism, heaven and hell, and the "superstition magic of the amulets' practiced by many monks. This will cause misuse of Buddhism and lead to social problems later.

Mahatherasamakom and the Department of Fine Arts which are considered as public sectors should collaborate together in preserving the heritage buildings inside the temple compound especially the temples that have not registered as national historic monuments. This collaboration can be in the form of an announcement from Mahatherasamakom to the abbots of each temples about the rules on protecting ancient monuments. The rules must identify that before ancient structures or their parts will be repaired modified, altered, demolished, added to, destroyed, removed or excavated for anything or any building within the temple compound will be constructed, the abbot of the temple or the monk who is in charge must report and present a report of construction plan to the Fine Art Department for monitoring and giving an advise in conserving cultural heritage significances.

For the role of tourist in safeguarding the cultural heritage significances, the messages that should educate the tourists are "the responsibilities of the tourists" and the tourists should be wiser in making merit while traveling to Buddhist monasteries as their prigimage. The messages of the responsibility of the tourists are to create the awareness-raising in cultural heritage management should be the first message of responsibilities of the tourists to educate the tourists who travel to the monasteries that contain the historical buildings. In this case, cultural heritage management has traditionally been concerned with the identification, interpretation, maintenance, and preservation of significant cultural sites and physical heritage assets. Being wiser in makeing merit can reduce the problem of Commercial Buddhism. In this case, Thai Buddhists should change attitude of merit-making behavior by considering Ten ways of make merit in Buddhism as it is called "Punna-Kiriya-Vatthu Ten".

The role of travel media should be focused on educating and drawing tourist's attention to cultural heritage management and ethical issues which are related with environmental, economic and social dimensions in sustainability. Moreover, travel media should present a growing interest in the concept of saving cultural heritage significances to the public. This is because where the media is interest in a topic it can also be more than simplistic or superficial in its coverage and the media tends to search for heroes for its issues. For example, travel media, especially social media which is

related with religious and cultural tourisms, can play an important role as "watchdog" to spread videos of involving various prohibited activities that would be harmful to cultural heritage significances. In the case of Wat Kalayanamitre Woramahaviharn, the abbot of Wat Kalayanamitre Woramahaviharn had revonated and destructed many historic buildings inside the temple compound. Fortunately, news of such destruction is disseminated to the public by the community members through the social media. Therefore, this news of destruction historic buildings has become the social issue to the public and cultural heritage conservation has been mentioned by the public as well.

The roles of voluntary sector in safeguarding the cultural heritage significances is to increase interest in the subject of cultural heritage conservation. For example, the UNESCO Asia-Pacific Awards for Cultural Heritage Conservation were established in 2000 to recognize excellent achievement in successfully conserving or restoring heritage buildings and properties in the region by the private sector or by public-private initiatives. This is because UNESCO seeks to encourage private sector involvement and public-private collaboration in conserving the region's cultural heritage for the benefit of current and future generations.

By winning the top honors for the UNESCO Asia-Pacific Heritage Awards in 2013, the Award of Excellence, the conservation of Phra Borommathat Maha Chedi and Pharin Pariyattithammasala of Wat Prayurawongsawas, has clearly demonstrated exceptional achievement in all criteria of the awards and has empowered significant change both socially, technically and politically. Embodied within the jury citation, the project has catalyzed extensive social impact in the multicultural historic district of Kadeejeen, whilst the technical interventions, combining the latest in scientific advances with traditional construction techniques, help to convey a sense of antiquity and feeling of age. Of particular importance was the exemplary co-operation between the monks, specialists and local community members in developing a unique and enduring partnership. The success of the conservation project at Wat Prayurawongsawas will continue to motivate generations to come and to deepen their commitment and passion for sustaining Thailand's rich cultural legacy in all its manifestations as we can see from eleven Thai projects, such as Baan Luang Rajamaitri, Muang District, Chantaburi province, has been won of Award of Merit in 2015, have garnered an award , which collectively reflect the advancements that have been made in heritage conservation within Thailand.

## 4. Discussion and Conclusion

This research is aimed to map the changes in cultural significance and value of nine sacred temples in Ang Thong and their communities for considering policies that could assist in safeguarding the cultural heritage significance of nine sacred temples and their communities to manage the tourism sustainably.

At the beginning, these sacred nine temples were emerged from the connection between religion, monarchy and communities. The ecclesiastical honorific title award or *Samanasak* is a cause of changing in cultural significance of nine temples in Ang Thong. For safeguarding the cultural heritage significance of nine sacred temples and their communities to manage the tourism sustainably must invlove five key players, in the form of abbots, monks, host community members, tourists, government representatives, and to a lesser extent the media and voluntary organizations. These five key stakeholders must be involved in the problems of religious tourism and also should keep playing an active part in tourism planning and management in conserving the cultural heritage significances and to create more sustainable forms of tourism.

Ultimately, authenticity of cultural heritage significances becomes critical concern for the public nowadays. This can be seen from the case of Wat Kalayanamitre Woramahaviharn that the abbot of Wat Kalayanamitre Woramahaviharn had revonated and destructed many historic buildings inside the temple compound. This becomes a hot issue for the public. It can be a good sign that the public now foresee the values of cultural heritage significances. If these five key stakeholders would follow their roles intimately, the authenticity of cultural heritage significances can be well protected.

The fact that impacts of tourism are multi-faceted contributes to them being difficult to plan for and manage. There are a number of different organizations, groups and individuals that have an important role to play in tourism planning and management in safeguarding the cultural heritage significances. These key players, in the form of abbots, monks, host community members, tourists, government representatives, and to a lesser extent the media and voluntary organizations, are involved in the day to day problems of religious tourism. In most democratic countries, at least, these individuals, groups, and organizations are in a position to play an active part in tourism planning and management. Last but not least, a major reason for this desire for collaboration has been the wish to achieve more sustainable forms of tourism.

## References


Australia ICOMOS. The Burra Charter. The Australia ICOMOS Charter for places of Cultural Significance, 1999.

Brand A. Merit, Hierarchy and Royal Gift-giving in Traditional Thai Society. Land-en Volkenkunde: Bijdragen Tot de Taal, 1975.

Buranasomphob Trungjai and Pongkwan Sukwattana Lassus. Conservation and Management of Buddhist Temples in Thailand Case study: Destruction of Cultural Heritage at Temple Kalayanamitre Woramahavihara. Bangkok: Proceedings ICOMOS Thailand International Conference 2008: 180-190, 2011.

Damrong Rajanubhab Prince. Thesaphiban (Provincial administration). Bangkok: Klang Wittaya, 1959.

Damrong Rajanubhab Prince. Ruang Phra Ruang (History of Sukhothai Dynasty). Bangkok: Klang Wittaya, 1960.

Damrong Rajanubhab Prince. Phraratcha Phohgsawasan Chabab Phraratchachatckha (Annals autograph edition by King Mongkut). Bangkok: Klang Wittaya, 1968.

Ishii Yoneo. Sangha, State, and Society Thai Buddhism in history translated by Peter Hawkes. Kyoto: The University of Hawaii Press, 1986.

Mason Peter. Tourism Impacts, Planning and Management. Burlington: Butterworth-Heinemann, 2003.

Pintupan, Huan. 1971. Our Ang Thong. Bangkok. Odeon Store Publishing.

Punyasingh Temsiri. Buddhism in Thai life. Bangkok: The National Identity Board, 1981.

Sthapitanonda Nithi and Brian Mertens. Architecture of Thailand: A guide to traditional and contemporary forms. Bangkok: Asia Books, 2005.

Suksamran Somboon. Buddhism and Politics in Thailand. Singapore: Institute of Southeast Asian Studies, 1982.

Stausberg Michael. Religion in modernen Tourismus. Berlin: Verlag der Weltreligionen im Insel Verlag, 2010.

Swarbrooke John. Sustainable Tourism Management. Wallingford: Cambridge/Mass: CABI. 1998.

The Fine Arts Department. 1999 . Cultural Development in History, Uniqueness and Local wisdom of Ang Thong Province. Bangkok, Khurusapha Publishing.

# Optimal Location Planning for Self-Storage Enterprises

by

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**Abstract**

Self-storage enterprises offer an innovative service in a new market. They offer storehouse capacities to private persons or enterprises for long and short term. The access to the storehouse is not limited to time. The service is often used due to insufficient warehouse capacities or the outsourcing of peak loads. Because of the innovative character of this service there are only a few competitors and the "product" itself is quite unknown to potential users. Therefore, it is advisable to quickly penetrate the market in order to get a big market share. Finding the optimal the expansion strategy for the next years is not trivial: Each investment decision has an impact on the market and therefore influences the decisions in the following periods. We construct a dynamic binary optimization model for this problem that determines when (which period) and where (which locations) how many storehouses should be put on stream within the planning horizon. The market is subdivided into a set of locations where storehouses can be built. Because of the long-term character the objective is to maximize the net present value of the related expansion strategy. Of course one has to consider the given budget and the constraints of the market situation and volume. Because of the high complexity of the problem structure, optimizing algorithms based on decision trees work only for small models. Practice-oriented problem sizes demand another solution procedure. Therefore, we concept and implement a genetic algorithm that handles any large problem size in acceptable time with good results.

**Keywords:** Location Planning, Self-Storage, Decision Model, Genetic Algorithm

## 1. Introduction

In the past decade, an innovative concept for storehouses evolved with its origin in the USA (Self Storage Association 2007). For outsourcing purposes, service providers offer storage capacities for individuals as well as for business users. The market is promising because the investment in storehouses, the operating costs and the market penetration are relatively low while the potential demand is high (Duffy/Kliebenstein, 2005). The basic idea is as follows: The service provider procures standardized storage room for a short period of time, the storage equipment (roller shutter, fork lift etc.) and administers the storehouse, but stockpiling and stock removal have to be done by the customers themselves. Due to an electronic entry system customers can access their rented storage capacities at every time independent of the presence of warehouse employees. For renters, this concept allows to reduce fixed storage costs that can now be replaced by usage dependent variable costs (see Mark 2005).

Because of the innovative character of the service and the developmentally chances many new sites will emerge in the next few years (Duffy/Kliebenstein, 2005). Therefore, it is very important in this stage to choose appropriate locations. Densely populated areas are attractive because of the restricted catchment area of a storehouse and the closeness to the potential target group. But the competitive situation and the investment costs in these areas are normally inauspicious. Thus, we are facing a complex long term site planning problem: How to choose the site that is the economically favorable one for the next years? (Fleischmann/Klose, 2004) In the following we present a multi periodic optimization model for this problem and show how this problem can be solved.

## 2. Development of the Optimization Model

### Characteristics and Goal

The characteristics of self-storage storehouses (SSS) are (Duffy/Kliebenstein, 2005): (1) Construction and equipment of SSS are considered as a medium-/long-term investment. (2) Once a decision on investment and location is made, a revision can't be taken without greater loss. (3) SSS provide a certain capacity of storage space. (4) The offered product »storage possibility« isn't affected by usage concerning its quality and life expectancy. (5) Operating costs of an SSS aren't constrained by use and load. They just ensure the disposability (availability fees). Thus, the marginal costs of an additional contract, if it lies within the capacity limits, matches 0. Non-use of storage capacity doesn't diminish the operating costs. (6) The sales market of an SSS is locally bounded to the location of choice. Main target group are individuals and craftsmen. (7) Even if the rental contracts allow flexible durations, most of the contracts are on a long term basis. To convince a customer once is important for the »natural« customer loyalty.

The location planning for self-storage enterprises is a multi-periodic dynamic decision problem. The planning horizon amounts to T years, scaled in t=1,2,...,T periods. Opening of storehouses takes place at period begin. The present point in time is $t = 0$. The goal is the maximization of the net present value that is determined by all site decisions made within the planning horizon. The decision concerns the expansion strategy. That is if and when storehouses should be built at a location within the planning horizon.

### Optimization Model

#### 1) Site Alternatives and their Characteristics

The investigation area shall be split into equal grid boxes (e.g. 5*5 km), each regarded as an »atomic« location element. A location will be determined by its x- and y-coordinates (x,y). Let x=1,…,X and y=1,…,Y be the relevant coordinates of all locations, so that the complete surface of the investigation area can be covered. Irrelevant locations that lie outside the grid because of the irregular shape of the investigation area are initially kept for an easier, formal description even if they fall apart later on. Each location is characterized by a set of attributes. Depending on their values a location rating can be computed. The relevant attributes of a location (x,y) for period $t = 0,\ldots,T$ are:

1. Outpayment: Land prices $GP_{x,y,t}$ [$]; storehouse equipment costs $LEQ_{x,y,t}$ [$]; labor costs index $LNIV_{x,y,t}$; annual outpayment-effective operating costs $K_{x,y,t}$ [$/period].
2. In-payment: Population $POP_{x,y,t}$ measured in 1.000; purchasing power of population, measured by purchasing power index $KKI_{x,y,t}$; market range of coverage, attainable price per square meter

$P_{x,y,t}$ [$/sqm]; average rented storage space per contract [sqm]; life cycle curve of »salable« storage space (contracts or rather rented space) conditioned by age of the storehouse; competitive situation (foreign as well as one's own SSS in catchment area); economic trend

**2) Prerequisites and Decision Variables**

For the optimization, the following conditions shall hold: (V1) At each location should be built a maximum of one storehouse. Locations with an already existing storehouse aren't considered any further (see further V2). (V2) Shutting down of storehouses won't be allowed. (V3) There exist competitors on the market. (V4) Due to financial shortage or other bottlenecks only Bt storage houses can be built in one period t. (V5) Each storehouse provides a certain maximum capacity of storage space KAPx,y (e.g. 4200 sqm). (V6) The periods aren't subdivided any further. All payments, except acquisition payments, occur at the period-end.

The decision variables consist of binary variables differenced after the locations and the construction periods (Vahrenkamp, 2007). Because of condition V1, only the values 0 (no construction) and 1 (construction of an storehouse) can occur so that the optimization model is a binary decision problem with the decision variables $S_{x,y,t}$:

$$S_{x,y,t} = \begin{cases} 1 \text{ if a storehouse is built at } (x,y) \text{ in } t \\ 0 \text{ else} \end{cases}$$

$$\text{with } x \in \{1,...,X\}, y \in \{1,...,Y\}, t \in \{1,...,T\}$$

At the start of planning, already existing storehouse locations are such $(x,y) \in X \times Y$ with $S_{x,y,0} = 1$. Because of condition V1 and V4 it applies formula (1) and (2):

$$(1) \qquad \sum_{t=0}^{T} S_{x,y,t} \leq 1 \quad \text{for all } (x,y) \in X \times Y$$

$$(2) \qquad \sum_{x=1}^{X} \sum_{y=1}^{Y} S_{x,y,t} \leq B_t \quad \text{for all } t = 1,...,T$$

**2.1 Determination of Outpayments for Equipment and Operation of a Storehouse**

With regard to the outpayment, we have to consider site specific land prices $GP_{x,y,t}$ and site neutral payments for storage equipment $LEQ_{x,y,t}$ (e.g. 2 Mio $). Furthermore, there occur operating costs which are almost fixed costs. With approximately 50%, labor costs are the biggest cost pool as surveys are showing. That means the annual site neutral costs affecting payments are $K_t$ [$/year] and the site specific costs – affected by the labor costs index $LNIV_{x,y,t}$ – are represented by $K_t \cdot LNIV_{x,y,t}$. The labor costs index $LNIV_{x,y,t}$ indicates the multiplier referring to a base salary (e.g. 1.07). From this, the annual costs affecting payments for the location (x,y) result in: $K_t \cdot (1 + LNIV_{x,y,t})$.

**2.2 Determination of In-Payments**

**Calculation of Market Potential**

A storehouse's market range of coverage is determined by its catchment area. It may reaches beyond its own location (x,y) and can also contain the ones nearby. Therefore, we define a degree of proximity $1 \geq Ng((x_1,y_1),(x_2,y_2)) \geq 0$ for all pairs of locations in such way, that they decrease with increasing distance from the observed location. It indicates which share of the population in $(x_2,y_2)$ can be reached by a storehouse in $(x_1,y_1)$ due to distance and transportation infrastructure. The degree of proximity of one's own location obviously is 1. Symmetry shall always apply. All locations in the neighbourhood with a positive degree of proximity are relevant for the site decision. With the help of

this environment information the potential reachable customers $KUZ_{x,y,t}$ of a location $(x,y)\in X\times Y$ in period $t=1,\ldots T$ is determined as:

$$(3) \qquad KUZ_{x,y,t} = \sum_{i=1}^{X}\sum_{j=1}^{Y} POP_{i,j,t} \cdot Ng\big((x,y),(i,j)\big)$$

with $POP_{i,j,t}$ is the population of location grid box (i,j) in period t. If there are competing storehouses (own or foreign) that have access to the same market potential then the market potential has to be split. It has to be noted that not only storehouses of competitors but also own storehouses may reduce the market potential of a location (cannibalization effects). Let $L_{i,j,t}$ be the number of storehouses at the beginning of period t in location (i,j) without differencing of own and foreign storehouses. Thus, the starting situation is described by $L_{i,j,1}$ with $L_{i,j,1} \geq S_{i,j,0}$ because of the competing storehouses. Then, considering the starting situation and the site decisions within the planning horizon the value of $L_{i,j,t}$ $(t>1)$ can be computed as:

$$(4) \qquad L_{i,j,t} = L_{i,j,1} + \sum_{t'=1}^{t-1} S_{i,j,t'} \quad \text{with } (i,j)\in X\times Y;\ t=2,3,\ldots,T$$

The »access intensity« $ZUG_{i,j,t}$ that describes how many customers can be reached in period t by the storehouse in location (i,j) can be defined as:

$$(5) \qquad ZUG_{i,j,t} = \sum_{k=1}^{X}\sum_{l=1}^{Y} Ng\big((k,l),(i,j)\big)\cdot L_{k,l,t} \quad \text{with } (i,j)\in X\times Y;\ t=1,2,\ldots,T$$

Consequently, in period t the relevant market potential (in thousand inhabitants) of a storehouse to be built in location (x,y) is determined by:

$$(6) \qquad MP_{x,y,t} = \sum_{i=1}^{X}\sum_{j=1}^{Y} POP_{i,j,t} \cdot \frac{Ng\big((x,y),(i,j)\big)}{\max\left\{Ng\big((x,y),(i,j)\big) + ZUG_{i,j,t};1\right\}}$$

In a bottleneck situation, the market potential is distributed proportionally in accordance to the degree of proximity.

**Attainable Price and Quantity of Sales**

Empirical studies have shown that the price per sqm $P_{x,y,t}$ correlates positively with the purchasing power index $KKI_{x,y,t}$. The capacity utilization depends except for the market potential $MP_{x,y,t}$ on the the age of a storehouse. Thus, there is a »life cycle curve« that can be described with the age dependent success rate $SUCCESS_s$ $(s=1,\ldots,T_L)$ measured in contracts per 1.000 reachable customers. $T_L$ is the lifetime of a storehouse. In its beginning a storehouse becomes known and gets used until the capacity limit is reached. The typical curve is first ascending continuously up to a certain absorption point and then stagnating. Practical experiences have shown that this point usually is reached after six years. The reason for this phenomenon is that many customers are storing goods during a long period of time. Once a storehouse has gained a customer he most likely will rent his storage box over the next years. This effect is enhanced by relatively high costs for stock transfer if another storehouse will be chosen for rental. Therefore, the number of contracts $AK_{x,y,t}$ is determined by (t is the storehouse's building time):

$$(7) \qquad AK_{x,y,\tau} \leq SUCCESS_{\tau-t+1} \cdot MP_{x,y,\tau} \qquad \tau = t, t+1, \ldots T$$

Additionally, the number of contracts is limited by the capacity of a storehouse. Let $LF_{x,y,t} = f_L(KKI_{x,y,t})$ with $dLF/dKKI_{x,y,t} \geq 0$ be the averaged storage space per contract. Then, the demand is determined by the number of contracts multiplied with the averaged storage space per contract.

**The Investment's Residual Value**

Let $RW_{x,y,t}$ be the residual value of a storehouse built in period t at location (x,y). This value represents a storehouse's value at the end of the planning horizon T. It is needed because the revenue

of such an investment takes place after a certain period of time that might lie beyond the planning horizon. If $RW_{x,y,t}$ wouldn't be taken into account investments at the end of the planning horizon would be monetarily misinterpreted.

### 2.3 Objective Function

The acquisition value $AW_{x,y,t}$ of a storehouse at location (x,y) at the beginning of period t has two components: The site specific land price $GP_{x,y,t}$ as well as the site neutral payments for the storehouse equipment $LEQ_{x,y,t}$:

(8) $$AW_{x,y,t} = GP_{x,y,t} + LEQ_{x,y,t}$$

Then, the net present value $CV_{x,y,t}$ of a storehouse in location (x,y) built at the beginning of period t ($x \in X$, $y \in Y$, und $t=1,\ldots,T$) will be:

(9) $$CV_{x,y,t} = -AW_{x,y,t} \cdot (1+i)^{-(t-1)} + RW_{x,y,t} \cdot (1+i)^{-T} + \sum_{\tau=t}^{T} \left( AK_{x,y,\tau} \cdot LF_{x,y,\tau} \cdot P_{x,y,\tau} - K_{x,y,\tau} \cdot \left(1 + LNIV_{x,y,\tau}\right) \right) \cdot (1+i)^{-\tau}$$

The discounting always is for the planning horizon begin, i.e. t=0. The acquisition payments accrue at period begin, all other payments at period-end. Naturally, the following condition must hold:

(10) $$CV_{x,y,t} \geq 0 \text{ with } (x,y) \in X \times Y;\ t=1,2,\ldots,T$$

Now, the objective function consists in the maximization of the total net present value:

(Z) $$\text{Max} \sum_{t=1}^{T} \sum_{k=1}^{X} \sum_{l=1}^{Y} CV_{x,y,t} \cdot S_{x,y,t}$$

Because $S_{x,y,t}$ are binary variables we are facing a binary decision model. The number of decision variables is $X \cdot Y \cdot T$. In order to compute the access intensity $ZUG_{i,j,t}$ all existent storehouses in t plus those storehouses to be built (represented by $S_{x,y,t}$) including the proximity index have to be considered. Additionally, the access intensity is a determination factor of the market potential. Thus, the decision model is NP-hard and cannot be solved in an acceptable calculation period. Even commonly known optimization algorithms like e.g. branch and bound have to compute all solutions in order to find the optimal solution. Only with proximity index 0 for all neighbour grid boxes a classical binary optimization algorithm could succeed because then, the access intensity only depends on the known starting situation at the beginning of the planning horizon.

## 3. Case Study

Let us now apply the presented model to Germany. Figure 1 shows a map of Germany on the left side. On the right side we can see the grid boxes the investigation area is split into. The grey grid boxes indicate the six areas with the highest population density: Hamburg, Berlin, Munich, Frankfurt, Cologne and the Ruhr. These are the regions the model is coping firstly. Due to the relatively low outpayments in Berlin and the Ruhr, storehouses are first of all built in respectively beside these regions. The chosen locations depend on the values we are using for each grid box and the access intensity. If the outpayments of the white boxes are low in comparison to the grey boxes and the access intensity is not zero the chosen locations lie outside the six areas. Otherwise, if each region consists homogenously of boxes with equal values the chosen locations lie in the center of each region.

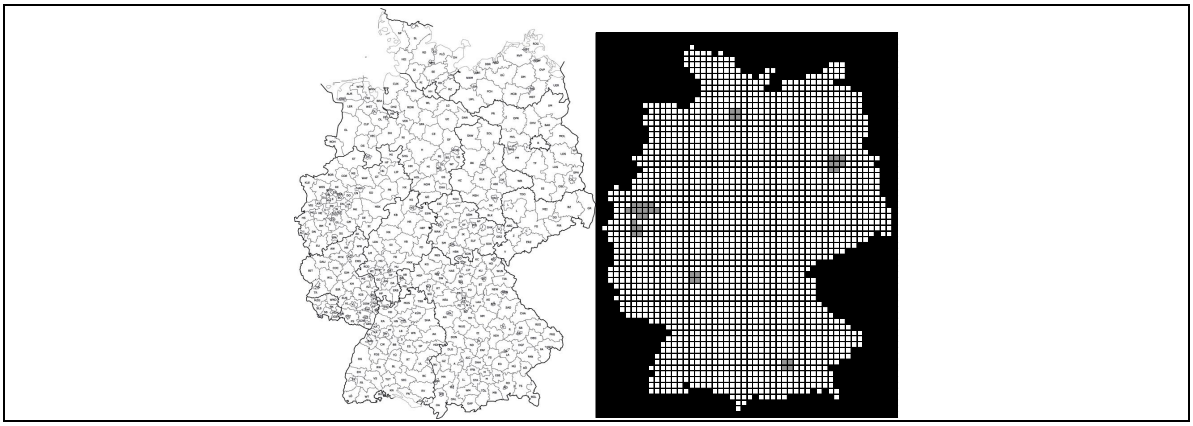

**Figure 1** Investigation Area Germany

The calculation for Germany could only be done because we reduced the number of grid boxes without empty values and the number of periods so that the number of possible solutions was decreased enormously. If we use a totally filled grid the calculation period explodes: With five periods and a 100×100 grid the solution space consists of 9,5 billion elements that have to be computed. Therefore, we will use a genetic algorithm in order to find good solutions in an acceptable time.

## 4. A Generic Algorithm As Approach

### Individuals

In the following we assume $B_t = 1$ for simplification. A solution can be described via a 3D-cube with the location coordinates and the periods as dimensions (Mitchell, 1998, Vose, 1999). Then, an individual of the genetic algorithm is one solution alternative that can be defined as follows: The individuals can be represented as a X×Y-matrix M. The matrix contains a maximum of T values between 1 and T whereas no value occurs twice. The other values of the matrix are 0. A value $M_{x,y} > 0$ in the matrix indicates that a new storehouse is built at site (x,y) in period $M_{x,y}$. The value 0 indicates that no storehouse is built at site (x,y). The net present value is used as fitness to choose the individuals for crossover and the selection of the next generation.

### Mutation

The mutation operator can be defined as follows: Randomly choose two cells of an individual M with different values and swap the two values. Because of the crossover we are discussing later on some values might be lost during the calculation. In order to reproduce those missing values between 1 and T we can insert them instead of swapping two values.

### Crossover

Let M and N be individuals of the genetic algorithm. Then, the crossover operator exchanges parts of the two individuals as follows: Randomly choose the bounds of a rectangle in the matrix. Then the rectangles are cut out of M and N and implanted into the other solution. This operation may lead to invalid individuals: The number of values between 1 and T may now be greater than T (case

1). Values between 1 and T may occur twice but there are only T values greater than 0 (case 2). Therefore, a repair mechanism has to be installed. In the first case, we randomly choose a cell with a value that occurs twice and set the value of the cell to 0 until there are only T values greater than 0. In the second case there are doublets as well as missing values. Therefore, we randomly choose a cell with a doublet value and set the cell's value to one of the missing value until no value occurs twice.

## 5. Conclusion and Further Enhancements

In this paper we presented an optimization model for the location planning of self-storage enterprises concerning the expansion strategy. As this problem is a binary decision problem with many decision variables it can hardly be solved with deterministic algorithms. As genetic algorithms rapidly find good solutions (Koza, 1993) we designed a genetic algorithm that finds a good solution in an acceptable computation time.

## References


Duffy, Scott, Kliebenstein, R.K. (2005), "How to invest in Self-Storage, MiniCo Publishing",

Fleischmann, Bernhard, Klose, Andreas (eds.) 2004, Distribution Logistics: Advanced Solutions to Practical Problems, Springer.

Koza, John R. (1993), "Genetic Programming", MIT Press.

Mark, Ken (2005), "Leveraging Wal-Mart, eBay and USPS", in Morse, Eric A., Mitchell, Ronald K., Cases in Entrepreneurship: The Venture Creation Process, SAGE.

Mitchell, Melanie (1998), "An Introduction to Genetic Algorithms", MIT Press.

Self Storage Association (2007), "US Self Storage Industry 1985 to 2005: Facilities, Square Meters, Revenue etc.", Self-Storage-Conference 2007, Paris.

Vahrenkamp, Richard (2007), „Logistik", 6. Auflage, Oldenbourg.

Vose, Michael D. (1999), "The Simple Genetic Algorithm: Foundations and Theory", MIT Press.