THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

LSECities

IGC International Growth Centre

Towards Urban Growth Analytics for Yangon

A comparative information base for strategic spatial development

An LSE Cities exploratory report commissioned by the Myanmar Country Office of the International Growth Centre

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Acronyms and abbreviations

BMA	Bangkok Metropolitan Area
BMR	Bangkok Metropolitan Region
BTS	Bangkok Mass Transit System
BRT	Bus Rapid Transit
CBD	Central Business District (Yangon)
DHSHD	Department of Human Settlement and Housing Development
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GIS	Geographic Information System
GPP	Gross Provincial Product (Thailand)
GVA	Gross Value Added
IGC	International Growth Centre
JICA	Japan International Cooperation Agency
LSE	London School of Economics and Political Science
MIMU	Myanmar Information Management Unit
MRT	Metropolitan Rapid Transit (Bangkok)
NLD	National League for Democracy
UN	United Nations
UNFPA	United Nations Population Fund
US	United States
VGI	Volunteered Geographic Information
YCDC	Yangon City Development Committee

၁။ အစီရင်ခံစာ အကျဉ်းချုပ်

၁။ အစီရင်ခံစာ အကျဉ်းချုပ်

တစ်ကမ္ဘာလုံးရှိ မြို့တော်ကြီးများသည် မည်သည့်အကြောင်းကြောင့်၊ မည်သည့်ပုံစံဖြင့် မည်သည့်လားရာသို့ ဦးတည်ပြီး ဖွံ့ဖြိုးကြီးထွား နေကြသည်ကို နားလည်ရန် ခက်ခဲလာနေကြသည်။ အထူးသဖြင့် ရေရှည်တည်တံ့နိုင်ပြီး တန်းတူညီမျှမှုလည်းရှိသော မြို့ပြဖွံ့ဖြိုးမှုကို အားပေးနိုင်ရန်အတွက် ဖွံ့ဖြိုးမှုကို လိုသလို အတိအကျပဲကိုင်နိုင်ရန်၊ ထိုနားလည်မှုမှာ မရှိမဖြစ် လိုအပ်သည်။ များသောအားဖြင့် ရှုပ်ထွေးဆန်းကြယ် နေလေ့ရှိသော မြို့ပြဖွံ့ဖြိုးကြီးထွားမှုပုံစံများကို တိုင်းတာခြင်း၊ ပုံဖော်ခြင်းနှင့် ခွဲခြမ်းစိတ်ဖြာသုံးသပ်နိုင်ခြင်းတို့သည် ထိရောက်သော ပေါ်လစီဒီဇိုင်းများနှင့် အကောင်အထည်ဖော်မှုများ ဖြစ်လာရေးတွင် များစွာအထောက်အကူပြုသည်။

ထိုအခြေအနေတွင် IGC Myanmar ရုံးနှင့် LSE Cities တို့ ပူးပေါင်းပြီး ရန်ကုန်၏ မြို့ပြဖွံ့ဖြိုးမှုနှင့် ပတ်သက်၍ ပိုမိုနက်နဲသော သုတေသန အစီအစဉ်များ ဖော်ဆောင်နိုင်ရန်အတွက် ကနဦး ခြေလှမ်းတစ်ခုကို ပူးပေါင်းဆောင်ရွက်ခဲ့ခြင်း ဖြစ်ပါသည်။ ရလာဒ်အနေနှင့် ရှေ့ဆက်ဆောင်ရွက်မည့် လေ့လာဆန်းစစ်မှုများနှင့် မူဝါဒဆိုင်ရာ သုတေသန လုပ်ငန်းများအတွက် လက်တွေ့အချက်အလက် အထောက်အထားများကို ပံ့ပိုးပေးမည့် နှိုင်းယှဉ်တိုင်းတာနိုင်သော အချက်အလက် အခြေခံ အဆောက်အဦး တစ်ခုကို တည်ဆောက်နိုင်ခဲ့သည်။ ထိုမှတစ်ဆင့် အနာဂတ်တွင် ရန်ကုန်မဟာမြို့ပြဒေသကြီးကို မဟာဗျူဟာမြောက် ကြီးထွားဖွံ့ဖြိုး လာစေရေးအတွက် အလွန်အရေးကြီးသော အချက်အလက်များကို ပေးနိုင်လိမ့်မည်ဟုမျှော်လင့်ပါသည်။

ပြီးခဲ့သည့် ဆယ်စုနှစ်အတွင်းက LSE Cities သည် Urban Growth Analytics ဟုခေါ်တွင်သော သုတေသန နည်းစနစ်တစ်ခုကို တီထွင်ခဲ့သည်။ ယင်းသည် ယခုကဲ့သို့ ဒေတာအချက်အလက် အခြေပြု မူဝါဒ လေ့လာဆန်း စစ်မှုများဆောင်ရွက်ရာတွင် အခြေခံသည့် မူဘောင်တစ်ရပ် ဖြစ်လာသည်။ Urban Growth Analyticsသည် အရေးပါသည့်မြို့ပြဖွံ့ဖြိုးမှုဆိုင်ရာ ဒေတာအချက်အလက်များအား လုံးကို စုဆောင်းခြင်း၊ ပုံစံထုတ်ယူခြင်း (visualization) နှင့် နှိုင်းယှဉ်သုံးသပ်ခြင်းများကို ဆောင်ရွက်နိုင်ပြီး ကြုံတင်ပြဋ္ဌာန်းသတ်မှတ်ထားသော အညွှန်းစံများအတိုင်း မြို့တော်ကြီးနှစ်မြို့နှင့်အထက်ကို တစ်ပြိုင်နက်တည်း ဆန်းစစ်လေ့လာနိုင်သည်။ မြေယာအသုံးချမှုနှင့် အခြေခံအဆောက်အဦများကို တစ်ဆင့်ခံ အညွှန်းများအဖြစ် လေ့လာခြင်းဖြင့် အချင်းချင်းဆက်စပ်နေသည့် မြို့ပြစနစ် အများအပြားကို လေ့လာနိုင်သည်။ အချက်အလက်များရရှိနိုင်မှုအနေအထားပေါ်မူတည်ပြီး လူမှု-စီးပွား၊ ပတ်ဝန်းကျင်၊ သယ်ယူပို့ဆောင်ရေးနှင့် ရွှေ့လျားသွားလာမှုပုံစံများကိုပါ လေ့လာဆန်းစစ်နိုင်သည်။ ဤနည်းအားဖြင့် ပထဝီအနေအထားအရ ဖွံ့ဖြိုးမှုနှင့် လူမှုဖွံ့ဖြိုးမှုပုံစံများအကြားမှ ဆက်နွယ်မှုများကိုပါ ရှာဖွေနိုင်မည်ဖြစ်သည်။

ယခု ကနဦးလေ့လာဆန်းစစ်မှုသည် ကနဦးအဆင့်သာဖြစ်ပြီး မြို့ပြဖွံ့ဖြိုးမှုဆိုင်ရာမူဝါဒများ၏ အားသာချက်များနှင့် အကန့်အသတ်များကို အသေးစိတ် အတွင်းကျကျ လေ့လာမည်တော့ မဟုတ်ပါ။ ထိုသို့ အသေးစိတ်ဆန်းစစ်မှုသည် အရေးပါသော နောက်တစ်ဆင့်ဖြစ်သည်။ လက်ရှိ သုတေသန၏ ရည်ရွယ်ချက်မှာမူ လက်ရှိ ရှိနေသော အချက်အလက်များကို ခြုံငုံသုံးသပ်ခြင်းနှင့် လက်ရှိ မြို့ပြဖွံ့ဖြိုးမှု အခြေအနေကို သရုပ်ဖော် တင်ပြခြင်း အတွက်သာဖြစ်သည်။

မြန်မာနိုင်ငံမှ မူဝါဒချမှတ်သူများနှင့် IGC Myanmar အဖွဲ့တို့ တိုင်ပင်ဆွေးနွေးပြီးနောက် ယခုကနဦးဆန်းစစ်မှုအတွက် နှိုင်းယှဉ်မှုပြုရမည့် မြို့တော်ကို ဘန်ကောက်ဟု သတ်မှတ်လိုက်သည်။ ဒေတာ အချက်အလက်ရရှိနိုင်မှု အခြေအနေကို ဆန်းစစ်ပြီးနောက်တွင် မြို့တော်နှစ်ခုကြားတွင် နှိုင်းယှဉ်သုံးသပ်နိုင်မည့် အဓိကအညွှန်းကိန်းများကို သတ်မှတ်ရွေးချယ်သည်။ နောက်ပိုင်းတွင် ယင်းအညွှန်းကိန်းများကိုသုံးပြီး အရေးပါသော မြို့ပြ ဖွံ့ဖြိုးမှုပုံစံများကို ပုံစံထုတ်ဖော်ပြ နိုင်မည်ဖြစ်သည်။ ထို့အပြင် သင့်လျော်သောနေရာများတွင် အခြားသော မြို့ကြီးများ၏ အချက်အလက်များကိုပါထုတ်နုတ်ဖော်ပြပြီး ရန်ကုန်မြို့နှင့် ဘန်ကောက်မြို့ကို နှိုင်းချိန်သုံးသပ်မှု ပြုသွားမည်ဖြစ်သည်။

ယခုဆောင်ရွက်သည့် ကနဦးသုတေသနသည် အနာဂတ်တွင် ဆောင်ရွက်မည့် ရန်ကုန်မြို့ပြ ဖွံ့ဖြိုးမှု မူဝါဒသုတေသနများအတွက် ခိုင်မာသော အခြေခံ သတင်းအချက်အလက် အထောက်အထားများကို ပေးနိုင်မည်ဖြစ်သည်။ အထူးသဖြင့် အလွန်လျင်မြန်သော အရှိန်အဟုန်ဖြင့် ပြောင်းလဲနေသည့် လူမှုစီးပွားနှင့် နိုင်ငံရေးအခြေအနေများကို ကြုံတွေ့နေရချိန်တွင် ခိုင်မာသော အချက်အလက်များကို အခြေခံပြီး မဟာဗျူဟာကျသော မူဝါဒများ ချမှတ်ဆောင်ရွက်နိုင်ရေးမှာ အလွန်အရေးကြီးသည်။ ဒေသတွင်း တစ်ခြားနိုင်ငံများနှင့်ယှဉ်လျင် ဘန်ကောက်သည် ရန်ကုန်မြို့အတွက် စံနမူနာကောင်းတစ်ခုဖြစ်ပြီး ယနေ့ ရန်ကုန်ဖွံ့ဖြိုးနေသည့်အတိုင်း လွန်ခဲ့သော အတိတ်ကာလတစ်ခုက စတင်ဖွံ့ဖြိုးခဲ့ပြီး ယနေ့အချိန်တွင် အရှေ့တောင်အာရှ၏ ရှေ့တန်း မဟာမြို့တော်ကြီးတစ်ခုအဖြစ် ရပ်တည်နိုင် နေပြီဖြစ်သည်။ ယခုအစီရင်ခံစာတွင် ဖော်ပြထားသော ဘန်ကောက်၏ အောင်မြင်မှုများနှင့် ရင်ဆိုင်ခဲ့ရသော စိန်ခေါ်မှုများသည် အနာဂတ် ရန်ကုန်ဖွံ့ဖြိုးမှုအတွက် အဖိုးတန်သော သင်ခန်းစာကောင်းများ ဖြစ်လာမည်ဖြစ်သည်။

ဒေတာအချက်အလက်များရရှိနိုင်မှု

အဓိကတွေ့ရှိချက်များ

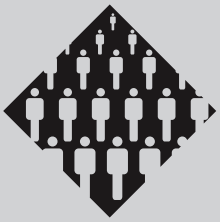
- ခြိုင်ပြီးဆိုရသော် ဘန်ကောက်သည် ရန်ကုန်ထက်စာလျင် အများပြည်သူ လက်လှမ်းမီနိုင်သော သတင်းအချက်အလက်များ ပိုများပြီး အလွယ်တကူ အသုံးချနိုင်သည့် ဒီဂျစ်တယ်ပြောင်းပြီးသော ဒေတာဆက်များလည်း ပိုမိုများပြားစုံလင်စွာ ရှိနေသည်။ မြို့တော်နှစ်ခုစလုံးတွင် မရရှိနိုင်သော အချက်အလက်များလည်း ရှိနေသည်။ သို့သော် ၎င်းတို့မှာ နဂိုကတည်းက ကောက်ယူထားခြင်း မရှိခြင်းကြောင့်လား၊ သို့တည်းမဟုတ် အချက်အလက်ရှိသော်လည်း ထုတ်ပြန်ခြင်း မရှိခြင်းကြောင့်လား ခွဲခြားနိုင်ခြင်းမရှိပါ။
- မြန်မာနိုင်ငံတွင် MIMU ကဲ့သို့သော အင်စတီကျူးရှင်းများက မြို့ပြသုတေသနနှင့် စီမံမှုလုပ်ငန်းများအတွက် မရှိမဖြစ်အရေးပါသော အချက်အလက်များကို ပေးနိုင်သော်လည်း ဒေသန္တရအဆင့်တွင် ကောက်ခံရရှိထားသော အချက်အလက်များကို အများသို့ ထုတ်ပြန်နိုင်ရန် တိုးချဲ့ဆောင်ရွက်ရဦးမည်ဖြစ်သည်။
- မြို့တော်နှစ်ခုစလုံးအတွက် အချက်အလက်များမှာ နောက်ဆုံးရ အချက်အလက်များ ဖြစ်လေ့ရှိသော်လည်း သမိုင်းဆိုင်ရာ အချက်အလက်များနှင့် အသေးစိတ် အချက်အလက်များကို အများသိထုတ်ပြန်ထားခြင်း မရှိပေ။ မြေယာ အသုံးပြုမှုနှင့် ဆိုင်သော အချက်အလက်များမှာ ယုံကြည်စိတ်ချရမှု အနိမ့်ဆုံးဖြစ်ပြီး လမ်းပန်းဆက်သွယ်ရေး အခြေခံအဆောက်အဦများနှင့် ပတ်သက်သည့် အချက်အလက်များ မရှိသလောက်ဖြစ်နေသည်။
- ရန်ကုန်တွင် ပထဝီအနေအထား အချက်အလက်ဆိုင်ရာများကို ကနဦး ကောက်ယူစုဆောင်းသူများမှာ နိုင်ငံတကာအဖွဲ့အစည်းများမှ ဖြစ်နေသည်။ ဒေသန္တရအဆင့်တွင် အဓိက အချက်အလက်ပေးနိုင်သူမှာ JICA ဖြစ်သည်။ သို့ရာတွင် JICA မှ ရနိုင်သော ဒေတာများမှာ ကိန်းဂဏန်း သို့မဟုတ် ဂရပ်ပုံစံများဖြင့် ဖြစ်နေပြီး ၎င်းတို့မှ ထုတ်ဝေသည့် အစီရင်ခံစာများတွင် ပါဝင်သော်လည်း သုတေသီများအနေဖြင့် ကိုယ်တိုင်ကိုင်တွယ်ပြီး ပြန်လည်လေ့လာသုံးသပ်၍ ရသော ပုံစံဖြင့် ထုတ်ပြန်ထားခြင်းမရှိပါ။ မူရင်း အချက်အလက်များ (raw data) နှင့် spatial-statistical data set များကို လက်လှမ်းမီနိုင်မှု မရှိခြင်းကြောင့် နောက်ထပ်လေ့လာဆန်းစစ်မည့် သုတေသနများပေါ်ထွက်လာမှုကို ကန့်သတ်လိုက်သလို ဖြစ်စေသည်။ အဘယ့်ကြောင့်ဆိုသော် လေ့လာဆန်းစစ်မှု အသစ်တစ်ခု ပြုလုပ်နိုင်ရန်အတွက် ကနဦး သတင်း အချက်အလက်များကို နောက်ကြောင်းပြန် ပြန်လည်ဖော်ထုတ်ရခြင်း (reverse engineering) နှင့် သုံးသပ်ပြီးသား အစီရင်ခံစာများမှ ပြန်လည်ထုတ်နှုတ်နေရခြင်းတို့ကြောင့်ဖြစ်သည်။

နောက်ထပ်သုတေသနမေးခွန်းများ

- သတင်းအချက်အလက်နှင့် အရင်းအမြစ် အကန့်အသတ်များ ရှိနေသော အချိန်တွင် လူမှု-ပထဝီဖွံ့ဖြိုးမှုဆိုင်ရာ ဦးစားပေးများကို မည်သို့သော ဆုံးဖြတ်ချက်ချသည့်စနစ်ဖြင့် ဖော်ထုတ်သနည်း။
- ထိရောက်သော မြို့ပြစီမံခန့်ခွဲမှုနှင့် မဟာဗျူဟာ စီမံကိန်းရေးဆွဲမှုများအတွက် မည်သို့သော လူသားအရင်းအမြစ်နှင့် အင်စတီကျူးရှင်း အရင်းအမြစ်များ လိုအပ်သနည်း။
- အချက်အလက်ကောက်ယူရာတွင် မည်သို့ ဦးစားပေးထားရှိသနည်း။ အစိုးရဌာနများနှင့်သက်ဆိုင်သော အချက်အလက်များကို အများသိဖြစ်အောင် မည်သို့ ထုတ်ပြန်နိုင်သနည်း။
- စေတနာ့ဝန်ထမ်းများက ပံ့ပိုးသော ပထဝီဆိုင်ရာ အချက်အလက်များ (volunteered geographic information-VGI) ပိုမိုရရှိရန် မည်သို့သော မက်လုံးများကို ဖန်တီးပေးသင့်သနည်း။ VGI ဆိုသည်မှာ မိမိတို့ဒေသနှင့် ပတ်သက်ပြီး ကောင်းစွာ သိကျွမ်းသူများအား ဆိုင်ရာပထဝီအနေအထား အချက်အလက်များကို စေတနာ့ဝန်ထမ်း ကောက်ယူစုဆောင်း ပေးပို့စေရန် ဆောင်ရွက်သော စနစ်တစ်ခုဖြစ်သည်။

အဓိကတွေ့ရှိချက်များနှင့် ရှေ့ဆက်ဆောင်ရွက်ရမည့် သုတေသနများအတွက် မေးခွန်းများ

ယခုအစီရင်ခံစာသည် ဒေတာအချက်အလက်များ ရရှိနိုင်မှုနှင့် အဓိကကျသော မြို့ပြဖွံ့ဖြိုးမှု အညွှန်းကိန်းများကို ပုံစံထုတ်ပြန် ရည်ရွယ်ပါသည်။ ထိုသို့ လုပ်ဆောင်ရင်းမှတစ်ဆင့် အနာဂတ်တွင်ဆောင်ရွက်မည့် မူဝါဒဆိုင်ရာ သုတေသနများမှ အဖြေရှာရမည့် သုတေသနမေးခွန်းများလည်း ပေါ်ထွက်လာမည်ဖြစ်သည်။ အစီရင်ခံစာပါ အဓိကအခန်းများမှ အရေးကြီးသော တွေ့ရှိချက်များနှင့် လေ့လာဆန်းစစ်ရင်းနှင့် ပေါ်ထွက်လာသော နောက်ထပ်သုတေသန မေးခွန်းများကို အောက်တွင် ဖော်ပြထားသည်။



လူဦးရေ

အဓိက တွေ့ရှိချက်များ

- ရန်ကုန်နှင့် ဘန်ကောက်သည် ကမ္ဘာပေါ်ရှိ အကြီးဆုံး မဟာမြို့ပြဒေသကြီး ၁၅၀ တွင် အပါအဝင်ဖြစ်သည်။ ၂၀၁၂ နှင့် ၂၀၃၀ ကြားတွင် ရန်ကုန်၏ ဖွံ့ဖြိုးမှုနှုန်းသည် ဘန်ကောက်ထက် မြင့်မားပြီး အခြားသော ဒေသတွင်း မြို့တော်ကြီးများထက်ပါ ပိုမိုမြန်ဆန်မည်ဟု ခန့်မှန်းထားသည်။ ယင်းကြောင့် ကမ္ဘာ့မြို့ပြ လူဦးရေတိုးနှုန်းတွင် ရန်ကုန်၏ လူဦးရေတိုးနှုန်းမှာ ယခင်ကထက် မြင့်မားသော အချိုးဖြင့် ပါဝင်နေမည်ဖြစ်သည်။
- ဘန်ကောက်တွင် ရှင်းလင်းစွာ သတ်မှတ်ထားသော မဟာဘန်ကောက်ဒေသ ရပ်ဝန်းရှိသည်။ သို့ရာတွင် မဟာဘန်ကောက်ဒေသ၏ လူဦးရေတွက်ချက်ပုံများမှာမူ မတူညီကြပေ။ ထိုကွဲလွဲမှုများသည် ဝန်ဆောင်မှုများပေးခြင်းနှင့် ရေရှည်မဟာဗျူဟာများ ရေးဆွဲခြင်းတို့တွင် အခက်အခဲများ ဖြစ်စေသည်။ ရန်ကုန်သည် ပိုမိုကျယ်ပြန့်သော မဟာရန်ကုန်မြို့ပြဒေသရပ်ဝန်းကို ယခုမှစတင် သတ်မှတ်ခြင်း ဖြစ်ရာ ထိုသို့ ရှင်းလင်းစွာ သတ်မှတ်နိုင်ခြင်းသည် အနာဂတ်ဖွံ့ဖြိုးမှုအတွက် အလွန်အရေးပါသည်။
- လွန်ခဲ့သော ၁၅ နှစ်အတွင်း ဘန်ကောက်၏ ဖွံ့ဖြိုးမှုမှာ မြို့စွန်ဒေသများနှင့် ဆက်စပ်ခရိုင်များတွင်ဖြစ်ပြီး ရန်ကုန်မှာမူ မြို့တော်တွင်း လူဦးရေအကြီးအကျယ် တိုးပွားခြင်းနှင့် ကြုံနေရသည်
- ရန်ကုန်မြို့တော် ဗဟိုချက်သည် ဘန်ကောက်ထက် လူဦးရေသိပ်သည်းမှုနှင့် သိပ်သည်းဆမြင့်မားသော်လည်း ကျန်ဒေသများတွင်မူ ဘန်ကောက်က ပိုမို သိပ်သည်းသည်။ ထို့ကြောင့် သိပ်သည်းဆ ပြောင်းလဲမှုနှုန်းတွင် ရန်ကုန်က ဘန်ကောက်ထက် ပိုမိုမြင့်မားသည်။

နောက်ထပ်သုတေသနမေးခွန်းများ

- မြို့ပြလူဦးရေ အလျင်အမြန် ကြီးထွားလာခြင်းကြောင့် လက်ရှိရန်ကုန်မြို့တော်၏ မြို့ကွက်တည်ဆောက်ပုံ၊ မြို့တော်နယ်နိမိတ်များနှင့် ဒေသန္တရနှင့် တိုင်းဒေသကြီး အုပ်ချုပ်မှုစနစ်များအပေါ် မည်သို့သော အခွင့်အလမ်းများနှင့် အန္တရာယ်များ ဖြစ်ပေါ် စေနိုင်သနည်း။
- ရန်ကုန်အနေနှင့် ယဉ်ကျေးမှု အမွေအနှစ်များ ထိခိုက်ပျက်ဆီးခြင်းကို မည်သို့ လျော့ချနိုင်မည်နည်း။ ဘဝ အရည်အသွေးဆိုင်ရာ မှတ်ကျောက်များဖြစ်သော လူမှုပေါင်းစည်းညီညွတ်မှု၊ တရားမျှတမှု၊ ဝန်ဆောင်မှုများ လက်တစ်ကမ်းတွင် ရရှိမှု၊ စီးပွားရေးအရ နိမ့်မြင့်တက်ကျ ဒဏ်ခံနိုင်မှုနှင့် ရေရှည်ဖွံ့ဖြိုးမှုတို့ကို စဉ်ဆက်မပြတ်တိုးတက်သွားစေရန် မည်သို့ဆောင်ရွက်နိုင်မည်နည်း။

စီးပွားရေးအဆောက်အဦ

အဓိကတွေ့ရှိချက်များ

- အမှန်တန်ဖိုးတွက်ချက်မှု (absolute terms) အရ ကမ္ဘာ့ကုန်ထုတ်လုပ်မှုတွင် ဘန်ကောက်၏ ဝေစုမှာ ရန်ကုန်ထက် များစွာမြင့်မားသည်။ သို့ရာတွင် ကမ္ဘာပေါ်ရှိ မဟာမြို့တော်ရပ်ဝန်းဒေသကြီး ၇၂၅ ခုကို နှိုင်းယှဉ်ရာ၌ ၂၀၁၂ နှင့် ၂၀၃၀ ကြားရှိ ရန်ကုန်၏ ခန့်မှန်းဖွံ့ဖြိုးမှုနှုန်းသည် ဘန်ကောက်ထက်မြင့်ပြီး ကျန်ဒေသတွင်းနှင့် တစ်ကမ္ဘာလုံးတွင်ပါ အမြင့်မားဆုံးမြို့တော်များထဲတွင် ပါဝင်သည်။
- ရန်ကုန်နှင့် ဘန်ကောက်ရှိ အလုပ်အကိုင်အများစုမှာ ဝန်ဆောင်မှု လုပ်ငန်းများ ဖြစ်သော်လည်း ဘန်ကောက်စီးပွားရေးတွင် ဝန်ဆောင်မှု လုပ်ငန်းများက လုံးဝ ကြီးစိုးထားသည်။ ရန်ကုန်တွင်မူ အရေးပါပြီး ဆက်လက်လည်း ကြီးထွားနေသော ကုန်ထုတ်လုပ်ငန်းများ ရှိနေသည်။ ပြည်ပရင်းနှီးမြှုပ်နှံမှုများ ဆက်တိုက် တိုးတက်နေခြင်းကလည်း ကုန်ထုတ်လုပ်ငန်းများအတွက် အလုပ်အကိုင် အခွင့်အလမ်း အသစ်များကို ဖန်တီးပေးပြီး ရွှေ့ပြောင်းအခြေချ လုပ်သားအများအပြား ထပ်မံ ရောက်ရှိလာမည်ဖြစ်သည်။
- ရန်ကုန်မြို့ရှိ ဝန်ဆောင်မှု လုပ်ငန်းများမှာ များသောအားဖြင့် ကျွမ်းကျင်မှု နိမ့်သော လုပ်ငန်းများဖြစ်နေသည်။ ဝန်ဆောင်မှုကဏ္ဍကို မြှင့်တင်လိုပါက (ပညာရေးနှင့် ကျွမ်းကျင်မှု သင်တန်းများမှ တစ်ဆင့်) လူ့စွမ်းအားအရင်းအမြစ်တွင် ရင်းနှီးမြှုပ်နှံထားရန်လိုသည်။ သို့မှသာ အနာဂတ်တွင် ပိုမိုအဆင့်မြင့်သော ဝန်ဆောင်မှု လုပ်ငန်းများအတွက် အဆင်သင့်ဖြစ်မည်ဖြစ်သည်။
- ရန်ကုန်နှင့် ဘန်ကောက်သည် မြန်မာနှင့် ထိုင်းနိုင်ငံများအတွက် အဓိက မြို့တော်များဖြစ်ကြသော်လည်း ရန်ကုန်သည် တစ်နိုင်ငံလုံး စီးပွားရေးထုတ်လုပ်မှုကို ဘန်ကောက်လောက် လွှမ်းမိုးနိုင်ခြင်းမရှိပါ။ ထိုင်း အစိုးရသည် စီးပွားရေးဖွံ့ဖြိုးမှုကို ခွဲဖြန့်နိုင်ရန်နှင့် အလုပ်အကိုင်အခွင့်အလမ်းများကို တစ်နိုင်ငံလုံးပျံ့နှံ့စေရန် ရည်ရွယ်ပြီး ဒုတိယမြို့တော်များကိုလည်း ဖွံ့ဖြိုးအောင် ရင်းနှီးမြှုပ်နှံလျက်ရှိသည်။ သို့သော် ယနေ့အချိန်အထိ အကန့်အသတ်တစ်ခုအထိသာ အောင်မြင်သည်။
- ဘန်ကောက်သည် လွန်ခဲ့သော နှစ်ပေါင်းများစွာကတည်းက နိုင်ငံတကာ ခရီးသွားလုပ်ငန်း၏ အချက်အခြာ မြို့တစ်မြို့ဖြစ်ခဲ့သော်လည်း ရန်ကုန်မှာမူ မကြာသေးမီကမှသာ နိုင်ငံခြားဧည့်သည်များ သိသိသာသာ တိုးတက်ရောက်ရှိလာခြင်း ဖြစ်သည်။ ခရီးသွားလုပ်ငန်းသည် စီးပွားရေးဖွံ့ဖြိုးမှုနှင့် အလုပ်အကိုင် အခွင့်အလမ်းသစ်များအတွက် အလားအလာကောင်းသော်လည်း အလုံးအရင်းနှင့် ဝင်ရောက်လာမည့် ဧည့်သည်များကို ကောင်းစွာမစီမံနိုင်ပါက လူမှုရေးနှင့် သဘာဝ ပတ်ဝန်းကျင်ဆိုင်ရာ ပြဿနာများ ပေါ်ပေါက်လာနိုင်သည်။

နောက်ထပ်သုတေသနမေးခွန်းများ

- ရန်ကုန်တွင် စီးပွားရေး ဖွံ့ဖြိုးမှုအတွက် မည်သည့်ရည်မှန်းချက်များ ချမှတ်ထားသနည်း။ လက်ရှိ စီးပွားရေး အဆောက်အဦ ဖွဲ့စည်းပုံကို လျင်မြန်စွာ ပြောင်းလဲလိုက်ခြင်းကြောင့် မြို့တော်၏ လူမှု - စီးပွားနှင့် ပထဝီ အနေအထားဆိုင်ရာ တည်ဆောက်မှုများအပေါ် မည်သည့် သက်ရောက်နိုင်သနည်း။ တစ်နိုင်ငံလုံး အတိုင်းအတာနှင့်ရော မည်သည့်သက်ရောက်မှုများရှိနိုင်သနည်း။
- ရွှေ့ပြောင်းအခြေချမှု၊ နိုင်ငံခြားရင်းနှီးမြှုပ်နှံမှုနှင့် ခရီးသွားလုပ်ငန်းတိုးတက်လာခြင်းကြောင့် မည်သို့ သက်ရောက်မှုများ ဖြစ်ပေါ်လာနိုင်သနည်း။
- ရန်ကုန်စီးပွားရေး အသွင်ကူးပြောင်းနိုင်ရန်အတွက် မည်သို့သော ကျွမ်းကျင်မှုနှင့် စွမ်းဆောင်ရည်များ လိုအပ်သနည်း။ ဝန်ဆောင်မှု အခြေခံစီးပွားရေးသို့ ကူးပြောင်းရာတွင် လိုအပ်ချက်များကိုဖြည့်ဆည်းပေးနိုင်မည့် လူသားအရင်းအမြစ်များ ဖွံ့ဖြိုးရေးကို မြို့တော်က မည်သို့စီစဉ်ဆောင်ရွက်နိုင်မည်နည်း။

မြို့ပြတည်ဆောက်မှုပုံစံ

အဓိကတွေ့ရှိချက်များ

- ဘန်ကောက်မြို့ပြ ဇရိယာသည် ရန်ကုန်၏ သုံးဆခန့်ရှိသော်လည်း မြို့နှစ်မြို့၏ လူဦးရေမှာ မတိမ်းမယိမ်းဖြစ်သည်။ ထို့ကြောင့် ဘန်ကောက်၏ ပြန့်ကားမှုနှုန်းမှာ မြင့်မားကြောင်းညွှန်ပြနေသည်။
- ရန်ကုန်မြို့ပြ ပြန့်ကားမှုကို တိုင်းတာနိုင်မည့် အချက်အလက်များ မရှိသောကြောင့် ဘန်ကောက်နှင့် တိုက်ရိုက်နှိုင်းယှဉ်ရန် မဖြစ်နိုင်ပေ။ ထိုအချက်အလက်များ ကောက်ယူခြင်းနှင့် အတည်ပြုခြင်းလုပ်ငန်းများသည် မြို့ပြပုံစံကို ပိုမိုနားလည်စေရန်နှင့် အနာဂတ်ဖွံ့ဖြိုးရေး အစီအမံများ ရေးဆွဲရာတွင် အလွန်အရေးကြီးသည်။
- ဘန်ကောက်မဟာမြို့ပြဒေသကြီးတွင် သတ်မှတ်ထားသော နယ်နိမိတ်ရှိပြီး အုပ်ချုပ်ရေးဆိုင်ရာ ပေါင်းစပ်ညှိနှိုင်းမှုများ ရှိသော်လည်း အမှန်တကယ် မြို့ပြဖြစ်ထွန်းမှုမှာ ယင်းထက်ပိုမိုသည်။
- ဘန်ကောက်တွင် ဂုံသတ်မှတ်မှု တင်းကျပ်ခြင်းမရှိသောကြောင့် ကြိုတင်စီစဉ်ထားခြင်း မရှိသော၊ တစ်ခါ တရံတွင် ကမောက်ကမဖြစ်စေသော မြို့ပြပြန့်ကားမှုများ ဖြစ်ပွားတတ်သည်။ အထူးသဖြင့် မြို့ပြတိုးချဲ့မှုတွင် သယ်ယူပို့ဆောင်ရေး ကွန်ရက်များကို ထည့်သွင်းတိုးချဲ့နိုင်ခြင်းမရှိခဲ့ပေ။ ရန်ကုန်အနေနှင့် ထိုသင်ခန်းစာများကိုယူနိုင်ပြီး မြို့ပြတိုးချဲ့မှုကို ဂရုတစိုက် စီမံခန့်ခွဲကာ မြို့တော်၏ ရေရှည်မဟာဗျူဟာများနှင့် ဟန်ချက်ညီအောင်ဆောင်ရွက်ဖို့လိုသည်။

နောက်ထပ်သုတေသနမေးခွန်းများ

- ရန်ကုန်အတွက် သင့်လျော်သော လူနေသိပ်သည်းမှုနှင့် အလုပ်အကိုင်ဆိုင်ရာ သိပ်သည်းမှုမှာ မည်သည့် ပမာဏဖြစ်သင့်သနည်း။ လက်ရှိမြို့ကွက်အနေအထား၊ သယ်ယူပို့ဆောင်ရေး အခြေခံအဆောက်အဦများနှင့် မြေရရှိနိုင်မှုတို့ကိုပါ ထည့်သွင်းစဉ်းစားရမည်။
- မြို့တော်၏ မြို့ကွက်နှင့် တည်ဆောက်မှု ပုံစံတို့ကို အခြေခံပြီး မြို့ပြဖွံ့ဖြိုးမှုကို အစီအစဉ်ဆွဲရာတွင် ရေရှည်မဟာဗျူဟာ ရည်မှန်းချက်များနှင့် အံဝင်အောင် မည်သို့ဆောင်ရွက်သင့်သနည်း။

သယ်ယူပို့ဆောင်ရေး အခြေခံအဆောက်အဦများ

အဓိကတွေ့ရှိချက်များ

- မြို့တော်ကို ဒုက္ခပေးနေသော လမ်းပိတ်ဆို့မှု ပြဿနာများကို ဖြေရှင်းရန် အတွက် ဘန်ကောက်သည် မကြာသေးမီက မြို့ပြသယ်ယူပို့ဆောင်ရေး အခြေခံအဆောက်အဦများတွင် အကြီးအကျယ် ရင်းနှီးမြှုပ်နှံခဲ့သည်။ မြေအောက်ရထားစနစ်ကို ချဲ့ထွင်လျက်ရှိပြီး အခြားသယ်ယူပို့ဆောင်ရေး ကဏ္ဍရင်းနှီးမြှုပ်နှံ မှုများကိုလည်း ဆောင်ရွက်လျက်ရှိရာ လမ်းကြောင်းသစ်များတွင် ကြန့်ကြာမှုများနှင့် မရေရာမှုများလည်း ကြုံတွေ့နေရသည်။ အမြန်ရထားစနစ်ကလည်း ဒုတိယလေဆိပ်အပါအဝင် လူနေထူထပ်သော ဒေသအချို့သို့ ပေါက်ရောက်နိုင်ခြင်း မရှိပေ။
- ရန်ကုန်ရှိ မြို့ပတ်မီးရထားလမ်းကြောင်းမှာ အတန်အသင့် ကောင်းမွန်သည်။ သို့သော် အစွန်အဖျား ဒေသများအထိ ပေါက်ရောက်သည်မှာ ဘတ်စ်ကားများဖြစ်သည်။ သို့သော် ဝန်ဆောင်မှုများအား အရေအတွက်ရော၊ အရည်အသွေးပါမြှင့်တင်နိုင်ခြင်းနှင့် စနစ်တစ်ခုနှင့်တစ်ခု ချိတ်ဆက်နိုင်ခြင်းတို့သည် မြို့ပြသယ်ယူပို့ဆောင်ရေးဆိုင်ရာ အဓိက ပြဿနာများကို ဖြေရှင်းရာတွင် အထောက်အကူပြုသည်။
- ရန်ကုန်အတွက် သယ်ယူပို့ဆောင်ရေးကို အားပြုသော ဖွံ့ဖြိုးရေး မိုဒယ်တစ်ခုကို ဆောင်ရွက်ရန် အခွင့်အလမ်းရှိနေသည်။ အများပြည်သူ သယ်ယူပို့ဆောင်ရေးဦးစီးမြှုပ်နှံမှုများကို မြို့တော်၏ မဟာဗျူဟာ ဖွံ့ဖြိုးရေးစီမံကိန်းနှင့် ပေါင်းစပ်ရန် လိုသည်။ သို့မှသာ အသစ်ဖွံ့ဖြိုးလာသော လူနေရပ်ကွက်များနှင့် စီးပွားရေးလုပ်ကိုင်နေသောနေရာများကို အများပြည်သူများအတွက် သယ်ယူပို့ဆောင်ရေး ကွန်ရက်နှင့် ချိတ်ဆက်ပေးနိုင်မည်ဖြစ်သည်။

နောက်ထပ်သုတေသနမေးခွန်းများ

- လက်ရှိ သယ်ယူပို့ဆောင်ရေး အခြေခံအဆောက်အဦများကိုအဆင့် မြှင့်တင်ခြင်းနှင့် တိုးချဲ့ခြင်းအားဖြင့် တိုးပွားလာမည့် ခရီးသည်များကို သယ်ယူပို့ဆောင်ပေးရေးအတွက် ရေရှည်အစီအမံများကို မည်သို့ ရွေးချယ်ဆောင်ရွက်နိုင်မည်နည်း
- ပိတ်ဆို့ကျပ်တည်းမှုများကို လျှော့ချပြီး သယ်ယူပို့ဆောင်ရေး လက်လှမ်းမီမှုကို မြှင့်တင်ပေးနိုင်ရန် မြို့ပြ နောက်ခံအခြေအနေများကို ထည့်သွင်းစဉ်းစားထားပြီး သယ်ယူပို့ဆောင်ရေးကို ဦးစားပေးသည့် ဖွံ့ဖြိုးရေး ပုံစံတစ်ခုကို မည်သို့ ရေးဆွဲနိုင်မည်နည်း။
- မြို့ပြလိုအပ်ချက်အသစ်များကို တစ်ဆင့်ချင်းပြောင်းလဲသွားမည့် သယ်ယူပို့ဆောင်ရေး စနစ်များဖြင့် ရင်ဆိုင်ဖြေရှင်းနိုင်မည်လား။ အလားတူစိန်ခေါ်မှုများကို ရင်ဆိုင်နေရသော မြို့တော်များမှ မည်သည့် သင်ခန်းစာများကို ရန်ကုန်အနေနှင့် ရရှိနိုင်မည်နည်း။

ရွှေ့လျားသွားလာမှုဆိုင်ရာ အဓိကပုံစံများ

အဓိကတွေ့ရှိချက်များ

- အများပြည်သူ သယ်ယူပို့ဆောင်ရေးတွင် ရင်းနှီးမြှုပ်နှံမှု မလုပ်ခြင်းနှင့် လျင်မြန်သော ဖွံ့ဖြိုးမှုနှုန်းတို့ကြောင့် ဘန်ကောက်တွင် ကိုယ်ပိုင်ကားပိုင်ဆိုင်မှုနှုန်း အလွန်မြင့်မားလာသည်။ ယင်းနှင့်ဆက်စပ်ပြီး ကမ္ဘာပေါ်၌ အဆိုးရွားဆုံး ယာဉ်ကျောပိတ်ဆို့မှုများဖြစ်ပွားသည်။
- ရန်ကုန်တွင်လည်း လူဦးရေတိုးပွားမှု၊ မော်တော်ယာဉ်တင်သွင်းမှုနှင့် ပတ်သက်သည့် ကန့်သတ်ချက်များကို လျော့ပေါ့ပေးမှုနှင့် ဝင်ငွေတိုးလာမှုတို့ကြောင့် ဘန်ကောက်ကဲ့သို့ ပြဿနာများ ကြုံတွေ့ရနိုင်သည်။ အထူးသဖြင့် အစားထိုးအသုံးပြုစရာ အများပြည်သူ သယ်ယူပို့ဆောင်ရေးစနစ်များ အလျင်အမြန် မဖွံ့ဖြိုးလျင် ပို၍ဖြစ်နိုင်သည်။
- ဘန်ကောက်တွင် ရွေးချယ်စရာများ ရှိလာသော်လည်း သယ်ယူပို့ဆောင်ရေး ပြဿနာများ ဆက်ရှိနေပြီး မြို့တော်၏ နာမည်ဆိုးသော ယာဉ်ကျောပိတ်ဆို့မှုသည် ရင်းနှီးမြှုပ်နှံမှုများကိုပါ ထိခိုက်စေသည်။ ရန်ကုန်တွင်လည်း လမ်းပိတ်ဆို့မှုမှာ မကြာသေးမီကစပြီး ပိုမိုဆိုးရွားလာခဲ့သည်။ လမ်းကွန်ရက်စနစ်များ ပိုကောင်းအောင် ဆောင်ရွက်ပေးခြင်းက ရေတိုဖြေရှင်းမှု ဖြစ်နိုင်သော်လည်း ရေရှည်တွင်မူ လမ်းများ ပိုကောင်းလာခြင်းကြောင့် ကိုယ်ပိုင်ကားများ ပိုများလာအောင် တွန်းအားပေးသလိုဖြစ်သွားနိုင်သည်။
- ဘန်ကောက်သည် အများပြည်သူ သယ်ယူပို့ဆောင်ရေးတွင် ရင်းနှီးမြှုပ်နှံမှု အသစ်များ အကြီးအကျယ် လုပ်လျက်ရှိသော်လည်း ရှိပြီးသား မြို့ပြယန္တရားကြီး အတွင်းသို့ ယင်းစနစ်များ အံဝင်အောင်ထည့်သွင်းရေးနှင့် အရိုးစွဲနေပြီဖြစ်သော ကိုယ်ပိုင်ကားယဉ်ကျေးမှုကို ပြောင်းလဲရန်မှာမူ ခက်ခဲသည်။

နောက်ထပ်သုတေသန မေးခွန်းများ

- ရန်ကုန်သားများ၏ သွားလာမှုပုံစံနှင့် ယင်းနှင့်ပတ်သက်သည့် သဘောထားအယူများ မည်သို့ရှိသနည်း။ လက်ရှိ ရုပ်ပိုင်းနှင့် လူမှုစီးပွား အပြောင်းအလဲများက ယင်းတို့အပေါ် မည်သို့သက်ရောက်စေသနည်း။
- ကိုယ်ပိုင်ယာဉ်များ တိုးပွားလာမှုနှင့် ယင်း၏ ဘေးထွက်ဆိုးကျိုးများကို (ရေတို ဖြစ်စေ) မည်သို့ကိုင်တွယ် ဖြေရှင်းနိုင်မည်နည်း။ တပြိုင်နက်တည်းမှာပင် အများပြည်သူ သယ်ယူပို့ဆောင်ရေးစနစ်များတိုးတက် လာအောင် မည်သို့ရင်းနှီးမြှုပ်နှံနိုင်မည်နည်း။

မြို့ပြအုပ်ချုပ်မှုစနစ်

အဓိကတွေ့ရှိချက်များ

- ရန်ကုန်နှင့် ဘန်ကောက်အကြားတွင် မြို့ပြအုပ်ချုပ်မှုစနစ်များ များစွာကွဲပြားသည်။ ဘန်ကောက်တွင် မြို့တော်နှင့် ဒေသန္တရအုပ်ချုပ်ရေး နှစ်ရပ်စလုံးကို ဘန်ကောက်မြူနီစပယ် BMA က တာဝန်ယူပြီး ရန်ကုန်တွင်မူ တိုင်းဒေသကြီး အစိုးရနှင့် ရန်ကုန်စည်ပင်သာယာရေးကော်မတီ YCDC ဟူ၍ သီးခြားအဖွဲ့အစည်းနှစ်ခုရှိနေသည်။
- မြို့ပြအုပ်ချုပ်မှု အာဏာသဘောအရ BMA နှင့် YCDC တို့မှာ မြို့ပြစီမံကိန်းနှင့် မြေအသုံးချမှုတို့အပါအဝင် လုပ်ပိုင်ခွင့်နယ်ပယ်ဆင်တူသည်။ ဘန်ကောက်ကို မြို့တော်အနေနှင့်ရော ခရိုင်တစ်ခုအနေနှင့်ပါ သတ်မှတ်ထားသောကြောင့် BMA က သယ်ယူပို့ဆောင်ရေးအပါအဝင် ကဏ္ဍများကို တစ်ဦးတည်းတာဝန် ယူသော်လည်း ရန်ကုန်တွင်မူ ဒေသအစိုးရနှင့် YCDC အကြား လုပ်ပိုင်ခွင့် ခွဲဝေထားမှုများ ရှိနေသည်။
- စည်ပင်နှင့် မြို့ပြဝန်ဆောင်မှု လုပ်ငန်းများအကြား ပေါင်းစပ်ညှိနှိုင်းမှု မရှိသောကြောင့် ဘန်ကောက်၏ မြို့ပြစီမံကိန်းနှင့် ဇုံရေးဆွဲခြင်းတို့တွင် အားနည်းချက်များ ရှိသည်။ အရေးပေါ် အခြေအနေစီမံခန့်ခွဲမှုမှာလည်း များစွာညံ့ဖျင်းသည်။ ရန်ကုန်တွင်လည်း တိုင်းဒေသကြီးအစိုးရနှင့် မြူနီစပယ်အာဏာပိုင်များ အကြားလုပ်ပိုင်ခွင့်ရှင်းလင်းစွာ ခွဲခြားထားခြင်းမရှိရာ ဘန်ကောက်ထက် ပိုဆိုးသော အခြေအနေဖြစ်နိုင်သည်။

နောက်ထပ် သုတေသနမေးခွန်းများ

- မဟာရန်ကုန်ဒေသကြီးကို တစ်ခုတည်းသော အုပ်ချုပ်ရေးဒေသကြီးအဖြစ်သတ်မှတ်နိုင်ရန် မည်သို့သော စိန်ခေါ်မှု၊ အခွင့်အလမ်းနှင့် အကန့်အသတ်များ ရှိနေသနည်း။
- အင်စတီကျူးရှင်း အမျိုးမျိုးကြား အလျားလိုက်နှင့် ဒေါင်လိုက်ပေါင်းစပ် ညှိနှိုင်းမှု (Horizontal And Vertical Coordination)၊ မြို့ပြ အုပ်ချုပ်ရေးစနစ် ဖွဲ့စည်းပုံနှင့် တာဝန်ခွဲဝေပုံများ ရှင်းလင်းပြတ်သား စေရန်အတွက် မည်သို့ စီစဉ်ဆောင်ရွက်နိုင်သနည်း။

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Cities around the world face the challenge of understanding why, how and where they are growing; an understanding that is crucial if they are to realise opportunities to steer this growth in ways that promote sustainable and equitable urban development. Being able to measure, visualise and analyse these often complex patterns of growth is essential to effective policy design and implementation.

It is within this context that the IGC Myanmar office has collaborated with LSE Cities on this first step towards developing a more in-depth research programme on urban development in Yangon. It has resulted in the creation of a comparative information base that will provide a strong empirical foundation for subsequent analytics and policy research. This will in turn inform strategic spatial development in the Yangon metropolitan region in the future.

Over the past decade, LSE Cities has developed a research methodology known as Urban Growth Analytics that provides a framework for this type of data-driven policy analysis. Urban Growth Analytics is based on the collection, visualisation and comparative analysis of critical urban development data, assessing two or more cities across a range of pre-defined indicators. A primary focus is on land use and infrastructure as proxies for various interrelated urban systems. In addition, and depending on data availability, socio-economic and environmental data as well as transport and mobility patterns are analysed to deepen the understanding of the relationship between spatial and social development patterns.

It is important to note that this initial research project is not an in-depth analytical assessment of urban development policies and their merits or limitations. While this is considered a crucial next step, the purpose of this piece of research is to provide an overview of available data as well as a descriptive exploration of the current state of urban development.

Following consultation with local policy makers and the IGC Myanmar team, the comparator city selected for this initial research effort was Bangkok. After assessing overall data availability, key indicators were selected for comparison between the two cities, and were subsequently used to visualise and describe a subset of important urban development patterns. Where relevant, data from other global cities was used to contextualise this information and place Yangon and Bangkok into a wider urban context.

This initial research effort should provide a strong evidence base to inform future research around urban development policies in Yangon, critical at a time when the city is facing rapid social, political and economic changes that necessitate a well-informed and strategic policy response. In this context, Bangkok provides a useful regional benchmark, having grown at a similarly rapid rate in the past and having solidified its position as a leading Southeast Asian metropolis. As this report highlights, both Bangkok's successes and the challenges it faces can provide relevant lessons for Yangon's future development.

KEY FINDINGS AND FUTURE RESEARCH QUESTIONS

While this report focuses primarily on understanding data availability and visualising a subset of essential urban development indicators, the process also resulted in a number of potential research questions that could usefully inform future policy research in Yangon.

Below is an overview of some of the key findings from each section of the report, as well as the associated research questions that emerged from this comparative work.

Data availability

Key findings

◆ Overall, Bangkok appears to have more publicly accessible information than Yangon and a greater diversity of digitised datasets presented in a user-friendly format. In both cities, it is sometimes unclear whether the data is not available because it hasn't been collected or because it hasn't been shared.

◆ In Myanmar, new institutions such as MIMU provide data services that could be fundamental for city research and management, but more data produced at the local level could also be made publicly available.

◆ While information for both cities is fairly up-to-date, most historical data and data with a high level of detail is still not publicly available. Land use data seems to be the area with the lowest levels of reliability, while transport infrastructure data is largely non-existent.

◆ In Yangon, the primary source of raw spatial data seems to be from international agencies. At the local level, JICA emerges as one of the main data providers. However, the data from JICA is mostly numerical and graphical and although available through their reports, it is not publicly accessible in a format that can be manipulated. Not having access to raw and spatial-statistical datasets limits the development of the research process for future investigations, as information needs to be reverse engineered or extracted from secondary sources in order to be analysed.

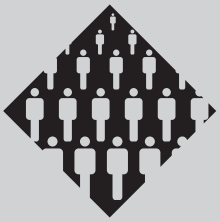
Future research questions

◆ What decision-making methodologies will facilitate the development of strategic priorities in a context of limited data availability and resources?

◆ What are the human capital requirements and institutional resources needed to enable effective urban management and strategic planning?

◆ What are the priorities in terms of data collection, and how can data produced from and for public institutions be made publicly available?

◆ How can the city create incentives to improve and increase volunteered geographic information (VGI) data? (VGI is the harnessing of people and tools to create, assemble and disseminate geographic data provided voluntarily by individuals with good local knowledge.)



Population

Key findings

◆ Yangon and Bangkok rank in the 150 largest metropolitan areas in the world. Between 2012 and 2030, Yangon is projected to grow more rapidly than Bangkok – faster, in fact, than most other urban areas in the region. This will increase the city's overall contribution to global urban population considerably.

◆ Bangkok has a clearly defined metropolitan boundary, but estimates of the overall population of the metro area vary considerably. This variance can be an issue when it comes to service provision and long-term strategic planning. Yangon is only just defining the wider metropolitan area, which will be essential to managing growth in the future.

◆ Bangkok's growth over the past 15 years has mostly taken place on the outskirts of the city and surrounding provinces, while Yangon has experienced significant population growth within the city.

◆ Yangon City has a higher and more concentrated population density in the city core than Bangkok but also much lower density in other areas. The overall variation in density is therefore much higher in Yangon than in Bangkok.

Future research questions

◆ What are the key opportunities and risks of rapid population growth for the city's urban footprint, current city boundaries and for local and regional governance arrangements?

◆ How can the city minimise negative impacts on its heritage and ensure it continues to improve against key quality of life indicators including social inclusion and equity, accessibility, economic resilience and sustainability?

Economy

Key findings

◆ In absolute terms, Bangkok's contribution to the total global economy is far higher than Yangon's, owing to its higher GDP. However, based on a comparison of the 725 largest metropolitan regions in the world, Yangon's projected GDP growth between 2012 and 2030 ranks higher than Bangkok's and among the highest both in Southeast Asia and globally.

◆ While the majority of jobs in both Yangon and Bangkok are service based, Bangkok's economy is almost entirely dominated by the service industry, while Yangon has a significant and growing manufacturing sector. Accelerated FDI has created new employment opportunities in manufacturing, leading to a high influx of migrants.

◆ Service jobs in Yangon are still often low-skilled jobs. In order to expand the service industry, an essential precondition will be investment in human capital through education and skills training.

◆ Although both Yangon and Bangkok are the primate cities of Myanmar and Thailand, Yangon does not dominate the national economic output to the same extent as is the case for Bangkok. The Thai government has been trying to invest more into secondary cities to diversify economic growth and employment opportunities in the country, but this has had limited success to date.

◆ While Bangkok has long been a major centre for international tourism, Yangon has only recently begun to receive a significant increase in foreign visitors. Tourism has the potential to provide many economic growth and employment opportunities but there are also social and environmental risks if the influx of visitors is not carefully managed.

Future research questions

◆ What are Yangon's economic development objectives and how will rapid changes to the economic composition impact existing socio-economic and spatial structuring of the city and the wider national context of Myanmar?

◆ What roles do migration, foreign direct investment and a growing tourism sector play in this context?

◆ What are the skills and capacities required to enable Yangon's economic transformation? How can the city ensure that human capital development is accelerated to allow its population to meet the demands of an increasingly service-based economy?

Urban form

Key findings

◆ Bangkok's urban area is almost three times the size of Yangon, but the two cities have nearly the same population. This indicates a higher level of sprawl in Bangkok.

◆ There was no data for Yangon on urban expansion that could be used to compare its growth directly to that of Bangkok's. The recording and validation of this kind of data is typically viewed as essential to understanding the form of the city and to planning for future growth.

◆ Even though Bangkok has defined a wider metropolitan region within which there is some administrative coordination, the built-up area has already begun to expand beyond this.

◆ Bangkok's lack of strict zoning laws has led to unplanned and often haphazard urban expansion that falls short of integrating the physical growth of the city with the provision of public transport. Yangon can learn from Bangkok's experience and ensure that urban expansion is carefully managed and in line with the wider strategic vision for the city.

Future research questions

◆ What levels of residential and employment density are desirable for Yangon, taking into account its current urban morphology, transport infrastructure and land availability?

◆ How can a planning system based on the city's urban morphology and footprint be used to steer urban growth in line with the long-term strategic vision?

Transport infrastructure

Key findings

◆ Bangkok has only recently begun to invest significantly in its public transport infrastructure, responding to the worsening congestion problems plaguing the city. While a considerable expansion of the metro system is underway, as well as other transport investments, there have been ongoing delays and uncertainty about some of the lines. The mass transit system does not yet serve many densely populated areas, including the city's second airport.

◆ Yangon has some good existing rail links, and the bus lines adequately serve even distant parts of the city. Nevertheless, improvements in the frequency and quality of service, and better integration between the systems, could help abate major traffic issues.

◆ There is a real opportunity for Yangon to follow a transport-oriented development model and incorporate new investments in public transport into the strategic growth plan for the city, ensuring that newly developed residential and employment centres are adequately connected via public transport.

Future research questions

◆ How can Yangon adopt a proactive approach to transport planning that improves existing transport infrastructure and expands public transport to accommodate a higher volume of passengers?

◆ How can the city develop a context-sensitive transport-oriented development strategy that reduces congestion and improves accessibility?

◆ Would an incremental approach accommodate future transport needs and allow the city to adapt to changing urban realities? What lessons can Yangon learn from other cities with similar struggles in that respect?

Mobility

Key findings

◆ In Bangkok, a lack of investment in good public transport and rapid development have led to very high motorisation rates and the corresponding congestion levels that are considered some of the worst in the world.

◆ In Yangon, population growth, a relaxation of import regulations for motor vehicles and rising income levels risk a similarly rapid increase in motorisation if alternative modes of transport are not developed quickly.

◆ Even though there are a range of alternatives, transportation continues to be an issue for Bangkok and the negative image of the city's traffic congestion may affect foreign investments. Yangon's congestion issues have also worsened rapidly in recent years. Investment in improved road networks may help to alleviate the problem temporarily, but will only lead to a continued rise in car use in the long run.

◆ Bangkok has been investing heavily in new public transport developments, but retrofitting these infrastructures into the existing urban fabric and changing a car-centred culture can be difficult.

◆ In contrast, Yangon's mode share is still primarily dominated by public transport and walking, which presents a real opportunity. Planning for a walkable city with a well-developed public transport system will allow the city to minimise the negative effects of a car-dependent development pathway.

Future research questions

◆ What are the actual travel behaviours and underlying mobility attitudes of Yangon residents and how are these affected by the current physical and socio-cultural context?

◆ How can Yangon manage an inevitable increase in private motorised vehicles (at least in the short term) while limiting negative externalities and simultaneously investing in the expansion of active and public transport options?

Urban governance

Key findings

◆ Urban governance structures differ significantly between Yangon and Bangkok. In Bangkok, the responsibilities of the city and regional government are combined within a single political entity (BMA), while Yangon has two distinct political levels for the city and the region respectively (Yangon Regional Government and YCDC).

◆ In terms of governance powers, the YCDC and the BMA have comparable responsibilities that include city planning and land use. The key difference is that Bangkok is simultaneously regarded as both a city and also an entity similar to a province, explaining, for example, why transport in Bangkok is entirely managed by the BMA, while in Yangon it is shared between municipal and regional authorities.

◆ The lack of collaboration between municipal and city services in Bangkok has had negative consequences for urban planning and land zoning. Poor coordination has also led to ineffective management in times of emergency. In Yangon, the problem seems to be more that there is not enough clarity on the division of responsibilities between the city and regional government.

Future research questions

◆ What are the challenges, opportunities and limitations related to the development of the Greater Yangon area as a new administrative entity?

◆ How can a clear urban governance structure and division of responsibilities, which includes both horizontal and vertical coordination between different institutional actors, be achieved?

1

INTRODUCTION

1 INTRODUCTION

The International Growth Centre (IGC) has been working in Myanmar since 2012. During this time of significant political and economic change, the IGC aims to provide local government officials and policy makers with relevant data and demand-led policy advice to promote sustainable growth in the country.

One of the key challenges Myanmar faces is an accelerating pace of urbanisation that creates urgent governance and infrastructural pressures. To support local policy makers in the effort to address these stresses, IGC Myanmar wants to strengthen the growing evidence base for carefully managed urban growth, first in Yangon and later in other cities in Myanmar. To date, the IGC has been seeking advice and input on strategic spatial development in Yangon, the commercial hub of Myanmar. Supported by the IGC's small grants facility, LSE Cities first conducted a collaborative project that scoped the current data availability and presents the broad patterns of urban development that can be extracted from existing datasets.

1.1 Project objectives

Recognising the importance of a solid information base for analysis and policy action, this project set out to develop a comparative information base to inform future research on strategic spatial development in the Yangon metropolitan region. Given that this was LSE Cities' first foray into Myanmar, it seemed essential to get a much better sense of the data availability as well as the status of current urban development. As a result, the project focused primarily on applying the Urban Growth Analytics lens to this new urban context to lay the foundations for future long-term research and policy engagement in the country.

The objective of this project is thus twofold:

- To understand the availability and quality of urban development data for Yangon and Bangkok and collect this data where available.

- To visualise and describe a selection of essential urban development indicators using the data collected in order to identify priority areas for future policy research.

These objectives were achieved through the application of the first two stages of the LSE Cities' Urban Growth Analytics methodology, which combines the collection and analysis of critical local data, international data sources and comparative information for other relevant cities. Particular attention is given to data visualisation and information design that enhance the communication of complex urban patterns and relationships.

1.2 Methodological approach

The choice of Yangon was obvious: although the city is no longer the administrative capital, it remains the economic centre and serves as a model for dynamic urban growth throughout the country.

In order to provide a context for the comparative perspective of this project, IGC Myanmar and LSE Cities decided to compare the urban growth of Yangon to its regional neighbour, Bangkok. The Thai capital serves as a key model and counter model at a different stage in its development. Although the historical pattern of urban growth varies between the two cities, Bangkok is viewed by many policy makers in the region as an aspirational model that can inform their own policy decisions. By highlighting trends in Bangkok's urban development and growth trajectory, Yangon urban policy makers are given the opportunity to evaluate these lessons in their drive to build a sustainable and vibrant city.

While there are certainly some areas where Yangon can learn positive lessons from Bangkok, there are others where Bangkok might not be the most relevant reference point, and still more areas where the experiences and current urban realities of Bangkok might act as a warning to Yangon policy makers about the way in which certain policy decisions can lock cities into undesirable urban development trajectories.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LSE Cities' Urban Growth Analytics operates at multiple spatial scales with an emphasis on data, visualisation and analysis at the metropolitan and city levels, which are considered the most relevant for strategic spatial development. At those levels, it focuses on land use and transport infrastructure as proxies for various interrelated urban systems and infrastructures. In addition, and subject to availability, socio-economic and environmental data and transport and mobility patterns are collected and analysed to better understand the relationship between spatial and social development patterns.

Urban Growth Analytics can broadly be understood to contain three key stages, of which the first two were completed for this research project.

Stage 1: Data collection

- This stage relies on a pre-defined set of indicators across a collection of thematic areas deemed of particular relevance to strategic urban development. Data to assess performance against each indicator is collected from a variety of sources and cross-referenced to determine the most reliable and complete dataset available for each indicator.

- Data availability is recorded in an overview table that highlights the indicators for which data is available, its sources, the time periods covered, the level of granularity available, whether it is spatial, numerical or visual data and additionally how reliable the source of the data is deemed by the researchers.

Stage 2: Data visualisation and description

- Using the overview table of data availability, a sub-section of indicators is selected for further consideration. This selection depends on the quality of the data, its comparability to other case study cities and its relevance in relation to the specific research objective.

- Data is then organised and re-structured to create comparative visualisations, using a set of illustration and mapping techniques developed by LSE Cities over the past decade. The patterns illustrated via these visualisations are described in a comparative way, drawing on additional data points to provide context where appropriate.

Stage 3: Data analysis and policy recommendations

- In the third stage of Urban Growth Analytics methodology, the work completed for the first two stages is used to engage with local policy makers and other stakeholders and explore how the urban development patterns identified via the data collection and visualisation stages map onto existing policy priorities and can be understood as either driving or holding back specific policy objectives.

- The data is analysed in relation to the local policy context and recommendations are developed to help structure future urban development pathways based on the evidence of current urban realities.

2

DATA COLLECTION

2 DATA COLLECTION

2.1 Introduction to data collection process

To develop a comparative urban growth analysis, a basic understanding of data availability for each city is crucial. The acknowledgement of existing but also missing data can be significant for research and policy making.

The research team looked for spatial, graphical and/or numerical datasets, and research was focused on time series data ranging from the years 1900 to 2015. The indicators were related to different scales: national, regional, metropolitan, city and sub-city[1]. Wherever possible, data was collected at the most detailed scale available, to allow for more granularity in the analysis.

Data collection was supported by the IGC Myanmar country office and local partners and institutions in Yangon, particularly the Yangon City Development Committee (YCDC) and the Myanmar Information Management Unit (MIMU), as well as the Bangkok Metropolitan Administration (BMA) and the Bureau of Registration Administration in Bangkok. Researchers also utilised archival and desktop research. In cases where data was not available through formal institutional sources, spatial data was collected from open sources and big data projects (e.g. Open Street Map and Google Earth).

The team reviewed more than 100 separate indicators for Yangon and Bangkok, across six categories:

1. Land use and urban design
2. Transportation
3. Governance
4. Spatial development
5. Social pattern & activity
6. Environment

For the purposes of this report, a sub-set of around 50 sources was finally selected for comparison. In addition to selecting indicators for their relevance to the particular urban growth challenges Yangon currently experiences, criteria such as availability, reliability and comparability of data were also considered before arriving at a final selection of indicators to be used for Chapter 3. (For the visualisation and analysis, these categories were slightly renamed and reorganised to aid in the flow of the report.) The selection, though comprehensive, is by no means exhaustive; for example, indicators on housing, green spaces, conservation areas, income and health were not considered in the process.

The overview of the data availability for Yangon and Bangkok is shown in Table 2.1 and Table 2.2 below. A more comprehensive table including all the indicators as well as a more thorough assessment of their reliability can be found in the Annex of this report. The metadata in the table include parameters such as format, year, scale, source name and type and level of reliability. These parameters aim to go beyond the simple assessment of data availability and towards a more in-depth evaluation of data quality.

[1] We understood the following terms as defined below:
City: the area for which the city government has jurisdiction. Most statistical data is available for cities.
Metropolitan Area: functional urban area/ region usually defined by commuter belt or in some cases by continuously built-up areas with some degree of homogeneity (disregarding the many possible political boundaries).
Urban Area: physical expanse or area of continuously built-up urbanisation.
Sub-city: lower levels of governmental jurisdiction within the city boundary.

2.2 Data availability overview

The 'Maps and imagery' section of the table represents the fundamental spatial data that allows the creation of maps and infographics exploring topics such as land use & urban form, transport infrastructure, administrative and statistical units and imagery. While this section presents more descriptive spatial data, the 'Indicators' section includes statistical and more analytical data. This later section explores indicators on *Spatial Development,* which include land use and transport infrastructure, and *Social Patterns and Activity,* which includes socio-economics, tourism, mobility and environment. These sections represent the topics that best capture how people and cities interact, based on ten years of comparative urban analysis by LSE Cities.

As most metadata doesn't include data collection methodologies, LSE Cities was unable to precisely assess its reliability and therefore relied on the judgment of local researchers. Not knowing how the data was generated, LSE Cities' reliability level was then determined through internal knowledge and testing of the scale and level of detail the data permits, i.e. some of the data is more accurate at a higher level of aggregation than at a lower level of analysis. In general, LSE Cities assumes that *governmental/ official* sources are more reliable than data from *private/ independent* agencies as the former has a higher degree of local knowledge and better access to primary data.

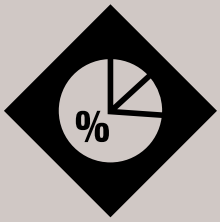
2.3 Discussion and limitations

Several limitations and constraints emerged during the comparative analysis of data on Yangon and Bangkok, particularly regarding methodology, data availability, reliability and the comparability of sources.

Data collection methodologies and analyses tend to differ between countries and organisations. For example, most Bangkok data comes from national sources, while for Yangon most of the data is provided by international organisations, particularly the Japan International Cooperation Agency (JICA). In Myanmar, statistics provided by the country's different government departments vary in their reliability, creating frequent challenges to ascertaining the accuracy of some available data (OECD, 2015). Furthermore, the indicators a country chooses to track are different in each place. The indicator of Gross Value Added (GVA) is used in Myanmar, for instance, but not in Thailand, where the government prefers to use Gross Domestic Product (GDP). Up-to-date data can be non-existent or not widely available, as in the case of modal share data in Yangon, which has not been updated since it was first collected in 2011. In Bangkok, there is little available information regarding modal share and travel times. Attempts to gather more information were made but the government agencies responsible did not have this data available.

There were also some difficulties collecting data for both cities over the same time period. The last census in Thailand was conducted in 2010 and the country conducts official censuses every ten years, whereas Myanmar conducted the most recent national census in 2014, its first since 1983. The only data available for the years between 1983 and 2014 were based on estimates made by international agencies like the United Nations (UN). These are the best available estimates, but the 2014 Myanmar census highlighted how these approximations may not be as reliable as international experts had thought: the national population of Myanmar had, for years, been overestimated by nearly 17%, with recent data showing 9 million fewer people than previously calculated (UNFPA, 2016).

A final challenge to the research effort was the mismatch of spatial dataset availability for Bangkok and Yangon. When comparing urban growth in Yangon to Bangkok, LSE Cities was limited by the fact that the data was incomplete for Yangon. For example, in the creation of the planned growth maps, this report had to merge the future urban development plans with the existing urban areas. Since the methodology and baseline data used to map the final spatial data is different in some cases, comparison of the maps is not always possible.



Key findings

◆ Overall, Bangkok appears to have more publicly accessible information than Yangon and a greater diversity of digitised datasets presented in a user-friendly format. In both cities, it is sometimes unclear whether the data is not available because it hasn't been collected or because it hasn't been shared.

◆ In Myanmar, new institutions such as MIMU provide data services that could be fundamental for city research and management, but more data produced at the local level could also be made publicly available.

◆ While information for both cities is fairly up-to-date, most historical data and data with a high level of detail is still not publicly available. Land use data seems to be the area with the lowest levels of reliability, while transport infrastructure data is largely non-existent.

◆ In Yangon, the primary source of raw spatial data seems to be from international agencies. At the local level, JICA emerges as one of the main data providers. However, the data from JICA is mostly numerical and graphical and although available through their reports, it is not publicly accessible in a format that can be manipulated. Not having access to raw and spatial-statistical datasets limits the development of the research process for future investigations, as information needs to be reverse engineered or extracted from secondary sources in order to be analysed.

Future research questions

◆ What decision-making methodologies will facilitate the development of strategic socio-spatial priorities in a context of limited data availability and resources?

◆ What are the human capital requirements and institutional resources needed to enable effective urban management and strategic planning?

◆ What are the priorities in terms of data collection, and how can data produced from and for public institutions be made publicly available?

◆ How can the city create incentives to improve and increase Volunteered geographic information (VGI) data? (VGI is the harnessing of people and tools to create, assemble and disseminate geographic data provided voluntarily by individuals with good local knowledge.)

Maps and imagery

Table 2.1: Selection of available spatial data and imagery

Land use & urban form	Format	City	Years	Scale	Data source	Source type	Reliability
Location of major development sites	Graphical	Yangon	2013	City	JICA Final Report I Current Conditions	International	High
		Bangkok	2013	Regional/City	Bangkok City Planning Department	Local	High
Urban growth	Spatial	Yangon	NA		-	-	-
		Bangkok	1850–2015	Regional/City	Lincoln Institute	International	High

Transport infrastructure	Format	City	Years	Scale	Data source	Source type	Reliability
BRT and bus networks	Numerical & Graphical	Yangon	2013	City	JICA	International	Low
	Spatial	Bangkok	2015	Regional/City	Bangkok Metropolitan Administration & Openstreetmap	Local & International	High
Light rail networks	Spatial	Yangon	2016	City	Openstreetmap	International	High
		Bangkok	2015	Regional/City	Bangkok Metropolitan Administration & Openstreetmap	Local & International	High
Rail networks	Spatial & Graphical	Yangon	2013	City	JICA	International	High
	Spatial	Bangkok	2015	Regional/City	Openstreetmap	International	High
Ferry networks	Graphical	Yangon	2013	City	JICA	International	High
	Spatial	Bangkok	2015	City	Bangkok GIS & Openstreetmap	Local & International	High

Administrative and statistical units	Format	City	Years	Scale	Data source	Source type	Reliability
Administrative boundaries	Spatial & Graphical	Yangon	2016	City/Sub-city	YCDC, MIMU & JICA	National & International	High
	Spatial	Bangkok	2015	Regional/City/ District/Sub-district	Bangkok GIS & ArcGIS	Local & International	High
Lowest available census	Spatial & Graphical	Yangon	2016	Sub-city/ward	YCDC	Local	High
	Spatial	Bangkok	2015	Regional/City/ District/Sub-district	National Statistic Office of Thailand	National	High

Indicators

Table 2.2: Selection of available numerical indicators

Socio-economics	Format	City	Years	Scale	Data source	Source type	Reliability
City population	Numerical	Yangon	2014/1983/ 1973/1931/ 1921/1911/ 1901/1891/ 1882/1872	City/Sub-city/ Ward	From the Department of Human Settlements and Housing Development prepared by MIMU	National & International	High
		Bangkok	1994–2015	City/Sub-city	Department of Provincial Administration	National	High
Metropolitan population	Numerical	Yangon	2014	Metropolitan	JICA	International	High
		Bangkok	2008–2014	Metropolitan	Bangkok Metropolitan Administration & Official Statistics Registration Systems	Local & National	High
National population	Numerical	Yangon	2014/1983/ 1973/1941/ 1931/1921/ 1911/1901/ 1891/1881	National	Department of Population. Ministry of labour, immigration and population	National	High
		Bangkok	2000–2014	National	Official Statistics Registration Systems	National	High
Ambient population * Reliability level depends on level of detail available	Spatial & Numerical	Yangon	2010	National/ Regional/City/ Sub-city/km^2	Landscan	International	High/ Medium
		Bangkok	2010	National/ Regional/City/ Sub-city/km^2	Landscan	International	High/ Medium
Employment by sector	Numerical	Yangon	2013	City	From the Department of Human Settlements and Housing Development prepared by MIMU		High
		Bangkok	2008–2014	City	Bangkok Metropolitan Administration & Official Statistics Registration Systems	Local & National	High
GDP per capita	Numerical	Yangon	2013	National	World Health Organisation	International	High
		Bangkok	1981–2009	Regional/City	Office of the National Economic and Social Development Board	National	High

Tourism	Format	City	Years	Scale	Data source	Source type	Reliability
Number of tourists	Numerical	Yangon	2015	National/City	Myanmar Ministry of Hotels and Tourism	National	High
		Bangkok	2009–2015	National/City	Department of Tourism, Ministry of Tourism and Sports	National	High

Mobility	Format	City	Years	Scale	Data source	Source type	Reliability
Modal share	Numerical	Yangon	2013	City	JICA & YCDC Data Through Myanmar Statistical Information Service	National & International	High
		Bangkok	2013	City	Office of Transport and Traffic Policy and Planning	National	High
Vehicle registration data	Numerical	Yangon	1990–2013	City	Kojima et al.	International	Medium
		Bangkok	1989–2015	Regional/City	Department of Land Transport	National	High

3

DATA VISUALISATION AND DESCRIPTION

3 DATA VISUALISATION AND DESCRIPTION

Using a selection of the indicators identified as part of the initial data availability review, this section illustrates how urban form in Yangon and Bangkok has evolved over time, using population change and municipal boundary growth since the early formation of each city to compare their growth in size, population, mobility and density. It also explores how economic expansion and increasing job opportunities have encouraged urban areas to expand, while urban governance struggles to keep up, underscoring how Bangkok has sprawled beyond its city boundary while Yangon remains fairly contained within its administrative borders, and considers the implications of this.

3.1 Overview of case study cities

Yangon and Bangkok are, respectively, the main urban hubs of Myanmar and Thailand. The countries are relatively different in size (678,500 km² and 513,000 km² respectively) and population:51.4 million people in Myanmar and 65.1 million in Thailand (2014). At the city level, the populations of Yangon and Bangkok are rather similar, ranging between 5 and 6 million.

The following introduction to Bangkok and Yangon (Figure 3.1) is intended for an international audience who may not be intimately familiar with these two cities. Particular emphasis is placed on geographical and historical information to allow for the contextualisation of the two cities in space and time.

Substantial urbanisation and the expansion of cities and metropolitan regions is one of the most important transformations of the modern world. In the case of Yangon and Bangkok, both cities have been modifying their boundaries to accommodate increases in population, but hosting their many newcomers as well as accommodating their growth remains a challenge.

Figure 3.1: Yangon and Bangkok geographical context

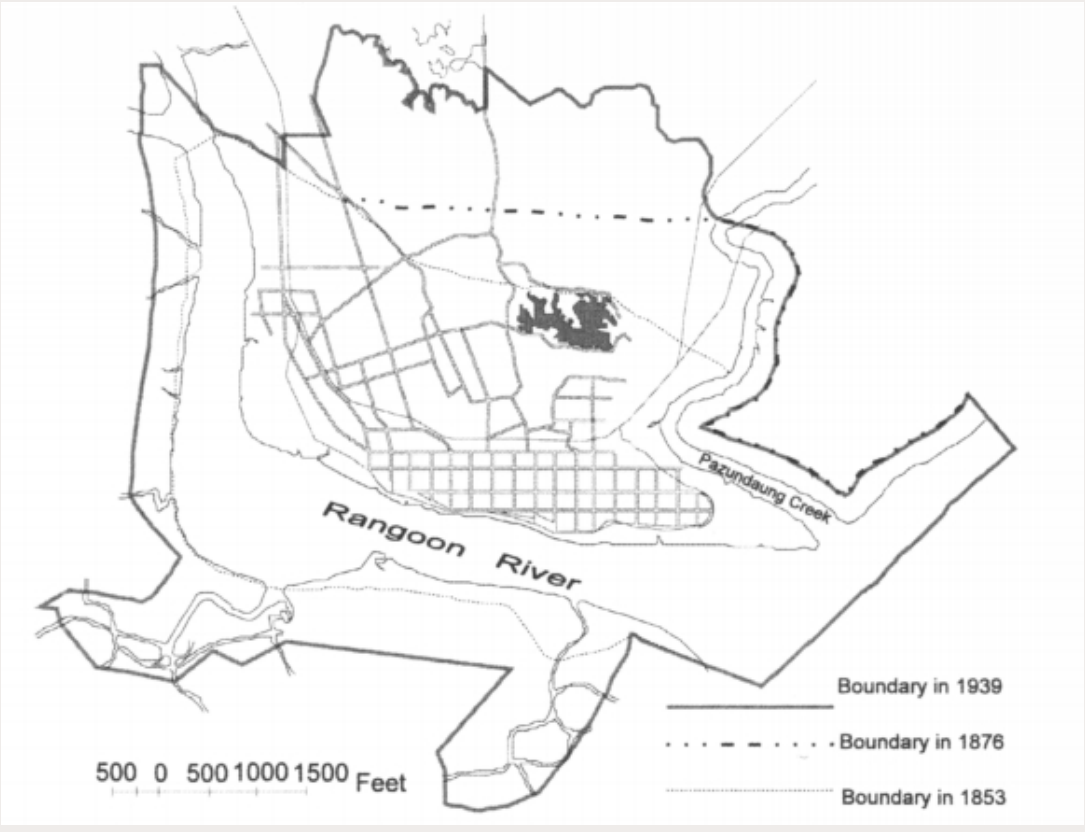
Source: LSE Cities 2016

3.1.1 Yangon: brief introduction

In the 11th century, Yangon was a small fishing village, originally called Dagon, and founded during the time of the Mon Kingdom. The site was given its contemporary name 'Yangon' in 1775 by Burman King Alaungpaya. In 1852, 'Rangoon' became the capital city of the British colonisation efforts in Burma[2]. At that time, the city's boundaries were largely confined to the present Central Business District (CBD)[3]. These boundaries were the first to include the eastern bank of the Yangon River and the city of Dala. In 1876, the city area expanded from an initial area of 2 km² to 29 km² (Nwe, 1998). In 1921, under the new town planning committee, Yangon's boundaries were enlarged again to encompass a total area of almost 80 km² (Nwe, 1998, p.92). In 1959, North Okkalapa, South Okkalapa and Thaketa Townships were constructed and added to the town. Although the city boundaries were extended again in 1974, very little development took place: the period between 1962 and 1988 is sometimes referred to as a time of 'urban development inertia' (Kraas *et al.*, 2015). The following period of military rule in Myanmar (1962–2011) brought about changes of many location names across the country, and the city was once again named 'Yangon' in 1989. In 1990, the Yangon City Development Committee was established. In late 1995, Hlaing Thar Yar, Shwe Pyi Thar, East Dagon, South Dagon, Dagon Seikkan[4] and North Dagon Townships were built (Figure 3.3) The city served as the nation's political capital between 1852 and 2005, but on the 6th of November 2005, the capital was moved to Nay Pyi Taw, 320 kilometres to the north. Yangon nevertheless remains Myanmar's commercial and cultural capital. Since the beginning of the democratic transition and the acceleration of economic liberalisation in 2011, Yangon has seen a swell of growth in construction: Colliers International (2016) reported that nearly 4,000 residential condominium units were launched in 2015 alone and YCDC approved 138 new high-rises of nine floors and above that same year (*New Crossroads Asia*, 2015).

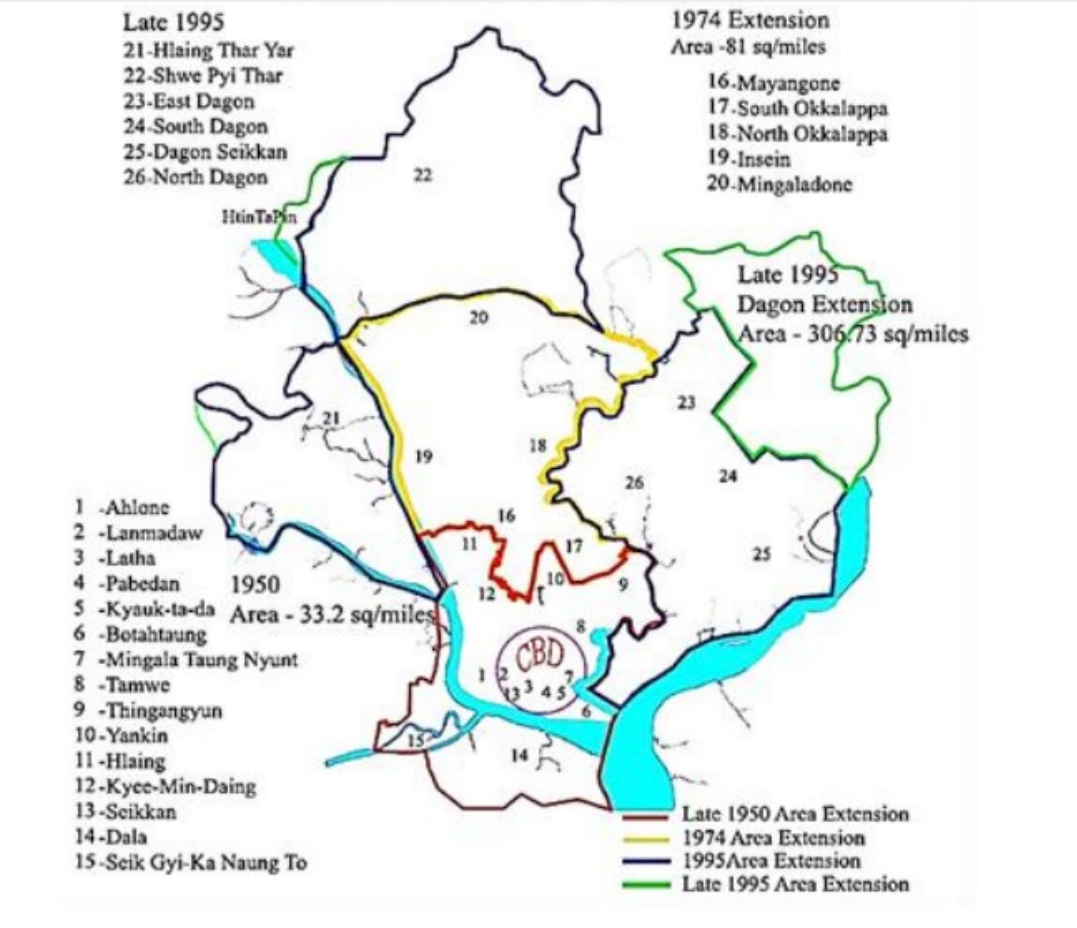
Today the city occupies 829 km² in the Yangon Administrative Region[5] (YCDC, 2016). It should be noted that the unofficial metropolitan region as defined by the Japan International Cooperation Agency (JICA) includes neighbouring townships and measures the land occupied as 1535 km². From the 1960s to the 1990s Yangon expanded rapidly, growing from under 2.5 million inhabitants in 1983 (Burma Census, 1983) to 5.2 million in 2014 (Ministry of Immigration and Population, 2014). JICA (2013) extends that figure one step further by including those who live within the 'not yet official' Yangon Metropolitan Area. These 6,481,000 people, or about 13% of the country's population, make Myanmar almost monocentric[6], dwarfing the country's other urban areas in terms of population and significance. For example, 90% of international trade moves through the Port of Yangon (Oxford Business Group, 2015).

Figure 3.2: Yangon boundaries under British Administration



Source: Nwe 1998: p.94.

Figure 3.3: Yangon administrative boundary changes



Source: Thu Ra et al 2014: p.30.

3.1.2 Bangkok: brief introduction

The area that now comprises the modern city of Bangkok was first established as a trading post in the 15th century. The settlement grew in size until splitting into two. Following the fall of the Ayutthaya Kingdom in 1767, King Taksin established Thonburi on the west side of the Chao Phraya River as his capital in 1768. (It was later relocated to the eastern bank (Figure 3.4). The other settlement was Rattanakosin (Bangkok), founded in 1782.

Administration of the city in modern form was first formalised with the establishment of the Monthon[7] in 1906. In 1932, the Monthon system was dismantled and split into several provinces (Nakpattharapong *et al.*, 2012).

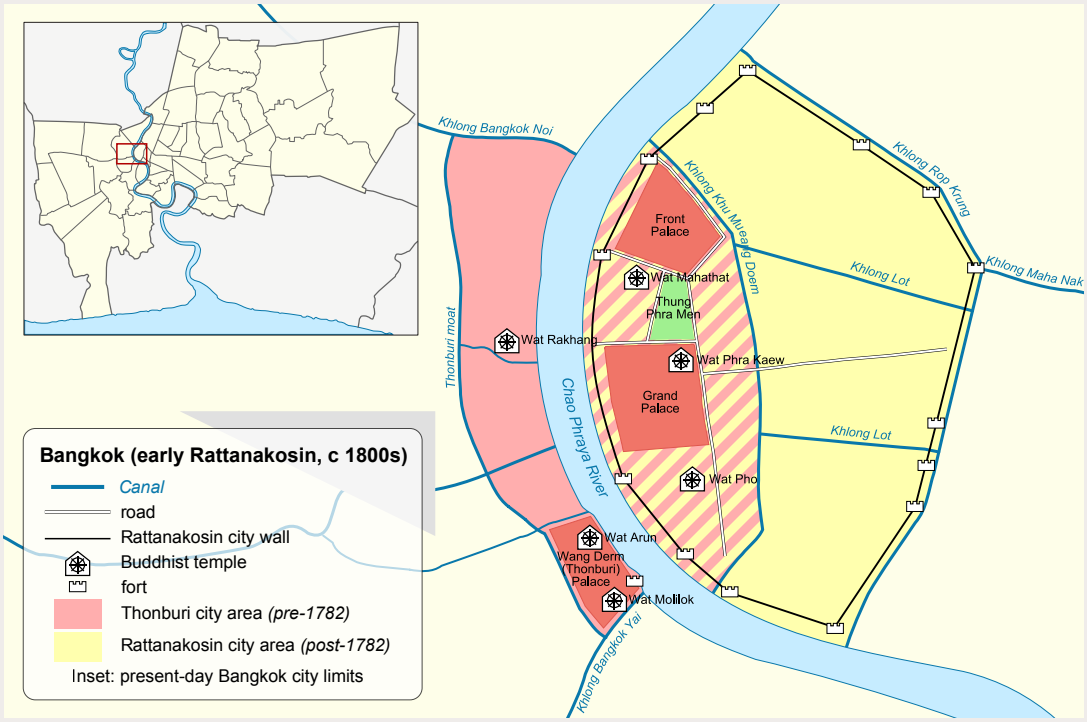
The city in its current form was created in 1972 with the formation of the Bangkok Metropolitan Administration (BMA), a result of the merger of Bangkok (Phra Nakhon Province) on the eastern bank of the Chao Phraya River and Thonburi Province on the west (Figure 3.5).

Originally a water-based city reliant on canals for transport, Bangkok was drastically transformed into its current land-based form during the modernisation efforts of the late 19th century (Shinawatra, 2012). The city grew swiftly during the 1960s and through the 1980s, and the Asian investment boom in the 1980s and 1990s led many multinational companies to locate their regional headquarters in Bangkok. Rapid growth continued until it stalled in the 1997 Asian Financial Crisis. The city has since slowly recovered and is now a major regional hub in finance and business. It is also an international hub for transport, healthcare, arts, fashion and tourism.

Today, Bangkok (Krung Thep Mahanakorn or Krung Thep) occupies 1,568 km^2 in the Chao Phraya River basin in Central Thailand (BMA Data Center, 2013). In 2015, the city had an official population of 5,693,884, or about 8.5% of the country's population (BMA Data Center, 2016). Up to 10.6 million people (about 16% of the population) live within the Bangkok Metropolitan Region (BMR), making Bangkok an extreme primate city (Bureau of Registration Administration, 2015). The city also exercises significant influence over Thai politics, economy, education, media and culture.

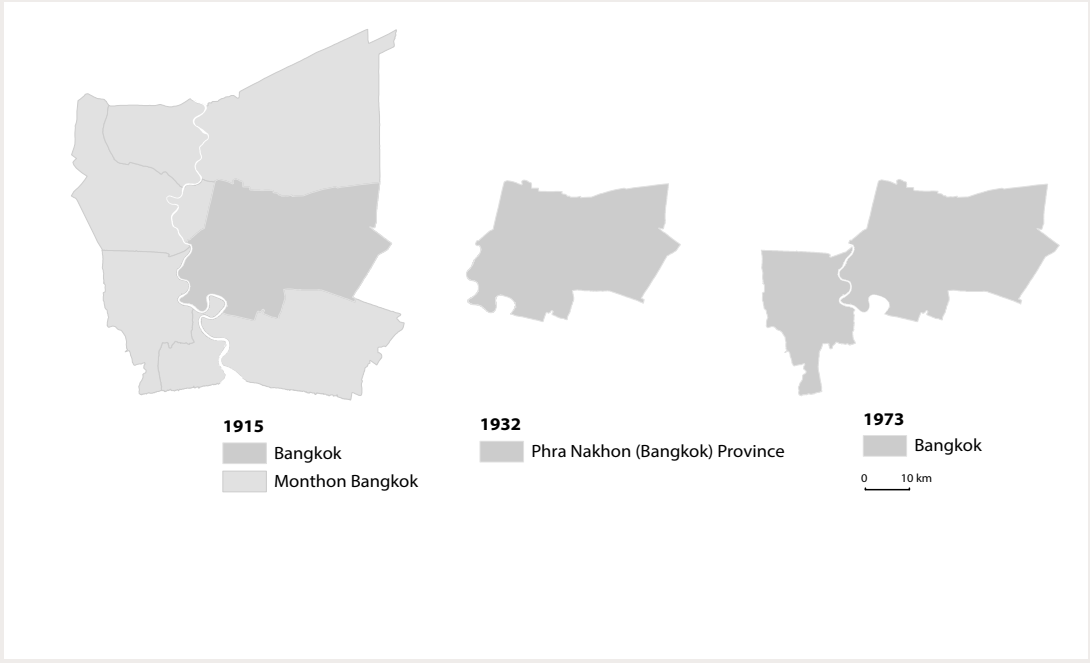
[2] Yangon remained under British rule until 1948.
[3] Yangon was defined by Theinbyu Street to the east, Lanmadaw Street to the west, Bogyoke Aung San Street to the north and Yangon River to the south (Pearn, 1939, p.187).
[4] Satellite communities and industry moved into this township in the 1990s, growing it from a rural population of under 10,000 to almost 100,000 by 2010.
[5] The Yangon Region is one of the seven administrative regions that form the Republic of the Union of Myanmar with seven ethnic states. Yangon is the capital city of Yangon Region.
[6] Myanmar could also be considered polycentric, if we consider the importance of Mandalay in terms of population and trade as well as the political importance of Nay Pyi Taw. But both cities' importance is still far from that of Yangon's.
[7] Monthon were administrative subdivisions of Thailand at the beginning of the 20th century. The word 'Monthon' is a translation of the word *mandala* (Sanskrit for 'circle') in its sense of a type of political formation.

Figure 3.4: Bangkok urban boundaries around 1800s



Source: Wikimedia Commons 2016

Figure 3.5: Bangkok administrative boundary changes



Source: LSE Cities 2016. Based on DIVA GIS and Bangkok GIS data

3.2 Population

In this section, population data is explored at different scales, starting with a comparison of metropolitan and city populations. It then looks in detail at population growth in the city and wider metropolitan areas, and places this growth in the broader context of global population growth. Finally, it also highlights the population distributions using ambient density in both cities. Considering different scales is often used to relate population to administrative boundaries and is intimately linked to governance issues. A full understanding of how many people live and work in each administrative level, and also their distribution and densities within the city, is fundamental for efficient policy-making on issues such as transport and housing.

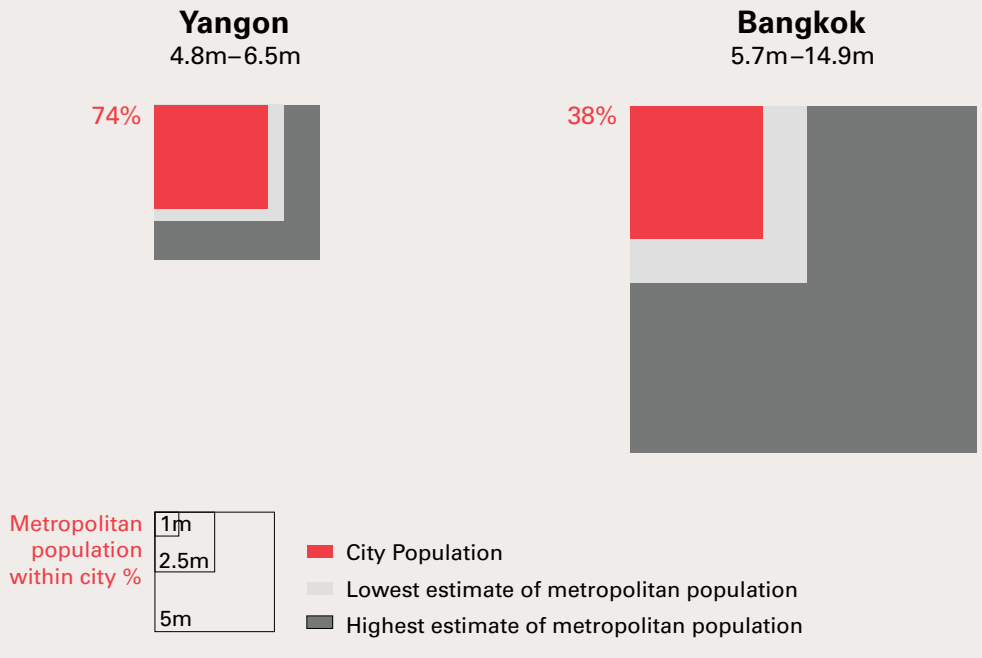
3.2.1 Comparing city and metropolitan populations

Based on official national figures – and illustrated in greater detail in the following subsection – Yangon City has a population of 5.2 million (Ministry of Immigration and Population, 2014) while Bangkok has a population of 5.7 million (BMA, 2015). While these may be the official statistics, estimating population figures for any given city or metropolitan area is a difficult and contentious matter. With dissimilar techniques and definitions, and the added challenge of counting informal urban dwellers and migrant workers who may not be registered, different organisations often report different figures. In the case of Yangon's metropolitan population, estimates fall between 4.8 million and 6.5 million, (the estimated population within the JICA-defined metro area). For Bangkok, the city population is estimated to lie somewhere between 5.7 million and 7 million, with its metro area estimated to accommodate between 10 million and 14.9 million people.

Figure 3.6 compares the number of people who live within the administrative boundaries of Yangon and Bangkok to the population of the wider metropolitan areas, or 'functional regions'. Since the estimates for these metropolitan populations can vary considerably, the lowest and highest estimates have been included alongside the number of people living within the city boundary. The percentage expresses the proportion of the metropolitan population who live within the jurisdiction of the city authorities, which has profound implications for the efficiency of urban governance.

While the two cities have similar total populations, Bangkok's registered population only constitutes about 38% of the BMR's total population. On the other hand, Yangon makes up nearly 74% of the total JICA-defined metropolitan population. Bangkok and Yangon are not alone in struggling to clearly define the exact population of their city and metropolitan area. Many cities around the world are facing the same dilemma, as previous LSE Cities research has shown (LSE Cities, 2014). For example, only 8% of Manila's 22.5 million metropolitan dwellers live under the control of the Mayor of Manila, while 100% of the 14.9 million people living in Istanbul fall under the jurisdiction of the Mayor of Istanbul.

Figure 3.6: Estimate of city and metropolitan populations in Yangon and Bangkok



Source: LSE Cities 2016

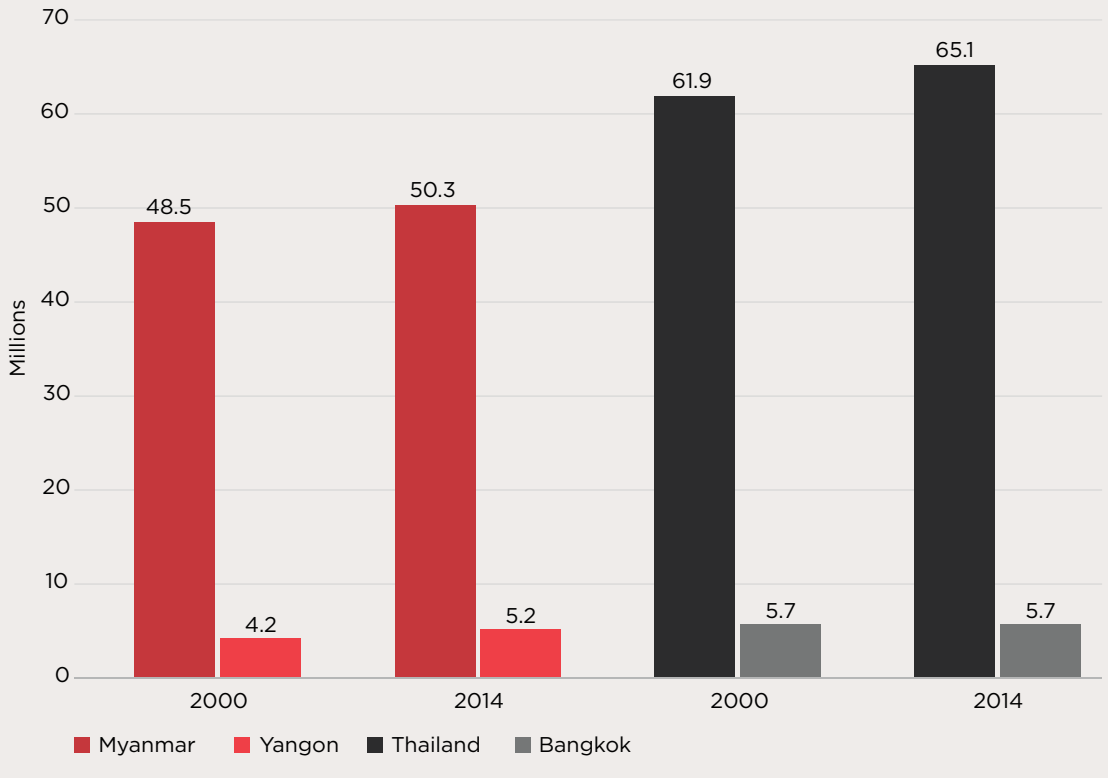
On balance, the closer the 'fit' between the number of people living within the city's administrative boundaries and the overall metropolitan population, the more likely it is that the governance of the metropolitan region will be more effectively managed (LSE Cities, 2014). In order to allow for strategic transport planning, service provision and infrastructure development across the entire functional urban area, it is important for the municipal government to have both a good understanding of the actual population and also the authority to make decisions that effectively manage the flow of people and goods across the urban area. Bangkok provides a model where the administrative boundaries were adjusted and a new political entity created, the BMA, to effectually manage the wider urban population. However, as the city continues to grow beyond the boundaries of the BMR, successful coordination between surrounding provinces and the BMA remains a challenge.

3.2.2 Population growth

From 2000 to 2014, Yangon experienced significant population growth (22.9%) while Bangkok's population remained largely stagnant (Figure 3.7). Over the same period, Myanmar's national population increased by 3.9% while Thailand's population increased by 5.1%. As is characteristic of urbanisation in both developing and developed countries, much of Bangkok's recent growth has occurred outside the city boundaries in suburban and exurban areas. This is particularly evident in the fact that while Bangkok's population was relatively stable (with only 0.2% growth), the Bangkok Metropolitan Region experienced a growth of 13% over the same period (Figure 3.8). Accounting for growth, not just within the city but also in the metropolitan area, is crucial for sound urban development planning.

Comparisons between Myanmar's 2014 census results and JICA's 2013 estimates for township populations in 1988 (including ward and village tracts) underscore that Yangon City is growing most rapidly in the peripheral areas. Rather than the population expanding significantly outside of the city boundaries, as is the case in Bangkok, Yangon City has expanded the administrative boundaries under the control of YCDC, and encouraged growth through development as well as forced relocation (Bosson, 2007). The ten townships on Yangon's periphery are the fastest growing, accounting for 53% of the city's total population, with seven of the ten at least doubling in size and Dagon Seikkan Township growing 816% since 1998. The two most populous townships, Hlaingtharya and Shwepyithar, were established during a push by the Department of Human Settlement and Housing Development (DHSHD) to expand the city east and west, instead of the historical north and south expansions that Yangon's geographic contours encouraged.

Figure 3.7: Country and city population in Yangon and Bangkok (2000 and 2014)



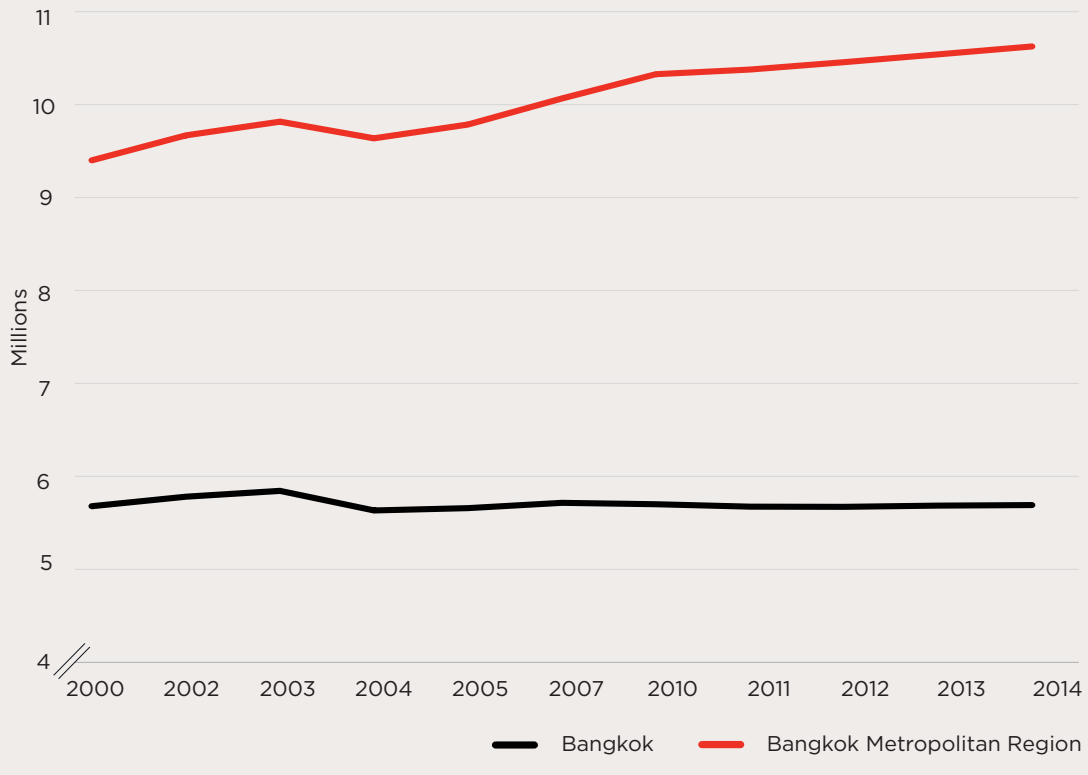
Source: LSE Cities 2016 Based on data from the National Statistic Office of Thailand & Myanmar Census

Using previous LSE Cities work based on the Oxford Economics database of 750 metropolitan areas, the charts below highlight the relative importance that cities, defined as metropolitan areas with more than 0.5 million people, play in terms of the overall global population.

Figure 3.9 shows the cumulative population of these cities (from largest to smallest by population size) as a percentage of the global population for 2012 and 2030; it suggests a relatively static pattern of population distribution over the period up to 2030. In 2012, the 50 largest cities had a global population share of 10%, similar to that projected for 2030. As the graph shows, Yangon will move up in the rankings from 177nd to 127rd place, while Bangkok's contribution to the global population will actually decrease slightly, moving it from 25th to 27th place between 2012 and 2030. This demonstrates how Yangon's population will be growing more rapidly than Bangkok's over that period, increasing Yangon's contribution to the global population dramatically and making the city one of the 150 largest metropolitan areas in the world.

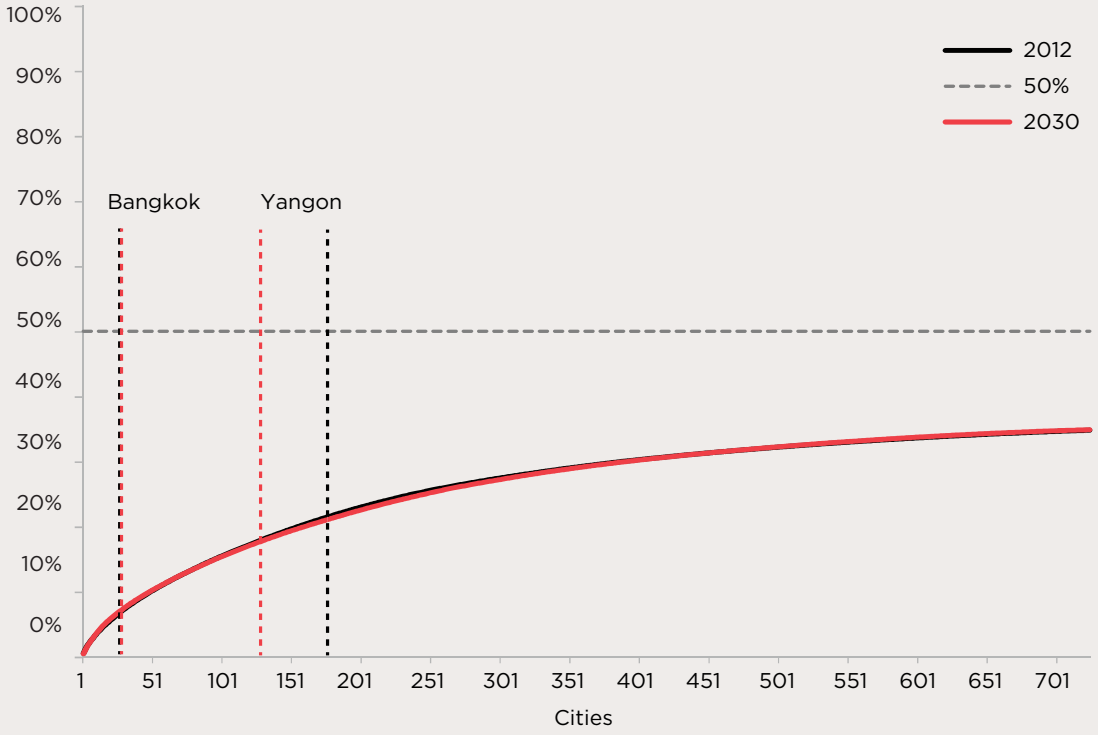
Figure 3.10 shows the relationship between population size and population growth by world region for the largest 750 metropolitan areas in the world. In terms of regional patterns, the highest population growth rates are in Sub-Saharan cities, followed by those in India and South East Asia. China has the largest number of cities above 5 million people, with moderate population growth rates of around 0.5%. In terms of overall population, Bangkok is significantly larger than the average in Southeast Asian metropolitan areas while Yangon is only slightly larger. In terms of overall population growth over the 2012–2030 period, however, Yangon is growing faster than Bangkok, and far faster than the regional average.

Figure 3.8: Population change in Bangkok and Bangkok Metropolitan Region (2000-2014)



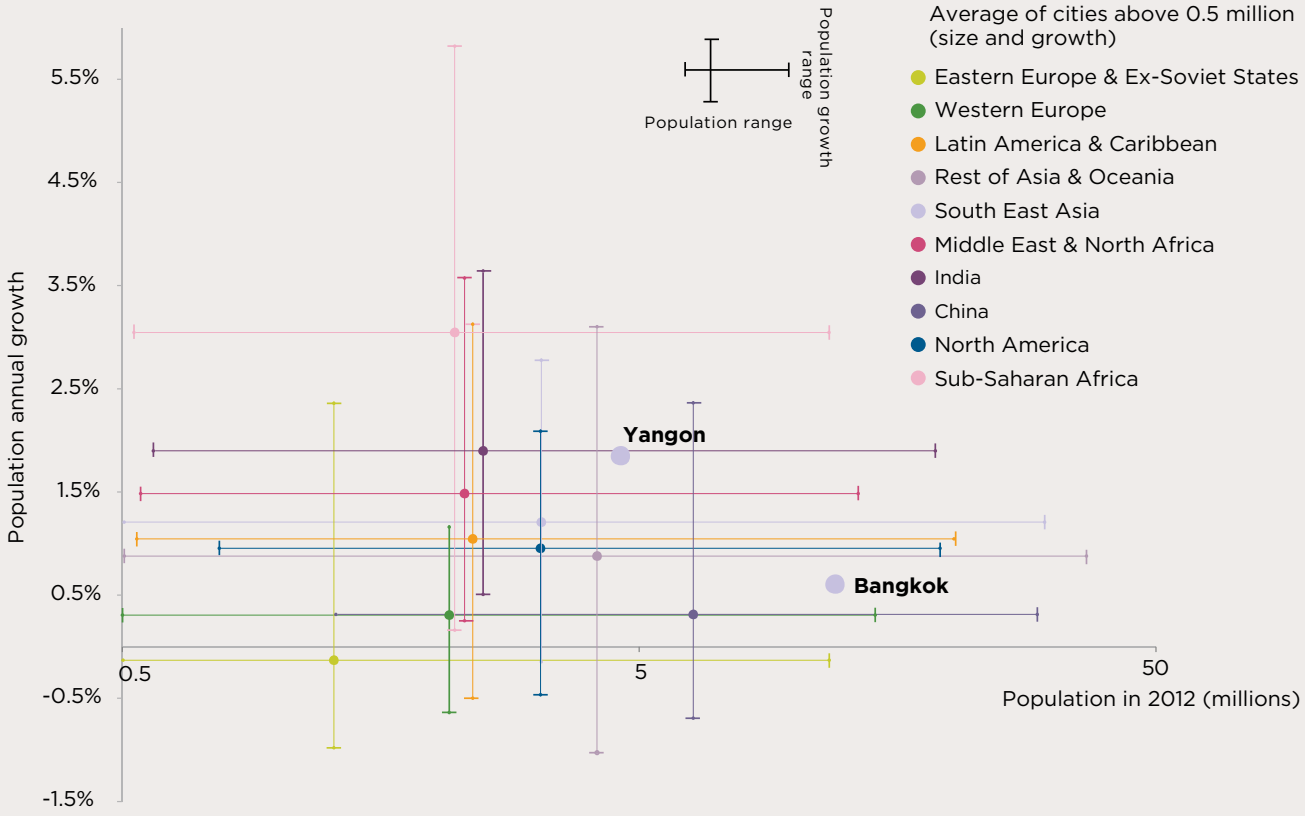
Source: LSE Cities 2016 Based on data from the National Statistic Office of Thailand & Myanmar Census

Figure 3.9: Contribution to global population of cities above 0.5 million (2012 and 2030)



Source: LSE Cities 2016 graphic based on Floater et al, 2014: p.11.

Figure 3.10: Population size (2012) and annualised population growth (2012–2030) of cities above 0.5 million



Source: LSE Cities 2016 graphic based on Floater et al, 2014: p.13.

3.2.3 Population density

Density is a fundamental measure of urban structure and can be used to quantify the immense diversity in urban form across the globe. Higher urban densities can improve service delivery efficiency, promote urban vitality and facilitate more sustainable public transport. These advantages depend, however, on effective city management and urban design that minimises the negative costs of overcrowding and pollution.

The maps below represent 'ambient population density,' or the number of people living, working and travelling through a square kilometre over 24 hours. The diagrams illustrate this density of 'occupation' for the entirety of the city over a 24-hour period. They combine a range of socio-economic data – including residential location, places of employment and journeys to work – to capture the key spatial dimensions of urban economic life. The taller spikes in the diagrams represent higher numbers of people concentrated in particular locations – dense residential areas, central business districts, event spaces, shopping streets etc. Flatter zones suggest more residential neighbourhoods of suburban or low-density nature. Areas that lie within the administrative boundaries of the city are shown in red.

When comparing the two cities, the most crowded township in Yangon is about five times more crowded than the most densely populated Bangkok district. Similarly, the least crowded township in Yangon is about ten times less populated than the least crowded Bangkok district. This indicates that the population is more evenly distributed in Bangkok than it is in Yangon, which still contains areas of very low population densities within the city boundary. The average density in the city of Yangon is 3,259 people per km^2, but the peak density is 59,429 people per km^2.

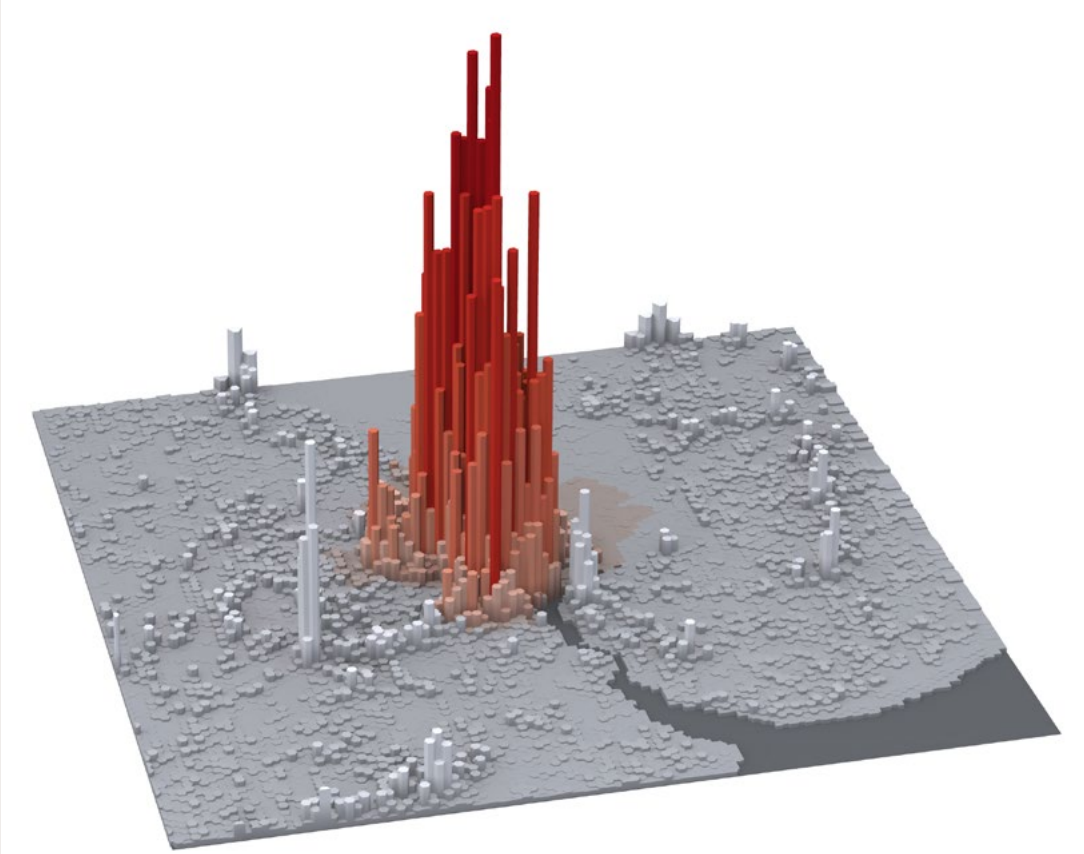
Similar to the urban conditions in Bogotá or Delhi, Yangon has higher and more concentrated densities in its city core, as shown in Figure 3.11. In the central area, Yangon maintains high density and high resident population, although peripheral areas[8] like Hlaingtharya, Shwepyithar and North Okkalapa Townships continue to attract inhabitants through rural to urban migration and the incidence of people leaving the Central Business District (CBD) for less expensive accommodation on the peri-urban border. Movements of people in a 24-hour period in Yangon are highly concentrated because most sites for employment are inside the city.

In 2010, the central parts of Bangkok continued to have high density and a very high residential population. However, much of the population is spread out across the urban periphery, both within the city of Bangkok and in the provinces of Samut Prakon to the southeast and Samut Sakhon to the west. This phenomenon is reflected in Figure 3.12, with high grey peaks to the south of Bangkok and significant peaks in the western part of Bangkok. These trends reveal that while the city's population remains relatively constant, the metropolitan population is increasing. Unlike most cities in Asia, including Yangon where new development has taken high-rise form, much of the development in Bangkok has been in the form of townhouses and suburban detached housing. High-rise urban form in the central area started to boom only after the expansion of the mass rapid transit system in the years following 2010.

The concentration of high red peaks illustrated in Figure 3.12 corresponds to the location of business areas, along with the mass rapid transit and other major transportation hubs. In 2010, the mass rapid transit system was not extensive: there were only two stations (Krung Thonburi and Wongwien Yai) to the west of the Chao Phraya River. As a result, many people who live west of the river had to travel to these areas to access the transit system. The highest peak represents this situation.

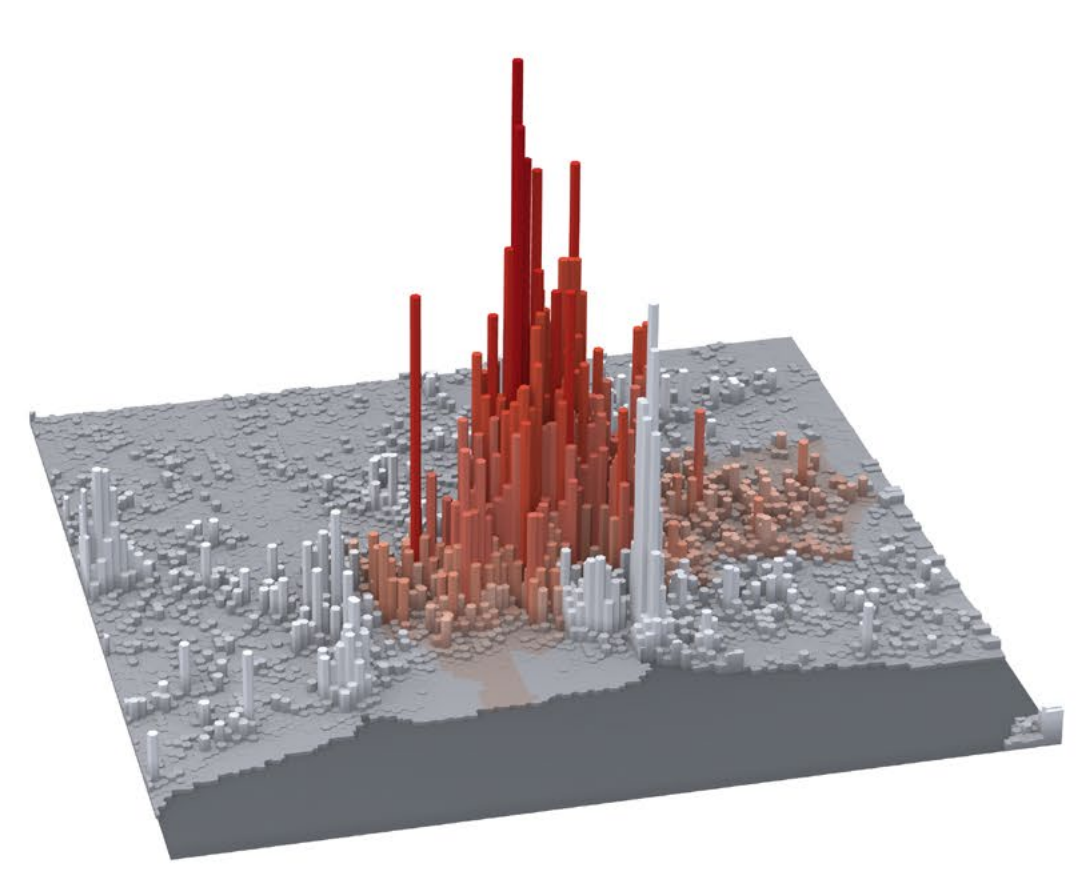
[8] Between 1983 and 2014 no national census was undertaken in Myanmar, limiting the accuracy of the data for that time period.

Figure 3.11: Ambient population density of Yangon (2010)



Source: LSE Cities 2016. Based on Landscan 2010™ High Resolution Global Population Data Set

Figure 3.12: Ambient population density of Bangkok (2010)



Source: LSE Cities 2016. Based on Landscan 2010™ High Resolution Global Population Data Set

Key findings

◆ Yangon and Bangkok rank in the 150 largest metropolitan areas in the world. Between 2012 and 2030, Yangon is projected to grow more rapidly than Bangkok – faster, in fact, than most other urban areas in the region. This will increase the city's overall contribution to global urban population considerably.

◆ Bangkok has a clearly defined metropolitan boundary, but estimates of the overall population of the metro area vary considerably. This variance can be an issue when it comes to service provision and long-term strategic planning. Yangon is only just defining the wider metropolitan area, which will be essential to managing growth in the future.

◆ Bangkok's growth over the past 15 years has mostly taken place on the outskirts of the city and surrounding provinces, while Yangon has experienced significant population growth within the city.

◆ Yangon City has a higher and more concentrated population density in the city core than Bangkok but also much lower density in other areas. The overall variation in density is therefore much higher in Yangon than in Bangkok.

Future research questions

◆ What are the key opportunities and risks of rapid population growth for the city's urban footprint, current city boundaries and for local and regional governance arrangements?

◆ How can the city minimise negative impacts on its heritage and ensure it continues to improve against key quality of life indicators including social inclusion and equity, accessibility, economic resilience and sustainability?

3.3 Economy

As the previous section has shown, Yangon's population is growing rapidly, with a significant portion of this growth attributable to people migrating to the city in search of economic opportunities. Managing this influx of people, the resulting pressures on infrastructure and services, and ensuring that it translates into greater productivity and ultimately a better quality of life for all urban dwellers is a central challenge for Yangon, as it is for most cities.

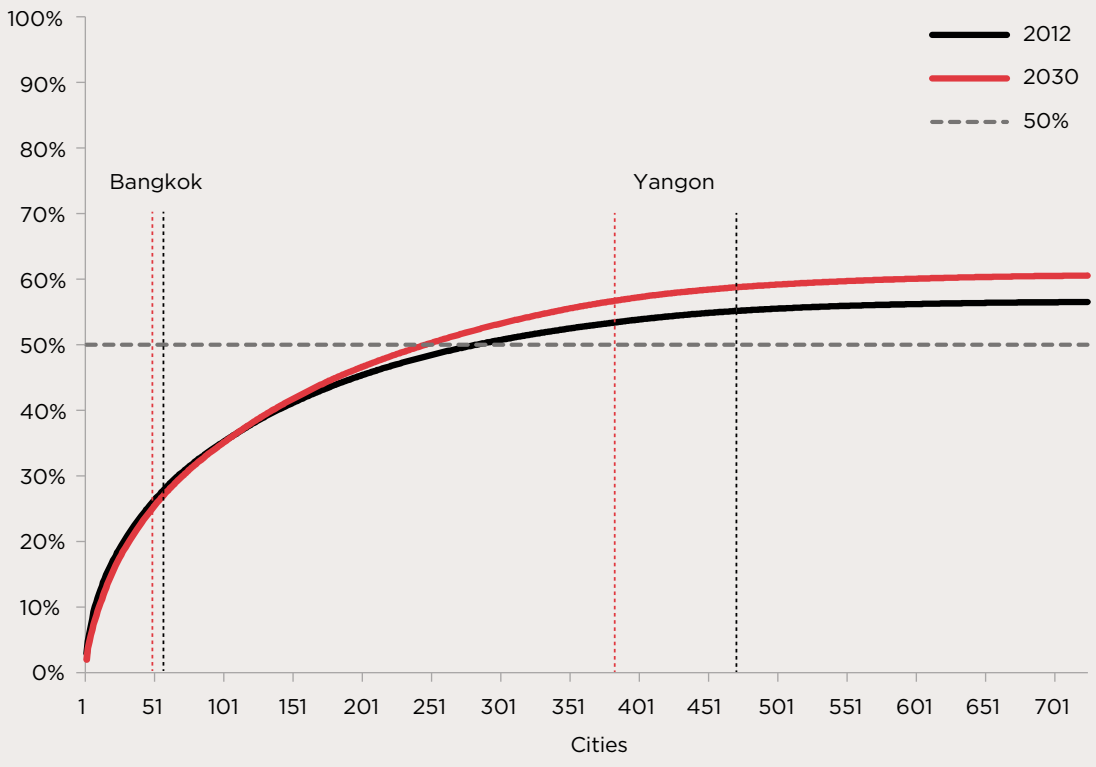
Robust city-level economic data, which would have allowed for a thorough comparative analysis of both cities, was limited in its availability. Nevertheless, this section explores a handful of key economic indicators and highlights some of the challenges and opportunities linked to these realities. It starts by placing the GDP *growth* of both cities in an international context and then looks at GDP and the rise in income disparities. It briefly explores patterns of employment before taking a closer look at the increasing tourism numbers as one potential source of economic growth that Yangon may be able to capitalise on, provided this is carefully managed.

Examining levels of employment, and breaking them down by economic activity, can also help describe land use, commuting patterns and informality levels. Tourism indicators allow a consideration of the impact of non-resident populations on urban management, as the added external population can effect issues of housing, basic infrastructure, etc.

3.3.1 GDP and GDP growth

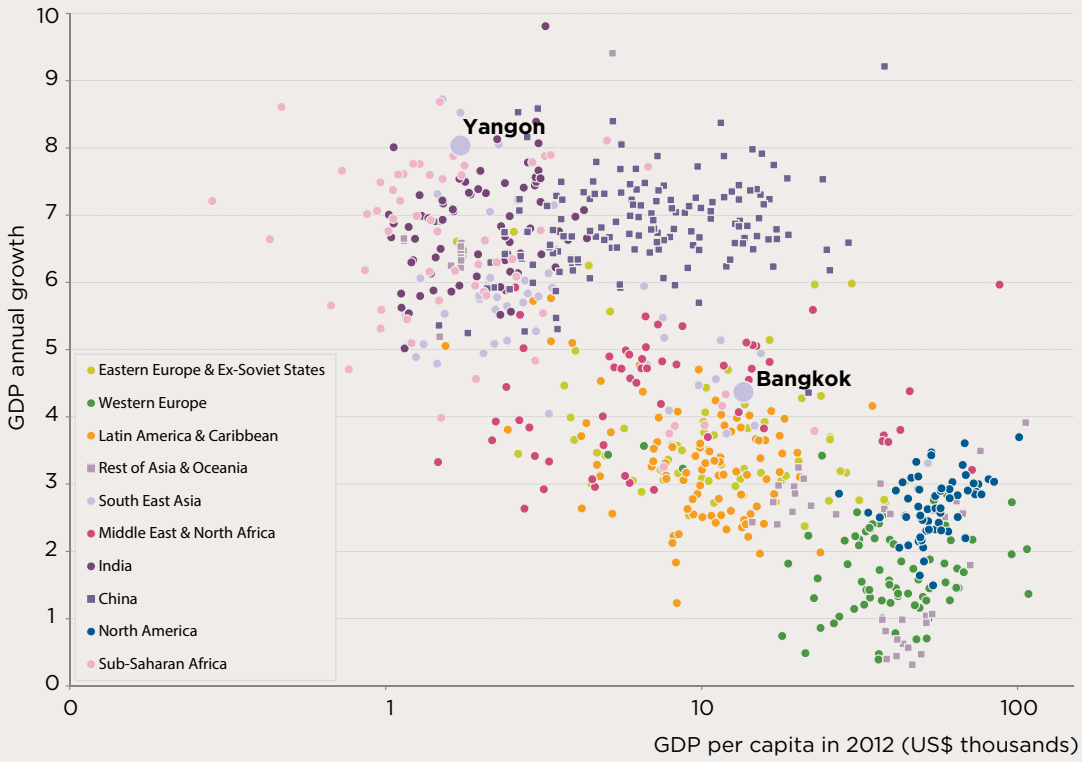
Figure 3.13 illustrates the cumulative contribution of cities to global GDP and shows that 309 cities alone contributed 50% of global GDP in 2012, with just 71 cities contributing 30%. Between 2012 and 2030, the relative share of economic output is projected to decrease slightly among the top 50 cities, while the share of the top 250 cities during the same period will increase further. Yangon's share in the overall global economy will increase markedly between 2012 and 2030, moving from 462nd place to 383rd place, while Bangkok's contribution is projected to stay relatively stable over the same period, moving from 55th to 49th place.

Figure 3.13: Contribution to global GDP of cities above 0.5 million (2012 and 2030)



Source: LSE Cities 2016 graphic based on Floater et al, 2014: p.12.

Figure 3.14: GDP per capita (2012) and annualised GDP growth (2012–2030) of cities above 0.5 million



Source: LSE Cities 2016 graphic based on Floater et al, 2014: p.15.

It is important to recognise that although cities in lower income regions are projected to contribute less to global GDP growth over the next two decades, the individual growth rates of these cities tend to be higher. The relationship between income levels (GDP/capita) of the world's cities and their projected economic growth rates (annualised over the period 2012–2030) is shown in Figure 3.14. As might be expected, the economic growth rates of cities are highest in cities with lower levels of income. Sub-Saharan African cities lead this group, with economic growth rates typically between 5% and 8%. Indian and Chinese cities both display projected growth rates typically between 6% and 8%. Latin American cities have typical income levels slightly above those of Chinese cities but substantially lower economic growth rates of around 3%. Among higher income cities, North American cities have the highest projected growth of between 2% and 3%, while most Western European cities are projected to grow their economies by between 1% and 2.5%. This illustrates that despite having lower GDP growth rates than Sub-Saharan African cities, cities in China, North America and Europe nonetheless contribute more to global GDP growth due to their higher starting levels of income in 2012. It also explains why Bangkok is ranked so much higher in terms of its overall contribution to the global economy, even though the above graphic clearly illustrates that Yangon is growing at a much faster rate.

Yangon and Bangkok are both the economic centres of their respective countries and at the heart of their investment and development strategies. Yangon residents have a higher quality of life than many living in other parts of the country. Myanmar Survey Research shows that a middle manager could earn anywhere from US$179 working for the government to over US$1000 working for a private business or embassy (*Myanmar Times,* 2014). Reports from 2011 and 2015 estimate that the Yangon Region contributes between 20% and 23% to the national GDP (Mon and Htun, 2011; UNDP, 2016).

Myanmar's GDP was US$64.33 billion in 2014 with a per capita GDP of US$1251 based on the 2014 population data (World Bank, 2014). No GDP figures were available for Yangon, but aggregating the data to a regional level shows a US$14.8 billion contribution to the national GDP and a per capita contribution of US$2012.

Bangkok's gross provincial product[9] (GPP) in 2014 contributed a similar percentage (29.1%) or US$117.96 billion[10] to the national GDP of US$375.21 billion (Office of National Economic and Social Development Board, 2015 b). This is a considerable increase compared to the city GDP of US$51 billion recorded in 2000.

Despite having a relatively high GPP, income disparity is a pressing concern in Bangkok, especially

[9] Gross provincial product or GPP is the measure of the size of a province (or Bangkok)'s economy. Similar to GDP, GPP is defined as the market value of all final goods and services produced within a province (or Bangkok) in a given period of time.
10 Using the exchange rate of 35 baht to 1 US dollar.

between middle-class professionals, business people and unskilled migrants from rural provinces and neighbouring countries (particularly Laos, Cambodia and Myanmar). Even though the number of people living in poverty is low – only 1.64% of Bangkok's registered residents were living under the poverty line in 2013, compared to a national average of 10.53% in 2014 (Office of the National Economic and Social Development Board, 2015 a) – income disparity is still substantial. The city's Gini coefficient of 0.385 in 1988 (Falkus, 1999, p. 132) increased to 0.48 in 2006 (UN Habitat, 2008), indicating a widening gap between the poorest and wealthiest city dwellers. It should be noted that the reliability of this data is questionable, as it can be difficult to assess exact income figures, especially in cities where a large proportion of the population works in the informal sector. While there was no data on income inequality available for Yangon, the World Bank has calculated an estimate of the Gini for urban areas in Myanmar as 0.36. As Yangon's economy grows and opens up to the global market, it will be essential to ensure that the benefits of this development do not exacerbate inequalities and create a situation where a few benefit disproportionately from these opportunities, while others are left worse off as a result of higher housing and living costs.

3.3.2 Employment

The 2014 census found that Yangon region had 3.3 million people over the age of ten in formal employment. Agriculture, manufacturing and retail trade were the three most common forms of employment at a regional level. Yangon City accounts for 2.4 million of those currently employed in the formal sector. Across the country, manufacturing is becoming an increasingly important employment source, and there has been a significant growth of industrial zones on the periphery of Yangon to service the expanding garment industry, attracting migrant workers from across the region as well as significant foreign direct investment (FDI). Within Yangon, some estimates suggest that as many as 61% of the people are employed in the service industry, although these are mostly low-skilled and non-tradable services, such as food preparation and the transportation of goods and people.

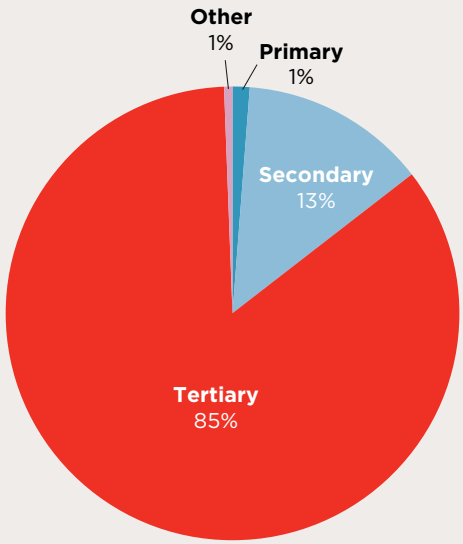
In contrast, Bangkok's economy today is dominated by the service sector, with an increasing number of people employed in high-skilled, office-based service jobs. Based on data from the BMA's statistic books (BMA Data Centre, 2016), in 2013, 84.8% of the population was employed in the service sector (Figure 3.15) although it was unclear what percentage of these service jobs were tradable services. Tradable services rely on a high level of human capital and specialised education and training. In order to increase opportunities for this form of employment in Yangon, education and skills development is an essential prerequisite.

Although the service sector is increasingly dominant, Bangkok continues to employ 13% of its population in the manufacturing industry (Figure 3.15). Most of the factories in Bangkok are small and many are family-owned. Food processing, textiles and the production of building materials are the chief activities of the city's manufacturing sector. Most of the city's manufacturing industries are located in the BMR, outside Bangkok, and have recently spilled over into other provinces, especially Chachoengsao and Phra Nakhon Si Ayutthaya (Ayutthaya). Due to rising land prices in the inner city, industrial activities have to move further and further out of town, putting pressure on the transport system and increasing commute times for workers. Bangkok is increasingly trying to cluster industrial and residential zones and improve public transport connectivity to these industrial areas, but this remains a challenge.

Bangkok's dominance as the country's main economic hub continues to dwarf other cities and limits investment in these secondary centres as well as in rural areas, causing a stark divide in income between urban and rural areas that has led to animosities (Goh & Bunnell, 2013). Despite recent decentralisation efforts, the BMR continues to provide more work opportunities and better facilities than other urban areas, contributing to the continued high internal migration discussed earlier. Many young and educated adults move to the BMR to work in the service industry. The majority of the service-related jobs are located in the central areas of Bangkok, although this is slowly expanding to the suburbs and exurbs. The job availability also explains why Bangkok's ambient density is high in the central areas.

In addition to the formal sources of employment in manufacturing and services, Bangkok also has a high percentage of jobs in the shadow or informal economy. According to some sources, Thailand's shadow economy is one of the largest in the world (Maierbrugger, 2015 & Schneider, 2006). Schneider estimates that Thailand's shadow economy accounted for up to 40.9% of real GDP in 2014 (Maierbrugger, 2015)[11]. If the shadow economy were taxed by the general 7% value

Figure 3.15: Share of employment per economic activity in Bangkok (2013)



Source: LSE Cities 2016
Based on data from the BMA Data Center

added tax (VAT), the country would have gained almost $11 billion more in 2014 (Maierbrugger, 2015). While no exact figures were available for Yangon, a similar pattern is observed there, with a high percentage of people working in some form of informal employment. It is nearly impossible to tax the informal sector and enforcing labour laws and ensuring adequate working conditions is a challenge. However, informal employment can play an important role in reducing urban poverty and providing income opportunities to low-skilled workers and newly arrived migrants. While it can be hard to collect accurate data on informal employment, this is an important first step to understanding the urban economy in a more holistic way.

3.3.3 Tourists and visitors

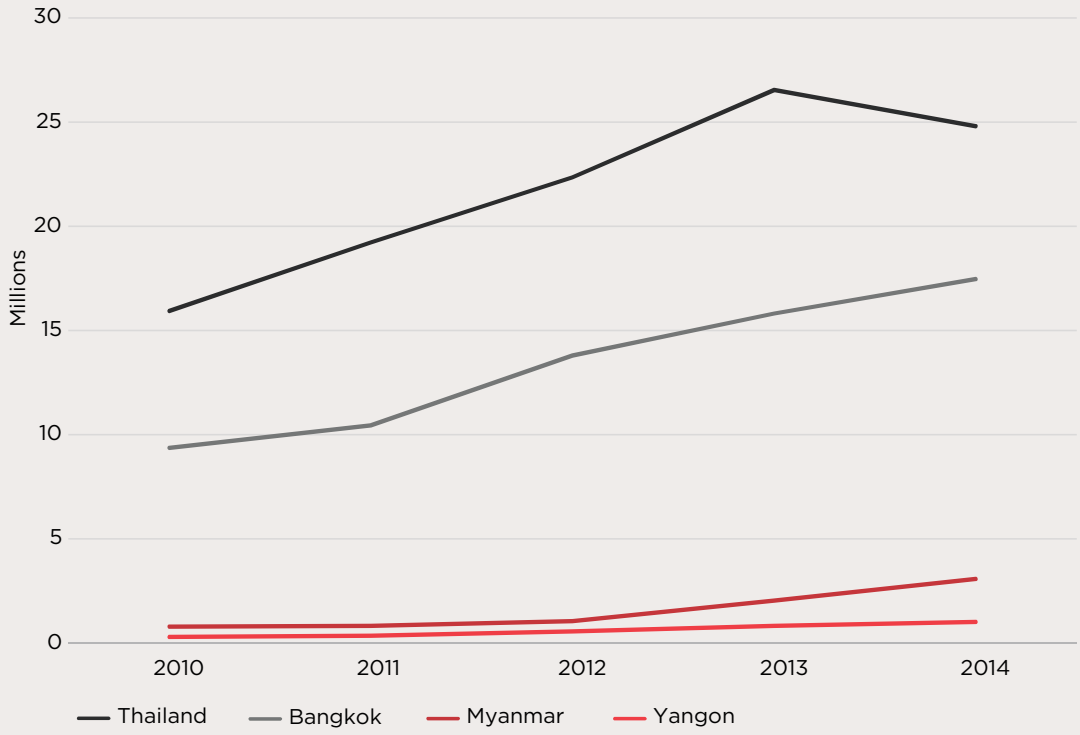
The tourism industry provides a source of income for both public and private sectors and generates employment opportunities for the city's inhabitants. Furthermore, tourism helps to raise the profile of the city internationally, encouraging even more job opportunities and further foreign investment that can help the city grow. To manage a city efficiently, the number of temporary visitors and tourists must be taken into account. For a city like Bangkok, visitors can make up nearly one-fifth of the local population. This has major implications for all aspects of urban life, from transport to housing. Although the disparity in tourist numbers between the two cities is currently high (Bangkok was the second most visited city in the world after London in 2015), there are still over a million tourists coming to Yangon every year (Figure 3.16) and the number is likely to rise rapidly as, since 2010, the country has increasingly become more accepted as an attractive and safe tourism destination. This will put additional stresses on the road and transport network as well as land values.

As the principal gateway for arriving visitors, Bangkok is visited by the majority of international tourists to the country (Figure 3.16). Domestic tourism is also prominent.

Bangkok has to account for an ever-growing number of visitors (there has been a 41% increase in total visitors and 38% increase in foreign tourists between 2010 and 2014) (Bangkok Data Center, 2016). Over 20 million visitors, most of them international, came to Bangkok in 2014 (Hedrick-Wong & Choong, 2015). While there seems to be sufficient accommodation and health facilities (catering to medical tourists) (Eden, 2012), transportation continues to be a major problem for Bangkok. It is true that most tourists tend to concentrate around central areas, but more and more are venturing out to the suburbs, as well as to the neighbouring provinces, usually by taxi, adding to existing congestion levels. The Bangkok Metropolitan Administration is currently attempting to address this problem.

The 2010 reforms in Myanmar brought a renewed interest in the country as well as a more streamlined visa-on-arrival process and increased access to many areas previously out of bounds to foreigners. The democratic changes and recent victory by the National League for Democracy (NLD) government have captured and attracted the international community. Growth in the tourism sector has been fuelled by widely publicised visits by world leaders, celebrities and

Figure 3.16: International tourists at national and city level (2010–2014)

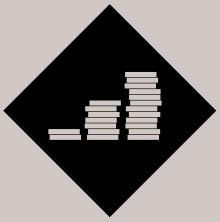


Source: LSE Cities 2016 Based on data from the Department of Tourism, Ministry of Tourism and Sports Thailand & Myanmar Census

television shows filmed in the country. As Yangon is home to the largest (and, until recently, only) international airport in Myanmar, most tourists must make their way to Yangon before exploring the rest of the country. Yangon specifically has seen a 15% increase in tourists between 2014 and 2015[12]. While total occupancy is down, Yangon can still expect the current luxury hotel stock of 2,582 rooms to potentially triple by 2018 (Colliers, 2015).

Unlike most other cities in Southeast Asia, including Bangkok, a period of isolation has preserved the built and cultural environment of Yangon (Fong, 2014). Conservationists assert that interventions to protect the built environment serve the collective best interests of the city, nation and people by establishing an aesthetic imagery based on Yangon's most distinguished characteristics stemming from its 'geographical location and its rich history' (Maw Oo, 2006 p.199). The conservation process has the greatest impact on vulnerable residents and those who work in the informal economy, who risk losing access to affordable rents and central locations in the now commercially valuable, protected areas (Rojas, 2015). In the coming years, Yangon will have to find a balance between preserving its cultural heritage and building a viable tourism industry while at the same time ensuring that the city serves its resident population, growing and developing in an efficient, equitable and sustainable manner.

[11] This figure is for the whole country. The figure for Bangkok is expected to be much lower than 40.9%.
[12] This growth was accompanied by a concurrent increase in hotel costs.



Key findings

◆ In absolute terms, Bangkok's contribution to the total global economy is far higher than Yangon's, owing to its higher GDP. However, based on a comparison of the 725 largest metropolitan regions in the world, Yangon's projected GDP growth between 2012 and 2030 ranks higher than Bangkok's and among the highest both in Southeast Asia and globally.

◆ While the majority of jobs in both Yangon and Bangkok are service based, Bangkok's economy is almost entirely dominated by the service industry, while Yangon has a significant and growing manufacturing sector. Accelerated FDI has created new employment opportunities in manufacturing, leading to a high influx of migrants.

◆ Service jobs in Yangon are still often low-skilled jobs. In order to expand the service industry, an essential precondition will be investment in human capital through education and skills training.

◆ Although both Yangon and Bangkok are the primate cities of Myanmar and Thailand, Yangon does not dominate the national economic output to the same extent as is the case for Bangkok. The Thai government has been trying to invest more into secondary cities to diversify economic growth and employment opportunities in the country, but this has had limited success to date.

◆ While Bangkok has long been a major centre for international tourism, Yangon has only recently begun to receive a significant increase in foreign visitors. Tourism has the potential to provide many economic growth and employment opportunities but there are also social and environmental risks if the influx of visitors is not carefully managed.

Future research questions

◆ What are Yangon's economic development objectives and how will rapid changes to the economic composition impact existing socio-economic and spatial structuring of the city and the wider national context of Myanmar?

◆ What roles do migration, foreign direct investment and a growing tourism sector play in this context?

◆ What are the skills and capacities required to enable Yangon's economic transformation? How can the city ensure that human capital development is accelerated to allow its population to meet the demands of an increasingly service-based economy?

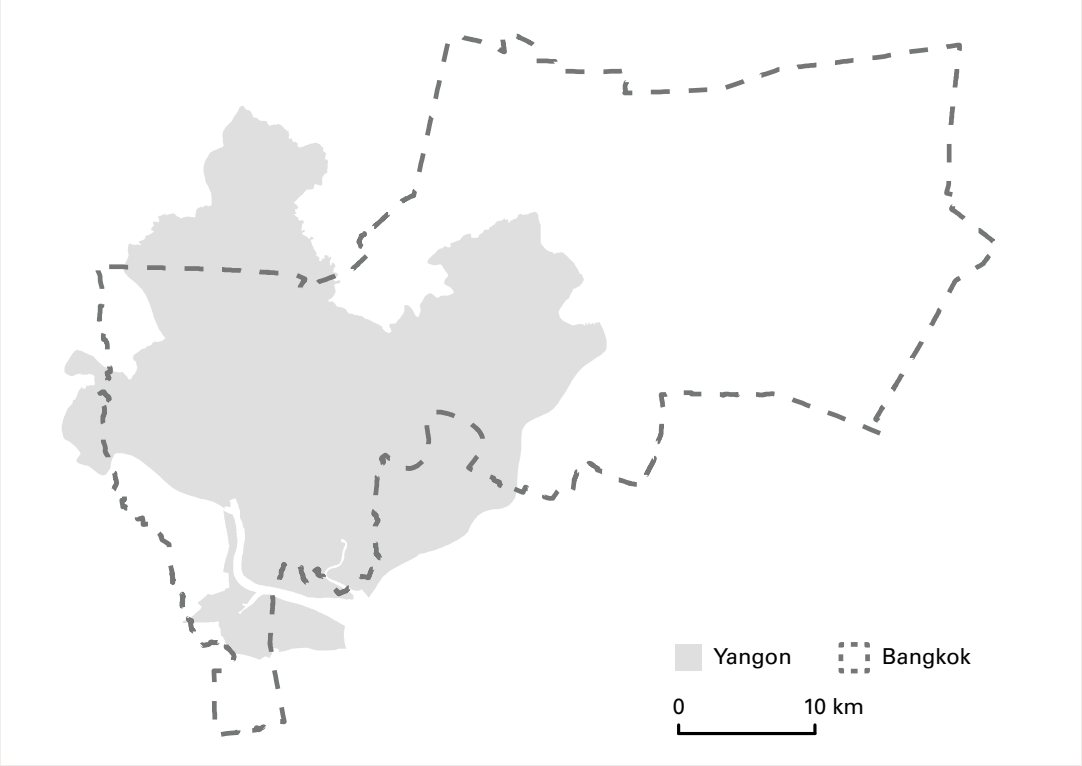
3.4 Urban form

Managing urban expansion effectively is a central responsibility of city governments, in terms of both population growth and the physical growth of the city. Strategic urban growth can alleviate congestion issues, reduce pollution, improve quality of life and stimulate economic growth and employment creation.

The following section will look at the current urban forms of both Bangkok and Yangon, place them in a global context and explore how both cities have reached their current shape. Unfortunately, detailed data on the growth of Yangon's urban region over time was not available, so this section will use planned growth as a proxy to show some of the areas of expansion. Having a detailed understanding of how fast and where the city is growing is an essential prerequisite to strategic spatial planning. Collecting urban footprint data at a granular level is an important first step to help visualise these patterns.

Despite the similar population sizes of the two urban centres, Yangon City (829 km²) is about half the area of Bangkok City. At 1,568 km², Bangkok is almost the size of London (1,572 km²) and is larger than Los Angeles (1,302 km²) but smaller than Tokyo (2,189 km²). Yangon is closer in size to Mumbai (603 km²). According to the World Bank (2015), urban growth in Thailand is dominated by the Bangkok urban area, which was the fifth largest metropolitan region in East and Southeast Asia in 2010 in terms of area, larger than Jakarta, Manila and Seoul.

Figure 3.17: Total administrative area of Yangon and Bangkok compared (2016)



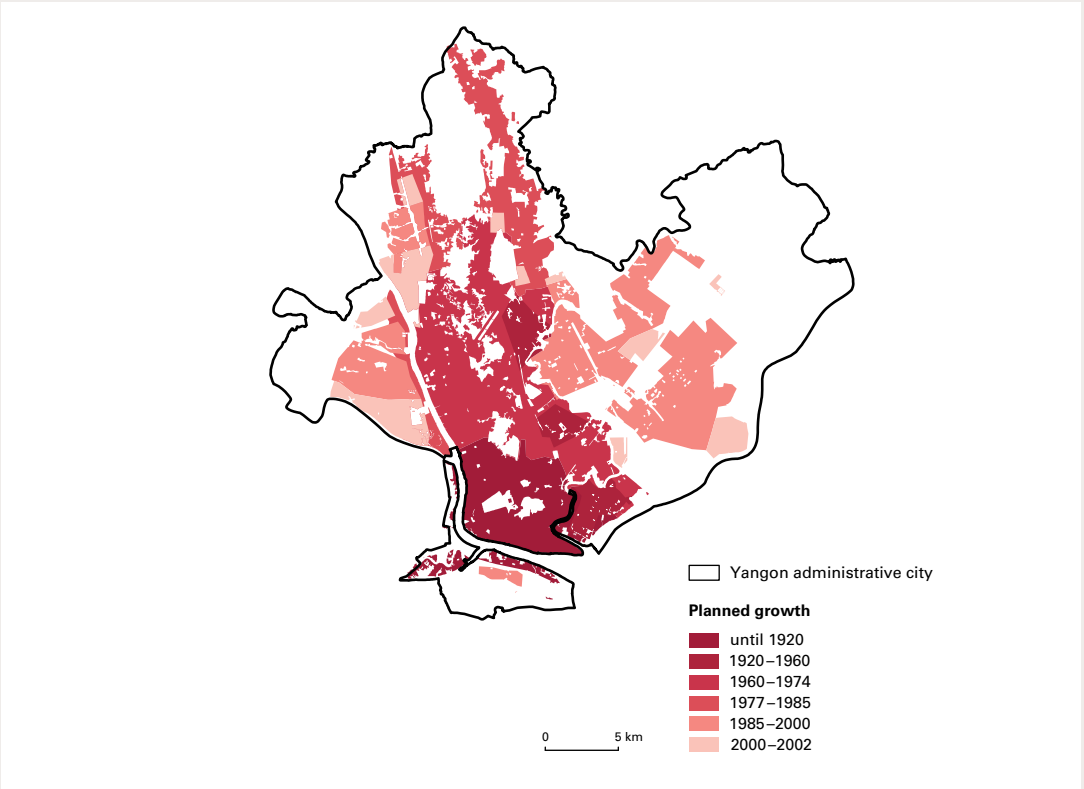
Source: LSE Cities 2016
Based on YCDC data

3.4.1 Urban expansion

Yangon is most populous in the historic Central Business District (CBD), having grown north along the banks of the bordering Bago, Yangon and Hlaing Rivers (YCDC, 2016). Before 1980, very little of the city expanded north of its colonial form. Rapid development over the past 30 years has created a stretching tail on the city with the CBD far removed from the geographic centre, although there are plans to balance this growth by prioritising development in the north/northeast and south/southwest parts of the city (Ibid.).

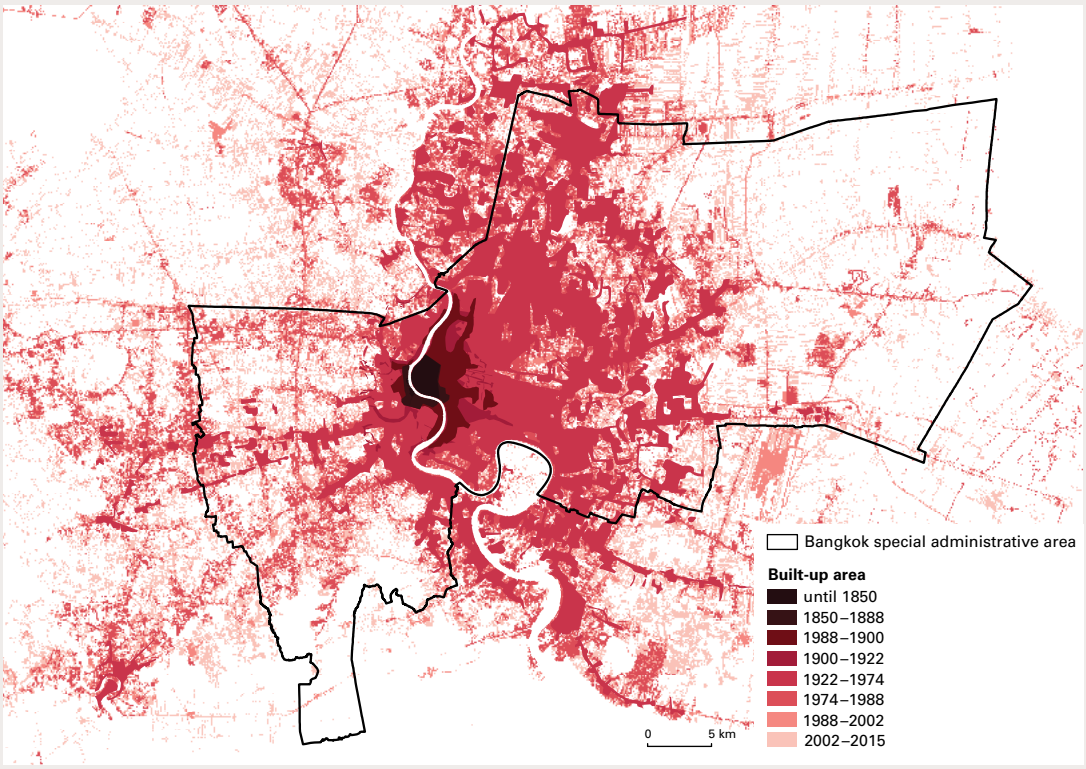
Unlike Yangon, Bangkok's commercial core is dispersed, with at least five areas of high-rise commercial concentration and large office buildings sprinkled throughout the central area (Cox, 2012). The areas of greatest commercial concentration are Siam, Sathorn/Silom, Sukhumvit, Yaowarat and Wongwien Yai/Thonburi.

Figure 3.18: Yangon historical planned growth[13]



Source: LSE Cities 2016. Based on YCDC and JICA data

Figure 3.19: Bangkok historical urban growth



Source: LSE Cities 2016. Based on Lincolninst data

[13] This map is of planned growth in Yangon – the actual urban footprint is not yet available. This is a project currently being undertaken at YCDC, but this was the most reliable data available at the time of publication.

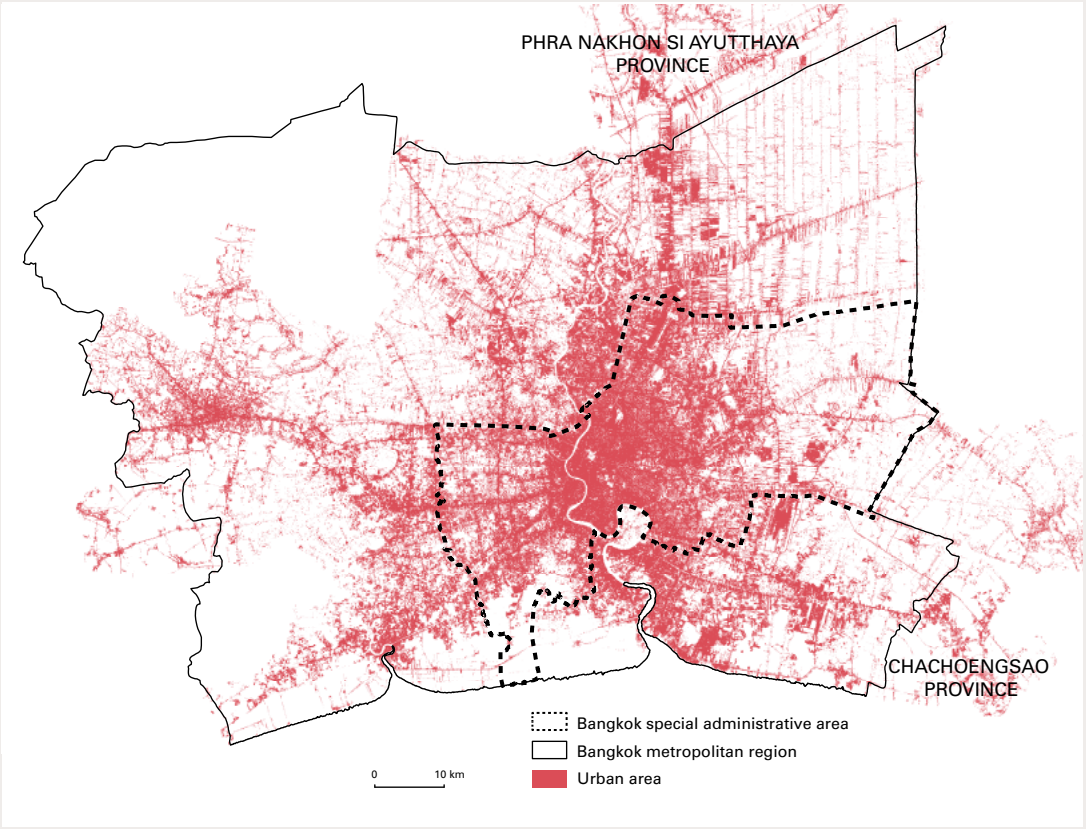
Since the 1980s, greater Bangkok's built-up areas have overspilled the city borders into neighbouring BMR provinces, initially to the north in Pathum Thani and Nonthaburi provinces, and eventually southward into Samut Prakan province (Figure 3.20).

In 2011, 29.6% of Bangkok's total land area was under commercial, industrial and governmental use, with 23.6% designated for agriculture, 23% for residential use (BMA Data Center, 2013; Supatn, 2011). Horizontally, the city is spreading along new roads built to accommodate the larger urban population and business, industrial and community demand – this growth follows the typical 'ribbon development' model (Figure 3.19 & Figure 3.20). Residential houses are mixed with commercial buildings and factories of various sizes. Since the 2000s, suburban areas have experienced strong growth in detached and townhouse construction (Usavagovitwong, 2013) and fringe areas are being developed, blurring the boundaries between each province in the Bangkok Metropolitan Region (BMR). The outward push of suburbanisation has intensified as park-and-ride lots near train stations have sprung up.

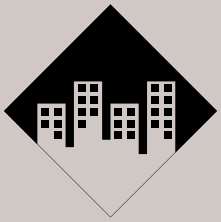
Now, urban expansion has begun to overflow outside of the BMR, especially into Chacheongsao Province to the east and Phra Nakhon Si Ayutthaya (Ayutthaya) Province to the north (Figure 3.19). Expansion there is largely due to the development of industrial zones – the factories in these provinces are not far from the country's two major airports[14] or the Bangkok Port. In addition, industrial sites located outside the BMR benefit from lower congestion and lower land prices, making them attractive for investment (Online Reporters, 2015; Supatn, 2011).

Yangon's governance will be discussed later in this report, but as it grows, the city is facing similar challenges to Bangkok. New growth is being planned for in a way that could circumvent certain complications encountered in an expanding city, including some of those that Bangkok experienced. Unlike Bangkok, however, the Yangon authority has not yet officially designated the metropolitan area[15].

Figure 3.20: Built-up area expansion beyond Bangkok Metropolitan Region



Source: LSE Cities 2016. Based on Lincolninst & Bangkok GIS data



Key findings

◆ Bangkok's urban area is almost three times the size of Yangon, but the two cities have nearly the same population. This indicates a higher level of sprawl in Bangkok.

◆ There was no data for Yangon on urban expansion that could be used to compare its growth directly to that of Bangkok's. The recording and validation of this kind of data is typically viewed as essential to understanding the form of the city and to planning for future growth.

◆ Even though Bangkok has defined a wider metropolitan region within which there is some administrative coordination, the built-up area has already begun to expand beyond this.

◆ Bangkok's lack of strict zoning laws has led to unplanned and often haphazard urban expansion that falls short of integrating the physical growth of the city with the provision of public transport. Yangon can learn from Bangkok's experience and ensure that urban expansion is carefully managed and in line with the wider strategic vision for the city.

Future research questions

◆ What levels of residential and employment density are desirable for Yangon, taking into account its current urban morphology, transport infrastructure and land availability?

◆ How can a planning system based on the city's urban morphology and footprint be used to steer urban growth in line with the long-term strategic vision?

[14] Thailand's two major airports are Suvarnabhumi International Airport (IATA: BKK) and Don Mueang International Airport (IATA: DMK).

[15] At the time of publication, the only boundaries set for the Yangon Metropolitan Area were those in the 2013 JICA-produced Strategic Urban Development Plan for Greater Yangon.

3.5 Transport infrastructure

A significant factor in the city transformations of the last decades has been renewed investment in public transport, and an enhanced focus on improving urban sustainability and quality of life by facilitating walking and cycling. Some mature cities have made improvements to existing public transport networks, while other rapidly growing cities have invested in almost completely new networks. Efficient public infrastructure networks feed national and regional connections while allowing movement of people within the city. It is indisputable that a well-functioning transport network is essential for cities to thrive and grow, and has important long-term implications for productivity, competitiveness, sustainability and public health.

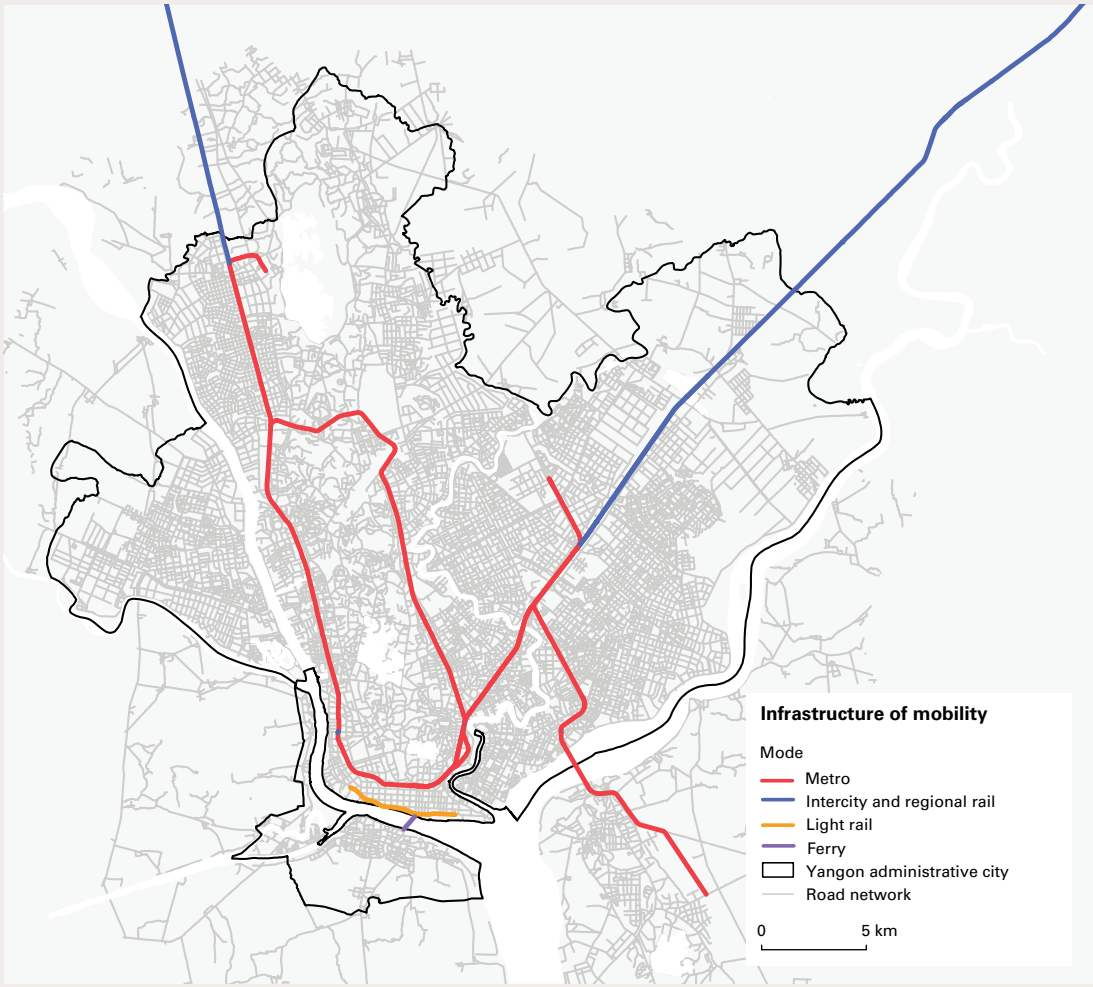
This section will look in detail at the existing transport infrastructure in Yangon and Bangkok, including the frequency of service and connectivity, as well as exploring the new developments planned in each city. The efficiency of the transport network may be measured not only by its frequency, but also by its spatial relation to the urban footprint, land use and population densities.

3.5.1 Transport systems

The maps below illustrate existing public transport networks in Yangon and Bangkok while also highlighting infrastructure that is proposed or currently under construction. Due to decades of stalled growth following the colonial period, Yangon –a mature and yet rapidly growing city – has the potential to make improvements and additions to its public transport networks with little existing infrastructure to stand in the way. Several parts of Yangon lack infrastructure, but there is a clear opportunity to understand the areas of need and plan network extensions accordingly, as is currently happening in Bangkok. For example, Yangon is expanding its rail system eastward (Figure 3.21), while Bangkok is slowly increasing some of its metro lines outwards from the city centre to cater to the needs of people who reside outside the central areas (Figure 3.22).

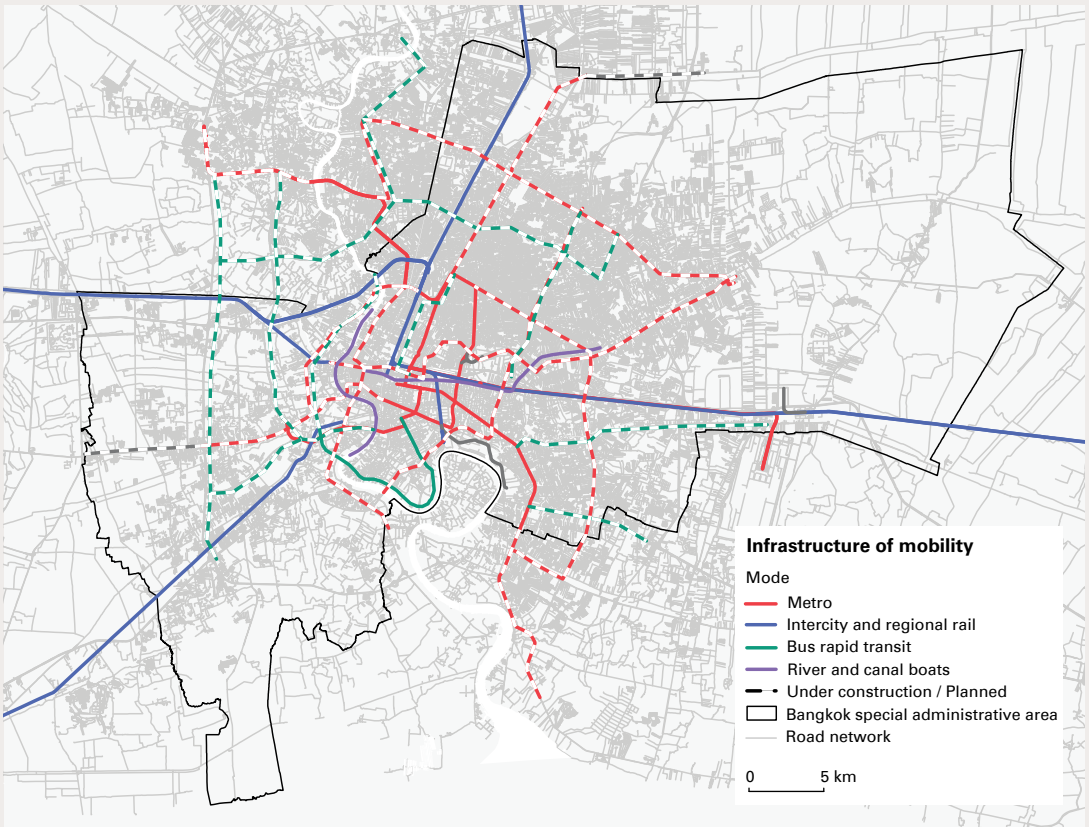
There is a greater variety of transport infrastructure in Bangkok than in Yangon. Bangkok's network includes the rapid light rail (BTS) and metro (MRT), bus rapid transit and other bus services, regional rail and ferry services. Services across most public transport modes are rapidly being expanded to try to address the cities' worsening road congestion issues. However, although projects are underway, the mass transit system does not yet serve many of Bangkok's densely populated areas like Lat Phrao, Bang Khen and Don Mueang (where the city's secondary airport is located). In Yangon, there are several public transport options. The city is served by various transport modes that include the equivalent of a metro line, two intercity lines, an expansive bus and taxi network and a new light rail service. The bus lines serve even distant parts of the city. Nevertheless, integrating these services and considering alternatives could potentially avoid land scarcity in the Central Business District and abate major traffic issues. The following subsections compare existing modes of public transport infrastructure in more detail.

Figure 3.21: Infrastructure of mobility in Yangon (2016)



Source: LSE Cities 2016. Based on OpenStreetMap contributors, MIMU and YCDC data

Figure 3.22: Infrastructure of mobility in Bangkok (2016)



Source: LSE Cities 2016. Based on Lincolninst, OpenStreetMap contributors and Bangkok GIS data

Metro and other rail based systems

Yangon's rail-bound infrastructure consists of a circular railway and a tram line. The 'Circle Line' or 'Circular Railway'[16] runs a 46-kilometre loop and connects the city's northern townships, the southern Central Business District (CBD) and the Dagon University and Computer University. It runs on separate rails and avoids the snarled street traffic. Excluding buses, the Circle Line is Yangon's most important public transport link[17]. In 2013, the University of Tokyo estimated that 73,000 passengers ride the loop every day (Myat Nyein Aye, 2016). The line's 38 stations are designated for refurbishment, including new rolling stock and upgrades to signalling and tracks (JICA, 2016). The project is set to commence during the 2017–2018 fiscal year with completion expected by 2022 (*Global New Light of Myanmar*, 2016c).

In the CBD, the Yangon Tram is designed to run west–east along the waterfront Strand Road from Linsadaung to Wardan Jetty. The tram was launched in January 2016 and an extension from Wardan to Kyeemyindaing and from Linsadaung to Pazundaung planned for later that year (Phan *et al.*, 2015). The extension was intended to extend the route from 4.8 to 11.3 kilometres and eventually link to the Yangon Circle Line. After a few months of usage, the tram suspended operation due to a lack of passengers. The tram ran six times each day in each direction with a capacity of 200 passengers, but never reached capacity, often running with only 45 regular passengers each day. Myanmar Railways are currently considering other options for the tram including extending the route further to encourage more ridership. Until then, however, the tram, will be kept in storage, and the US$3.88 million initial investment has yet to be publicly discussed (*Global New Light of Myanmar*, 2016b).

Bangkok is served by three different rail systems: the BTS 'Skytrain', the two Metropolitan Rapid Transit lines (MRT) and the Airport Rail Link. The 'Skytrain' is an elevated rapid transit system that began operations in 1999 and serves 34 stations along two lines. The MRT Blue Line opened in 2004 and the MRT Purple Line opened for service in May 2016[18]. The Metro now consists of 35 stations and is slowly being expanded. Three additional lines are under construction and four more are planned.

Bangkok is additionally served by the 28.6-kilometre Airport Rail Link (ARL), which opened in August 2010 and currently consists of two lines. One line provides an express service between Suvarnabhumi Airport and Phaya Thai in central Bangkok via the populated area of Makkasan. The other 'City Line' is a commuter rail service with eight stations. According to the Office of Transport and Traffic Policy and Planning, the BTS, ARL and MRT serviced a total of 683,000 person-trips per day in 2011. This number is expected to rise to 2,800,000 person-trips per day in 2017 (about a 309% increase from 2011), and 5,611,000 person-trips per day in 2020 (an increase of 721%), following a massive expansion of the metro lines (see Figure 3.22 for planned metro extension).

Bus Rapid Transit (BRT)

Both cities have a BRT line and plans to expand these services. The advantage of these systems is that they run on separate lanes to the vehicle traffic and are cheaper to introduce than rail-bound systems.

Yangon's BRT network puts 49 buses transporting nearly 700,000 commuters on daily routes along Pyay and Kabar Aye Pagoda Roads (*Myanmar Times*, 2015). Air-conditioned buses run from early morning until the evening, at a marginal 10-cent increase in cost for riders compared to other bus services. An estimated 8–9,000 riders use the BRT system each day. Those numbers are expected to grow significantly once 20 more buses are added to the existing routes. An extension of the network is planned over the coming years (*Eleven Myanmar, 2016*).

In 2009, a 16-kilometre long BRT line with 12 stations in the centre of the road opened in Bangkok (see the green line in Figure 3.22 for the BRT route). The two termini connect to the BTS Skytrain, allowing people to make connections between transport networks. There are plans to create more BRT lines (the green dotted line in Figure 3.22), but these plans have not yet been agreed upon by the relevant official bodies.

[16] Operated by Myanmar Railways.
[17] It can be compared in terms of importance to London Underground and Overground.
[18] Although the MRT Purple Line commenced its service on 1st May 2016, its official opening date was 12th August 2016.
[19] The price of the journey varies according to the quality of the vehicle, whether it has air-conditioning and length of travel.
[20] Klong Saen Saep is a very dirty canal and many boats are not regularly inspected for safety. The most recent accident occurred in February 2016.

Bus fleet

The Yangon bus fleet is composed of vehicles that vary widely in quality and comfort[19]. In 2013, there were nearly 3,000 air-conditioned and non-air-conditioned buses with a capacity of up to 50 passengers, supplemented by 2,300 Dynas and minibuses with capacities of between 25 and 35 passengers. These smaller buses have grown in number since 2013 when nearly 1,000 Hilux pickup trucks were replaced by less dangerous and higher capacity minibuses throughout the city (YUTRA, 2013).

City buses account for 45% of the buses in Yangon Region. Most of the buses are overcrowded and irregular in their scheduled services due to heavy vehicle traffic in the city. They largely travel along the north–south axis, with very few buses following east–west routes. More than 300 bus lines serve nearly 7 million people throughout the region and carry between 4,500 and 4,900 passengers a day (*Myanmar Now*, 2016). At the time of publication, new attempts to regulate private bus companies and drop the number of lines down to 50 have been reported (*Global New Light of Myanmar*, 2016).

In contrast, Bangkok's Mass Transit Authority (BMTA) operates a monopoly on bus services, with substantial concessions granted to private operators. In 2015, there were 24,585 fixed route buses (Transport Statistics Division, 2015), together with private buses, minibuses, *song thaeo* buses and private vans, operating on 470 routes throughout the region. According to the Office of Transport and Traffic Policy and Planning, about 89% of total passenger trips boarding public transport in the BMR used buses (2011).

Taxi services

The number of taxis operating in Yangon is not officially available, but Mahtatha, the control committee for private bus lines, estimates that there are nearly 100,000 taxis in the city, or a fifth of all cars on the road (*Myanmar Now*, 2016).

A similar number of 100,200 urban taxis were reported for Bangkok in 2015. Additional taxi services are provided by cars, motorcycles and tuk-tuks. In 2015, there were 9,008 tuk-tuks servicing Bangkok (Bangkok Planning Division, 2015).

Boat services

The Yangon River splits Yangon into two parts – the CBD in the north and Dala Township to the south. Two-tiered ferry boats with a capacity of 700 passengers leave from Pansodan Jetty every 20 minutes, or 46 times a day, carrying a total of 30,000 passengers on the 10-minute shore-to-shore journey each day (YUTRA, 2013 & Figure 3.19). A bridge construction project between Dala and Yangon was launched in February 2016 and the resulting infrastructure is expected to eventually replace the need for ferries. The project is slated for completion within the next five years (Nyeint Aye, 2016). There is currently an open tender for a water taxi service intended to relieve the pressure of the congested streets. The ferries would run along the Hlaing River and Nga Moe Yeik Creek.

Across Bangkok, the Chao Phraya River and many of the city's canals provide important transportation routes. As seen in Figure 3.22, the river is a significant transport axis for the east of the city because there is no mass rapid transit system to cater for local inhabitants there. The Office of Transport and Traffic Policy and Planning reports that 298,000 passenger–trips in the BMR, or about 2.5% of total passenger trips, used boat services (2011). According to the official Express Boat website, more than 60,000 people, or about 20% of total boat passengers, use the Klong Saen Seap Express Boat in a single day (*Klong Saen Saep Express Boat,* n.d.) since it provides a fast and inexpensive service.[20]

Intercity and regional rail

Two intercity rail lines link Yangon to Mandalay, one through the Ayeyarwady River Valley and the other via the Sittang River Valley that also links Yangon to Nay Pyi Taw. Built in 2015, the newer Sittang River Valley line is quicker and more direct. A 267-kilometre segment of this line, from Yangon to Taungoo, is slated to undergo upgrades in 2017, initiating the first phase of a 10-year, $2.2 billion tender process that will cut the day-long journey from Yangon to Mandalay down to eight hours (*Global New Light of Myanmar*, 2016).

Bangkok is served by the Greater Bangkok Commuter rail (the blue line in Figure 3.22), which provides links to other parts of the country through the main railway station. Bangkok's first rapid transit system began to operate concurrently with the existing public transport systems in 1999, including extensive bus networks and boat services that still operate on the Chao Phraya River and Saen Saep Canal.

Key findings

- Bangkok has only recently begun to invest significantly in its public transport infrastructure, responding to the worsening congestion problems plaguing the city. While a considerable expansion of the metro system is underway, as well as other transport investments, there have been ongoing delays and uncertainty about some of the lines. The mass transit system does not yet serve many densely populated areas, including the city's second airport.

- Yangon has some good existing rail links, and the bus lines adequately serve even distant parts of the city. Nevertheless, improvements in the frequency and quality of service, and better integration between the systems, could help abate major traffic issues.

- There is a real opportunity for Yangon to follow a transport-oriented development model and incorporate new investments in public transport into the strategic growth plan for the city, ensuring that newly developed residential and employment centres are adequately connected via public transport.

Future research questions

- How can Yangon adopt a proactive approach to transport planning that improves existing transport infrastructure and expands public transport to accommodate a higher volume of passengers?

- How can the city develop a context-sensitive transport-oriented development strategy that reduces congestion and improves accessibility?

- Would an incremental approach accommodate future transport needs and allow the city to adapt to changing urban realities? What lessons can Yangon learn from other cities with similar struggles in that respect?

3.6 Mobility

The link between economic prosperity and higher levels of mobility (the ability to travel faster speeds for longer distances) has been increasingly well-documented. In 2005, 7.5 billion trips were made in urban areas across the globe, and the number of passenger-kilometres travelled in cities could quadruple by 2050 (UN Habitat, 2013). Providing the infrastructure to allow people to move around the city safely and efficiently, while simultaneously ensuring affordability and reducing environmental impacts, is one of the greatest policy challenges any city faces. Yet it is clear that if mobility patterns are not carefully monitored and managed, especially in cities facing rapid population growth, it may result in an unprecedented accessibility crisis, with severe social, economic and environmental consequences.

This subsection looks at the motorisation trends of Bangkok and Yangon, highlighting a dramatic rise in vehicle registrations in both cities over time, before moving on to an overview of transport modes, which differ significantly between the two.

3.6.1 Motorisation

As Myanmar undergoes economic growth, Yangon City is experiencing rapid motorisation. Historically, Myanmar has had very low car ownership, due to restrictive policies on the import of foreign automobiles along with a low per capita GDP. Motorcycles are prohibited in the 33 townships in YCDC areas, resulting in a low motorisation rate compared to other states and regions in the country. As Figure 3.23 shows, what was effectively no vehicle ownership has begun to rise since reforms began in 2011. That year, the Myanmar government introduced new car import regulations that allowed the number of cars in Yangon and the entire country to increase significantly. However, the road network has largely remained the same, apart from the construction of seven new flyovers[21] at Hledan, Bayintnaung, Shwegondaing, Myaynigone, 8 Mile, Kokkine and Tamwe junctions. As a result, road congestion has increased notably due to a volume of vehicles that is higher than the capacity of the city's major roads in both directions during morning and evening peak hours (JICA 2014).[22]

In 2014, JICA's Comprehensive Urban Transport Plan of the Greater Yangon (YUTRA) determined that demand for transport is radiating from two main corridors of the city: one between the CBD and the north, the other from the CBD to eastern districts like South Okkalapa and Dagon. The report recommends the implementation of transit-oriented development throughout the city by using a combination of infrastructure, safety and capacity building projects, including the BRT system now underway.

Whether these projects will reduce congestion or even be implemented is yet to be seen, but as population figures increase along with average annual income, planners worry that vehicle ownership and usage will lead to traffic congestion as serious as that of Bangkok, Jakarta and Manila (JICA, 2014).

One of Bangkok's most critical problems is transport. Being the fastest-growing area of Thailand, both in terms of population and vehicle ownership, Bangkok has not been able to cope with the enormous demands being placed on its existing road systems. Major roads link different areas of the city, branching into smaller streets and lanes that serve local neighbourhoods. There are only 11 bridges over the Chao Phraya River linking the two sides of the city, an insufficient number considering the amount of people crossing the river each day (see Figure 3.12, where the highest peaks are concentrated along the Chao Phraya). At the same time, attempts have been made to increase the convenience of public transport systems, as seen in Figure 3.22. Unfortunately, due to Thailand's evolving political situation, many plans have been abandoned or altered. It is only recently that some ambitious public transport projects are beginning to materialise.

Bangkok's high density and number of vehicles make Bangkok traffic among the worst in the world. TomTom Traffic Index 2016 ranks Bangkok the second most congested city in the world after Mexico City. The average car in Bangkok at the turn of the millennium spent 44 days each year stuck in traffic (Gakenheimer, 1999), a figure that is certain to have increased dramatically since then. Rapid growth in Bangkok in the 1980s resulted in sharp increases in vehicle ownership and traffic volume, which have since continued (Figure 3.23). The group of people who have the largest demand in personal transportation are those who send their children to schools in the city or who work in the central business districts but live far away from the BTS or MRT. These people travel

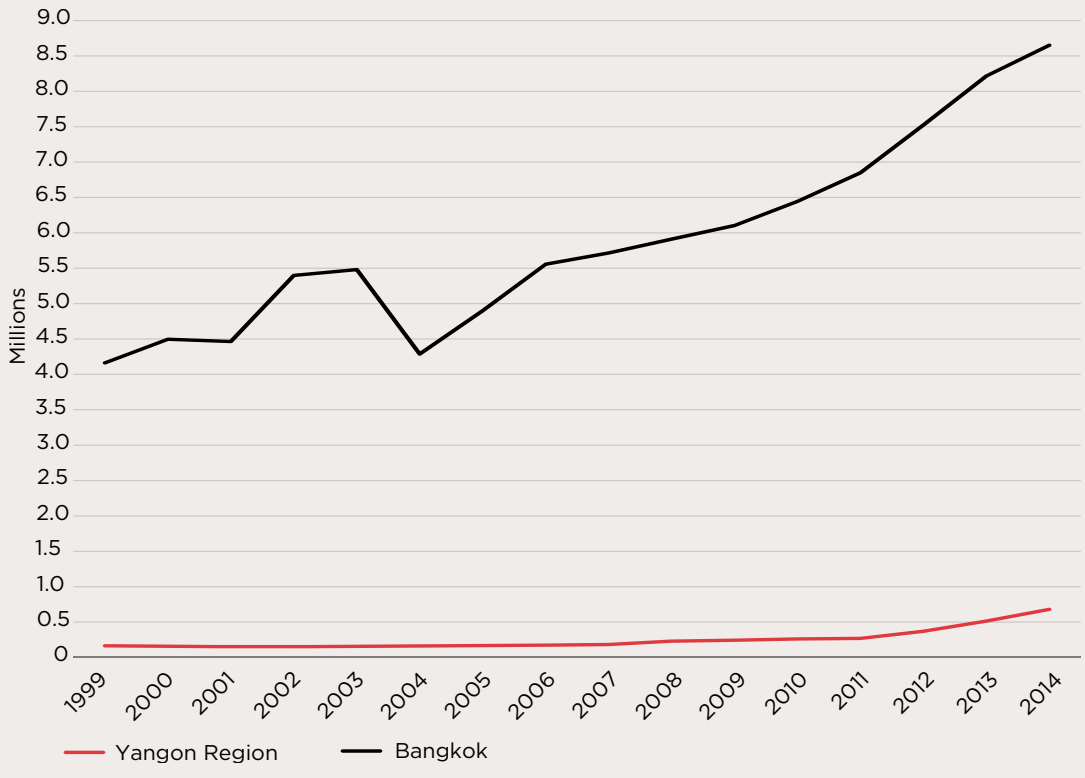
[21] *Coconuts Yangon* reports that due to criticism of ineffectiveness, some flyovers may be destroyed in the coming year (*Coconuts Yangon*, 10 December 2015).
[22] Major roads include Lower Pazundaung, Shwedagon Pagoda, Min Nander, Khay Mar Thi and Shan Road.

back and forth between their homes in the outskirts and the inner city every day. Consequently, traffic congestion is a severe problem, especially during the morning and afternoon rush hours (Supatn, 2011). Efforts to alleviate the road congestion problem have included the construction of intersection bypasses and an extensive system of elevated highways. The most recent extension was the 16.7 km extension of Si Rat-Outer Ring Road Express Way to the west (Thonburi) side of Bangkok. Nevertheless, a large number of automobiles and a scarcity of roads are not the only factors contributing to congestion. The lack of an efficient public transport system and well-organised traffic control, compounded by bad driving habits and the perception of car ownership as a status symbol, further exacerbate the issue.

It is interesting to note, however, that while the number of registered sedan vehicles in Bangkok is high, the number of registered sedan vehicles in other provinces of the BMR is significantly lower. This is probably due to the fact that many people purchase and register their vehicles in Bangkok even when they do not live or work there because of the social prestige attached to licence plates that bear the capital city's name. This makes it difficult to determine the actual motorisation rate in the city.

Figure 3.23 shows the growth of total registered motor vehicles in Yangon and Bangkok over the past 15 years. These include buses, cars, taxis and motorised two- and three-wheelers. When comparing this growth to the percentage increase in buses, the disparity is evident: the number of passenger vehicles in Yangon trebled between 1999–2014, while the number of buses did not quite double. Similarly, Bangkok passenger vehicles (sedans holding fewer than seven passengers) increasedby almost three times and buses nearly doubled for the same period. However, as mentioned above, many people who do not live in Bangkok might have registered their vehicles there. Between 1999 and 2014, the total number of registered motor vehicles increased by 108% for Yangon and 312% for Bangkok.

Figure 3.23: Registered motor vehicles in Yangon and Bangkok (1999–2014)



Source: LSE Cities 2016 Based on data from JICA 2014, Transport Statistics Sub-Division, Planning Division and Department of Land Transport.

3.6.2 Modal share

Yangon also has a high percentage of residents with active transport patterns: 45% of trips are completed on foot and an additional 7% by bicycle. This is facilitated by the high levels of residential and employment density in the centre of the city, allowing for easier commuting on foot. Furthermore, high poverty levels in some areas may also mean that people simply cannot afford any other form of transport. This would suggest that a rise in income levels will very rapidly lead to a reduction in the percentage of people who walk and an increase in other modes of transport. All forms of public transport make up 42% of trips, of which bus trips are by far the most significant (28.8%). However, the high usage of public transport in Yangon is not necessarily indicative of quality service, but rather suggests a range of regulatory and financial barriers to private vehicle ownership. Yangon lacks an extensive metro system and most of the buses are second-hand vehicles made in East Asia. In Yangon, only 5% of the population commutes by private vehicle. High import taxes previously prevented most people in Yangon from purchasing a personal vehicle, but the lowered import taxes through car substitution programmes since 2011 have led to a rise in car ownership and traffic congestion over the past five years.

Bangkok hosts very contrasting travel behaviours. Only 14% of trips are done by walking, and cycling plays a minor role, so it does not show up in the statistics. Despite the existence of 30 signed bicycle lanes along several roads totalling 230 kilometres, cycling is largely impractical. Most bicycle lanes share the pavement with pedestrians, and poor maintenance and a hostile travel environment for cyclists and pedestrians make these unpopular methods of commuting. The general perception of public transport is still largely negative and it is considered an inefficient means of commuting. Even as the public transport system improves, a lack of disincentives to driving – like a London-style congestion charge[23], for instance – may still keep commuters in private cars, resulting in 40% of trips made by car. Violation of traffic rules is also rampant, particularly illegal parking and illegal lane-changing, which contribute to the bottlenecks.

[23] The London congestion charge is a fee charged on most motor vehicles operating within the Congestion Charge Zone in Central London between 7 am and 6 pm on weekdays. The charge aims to reduce high traffic flow in Central London and raise investment funds for London's transport system.

[24] The study area where the YUTRA Team did its modal share survey is 'the Greater Yangon, including Yangon City and a part of adjacent six townships (Thalyin, Hmawbi, Hlegu, Htantabin, Twantay and Kyawtan)' (YUTRA, 2013), while the survey was only conducted in Bangkok City.

Figure 3.24: Modal share in Yangon (2013)[24]

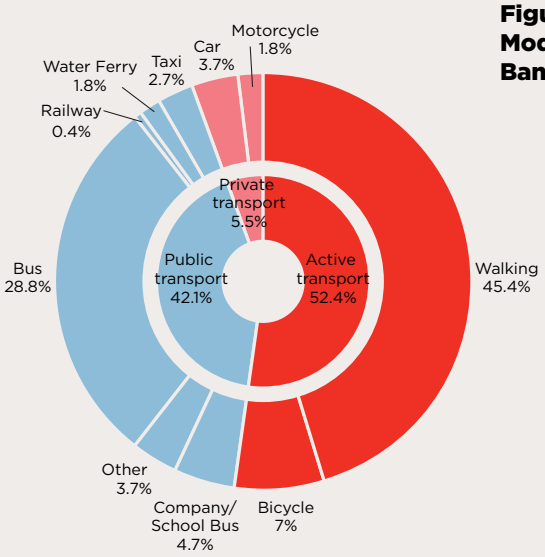
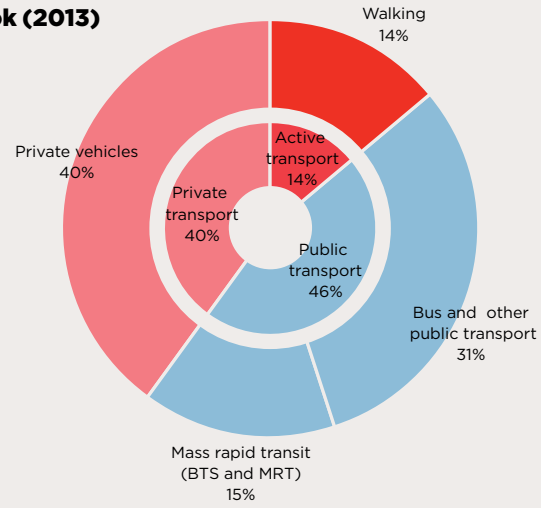


Figure 3.25: Modal share in Bangkok (2013)



Source: LSE Cities 2016. Based on Tulyasuwan 2013 & YUTRA 2013.

Key findings

◆ In Bangkok, a lack of investment in good public transport and rapid development have led to very high motorisation rates and the corresponding congestion levels that are considered some of the worst in the world.

◆ In Yangon, population growth, a relaxation of import regulations for motor vehicles and rising income levels risk a similarly rapid increase in motorisation if alternative modes of transport are not developed quickly.

◆ Even though there are a range of alternatives, transportation continues to be an issue for Bangkok and the negative image of the city's traffic congestion may affect foreign investments. Yangon's congestion issues have also worsened rapidly in recent years. Investment in improved road networks may help to alleviate the problem temporarily, but will only lead to a continued rise in car use in the long run.

◆ Bangkok has been investing heavily in new public transport developments, but retrofitting these infrastructures into the existing urban fabric and changing a car-centred culture can be difficult.

◆ In contrast, Yangon's mode share is still primarily dominated by public transport and walking, which presents a real opportunity. Planning for a walkable city with a well-developed public transport system will allow the city to minimise the negative effects of a car-dependent development pathway.

Future research questions

◆ What are the actual travel behaviours and underlying mobility attitudes of Yangon residents and how are these affected by the current physical and socio-cultural context?

◆ How can Yangon manage an inevitable increase in private motorised vehicles (at least in the short term) while limiting negative externalities and simultaneously investing in the expansion of active and public transport options?

3.7 Urban governance

While the previous sections discussed the current situation in Bangkok and Yangon relating to population, economy, urban form, transport and mobility, it is clear that changes to any of these areas depend heavily on the urban governance system they are situated in. Understanding the decision-making processes and wider political frameworks that govern these cities is therefore essential.

This section aims to explore the urban governance of Yangon and Bangkok to better understand decisions that shape urban futures. Before delving into the current urban governance structures and how they relate to the wider political system in these cities, it is important to first identify the basic administrative divisions that exist in Myanmar and Thailand. The data used in this section explores the administrative boundaries for both cities at different tiers.

3.7.1 Overview of administrative structures

Regional level

The primary administrative divisions of Myanmar are known as states and regions *(Tain theta gyi)*.[25] There are seven states and seven regions governed by the Union legislature *Hluttaw* in collaboration with the regional *Hluttaw*. The Yangon Region is unlike any other regions or state in the Union: Yangon City is managed by the Yangon City Development Committee (YCDC), which since colonial times has had some characteristics of a local government. Currently, the YCDC is administered under the Regional Minister for Development Affairs and, for the time being, the core activities of the regional government are related to the city.

In Thailand, the province *(Changwat)* is the principal administrative division. There are 76 provinces. Although Bangkok's boundary is at the provincial level, Bangkok is a special administrative area.[26] The city is locally governed by the Bangkok Metropolitan Administration (BMA), whose governor is directly elected to a four-year term, unlike other provinces where governors are appointed.

Sub-regional level

Within each of the states and regions of Myanmar, the next level of administration is the district *(Khayaing)*. Yangon Region is divided into four districts: the Western District (Downtown), the Eastern District, the Southern District and the Northern District (Figure 3.26).

[25] The regions are mostly inhabited by ethnic Burmese people, while the states are more populated by minority ethnic groups and bear these groups' names: Rakhine, Chin, Kachin, Shan, Kayah, Kayin and Mon. The seven regions are Yangon, Ayeyarwady, Sagaing, Magway, Mandalay, Bago and Tanintharyi.

[26] The fact that Bangkok is now governed as a metropolitan area (BMA) does not change the historical significance or use of this term. Pattaya City is also a special administrative area.

Figure 3.26: Yangon's four Districts

Source: LSE Cities 2016. Based on DIVA GIS and YCDC data

In contrast to Yangon, Bangkok has introduced the Bangkok Metropolitan Region (BMR).[27] The city of Bangkok is part of the larger BMR (Figure 3.27), which includes the five adjacent provinces of Nakhon Pathom, Pathum Thani, Nonthaburi, Samut Prakan and Samut Sakorn. The BMR is not a political entity but a geographic designation with some governance power. Its purpose is to understand and better manage the wider urban area and its long-term strategic needs.

Figure 3.27: Bangkok and its neighbouring provinces in Bangkok Metropolitan Region

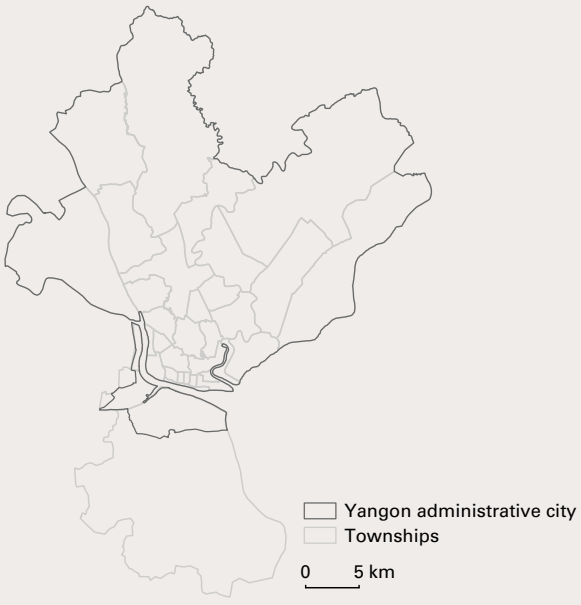
Source: LSE Cities 2016. Based on MIMU and YCDC data

City level

In Myanmar, each district is made up of locally administered townships *(Myo Nay)*. Yangon City and the area managed by the YCDC is made up of 33 townships (Figure 3.28). The townships are also responsible for electing two representatives to the regional Hluttaw, which will go on to form a regional cabinet made up primarily of Hluttaw members.[28]

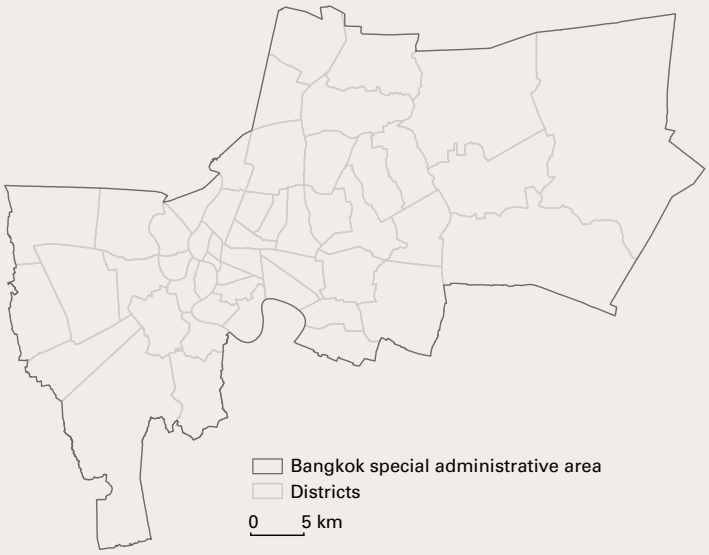
There are 50 districts or Khet in Bangkok (Figure 3.29), which is the first-tier sub-city administrative level. A Khet is roughly equivalent to an *Amphoe* in other provinces of Thailand.

Figure 3.28: Yangon's 33 Townships



Source: LSE Cities 2016. Based on YCDC and MIMU data

Figure 3.29: Bangkok's 50 Khets



Source: LSE Cities 2016. Based on Bangkok GIS data

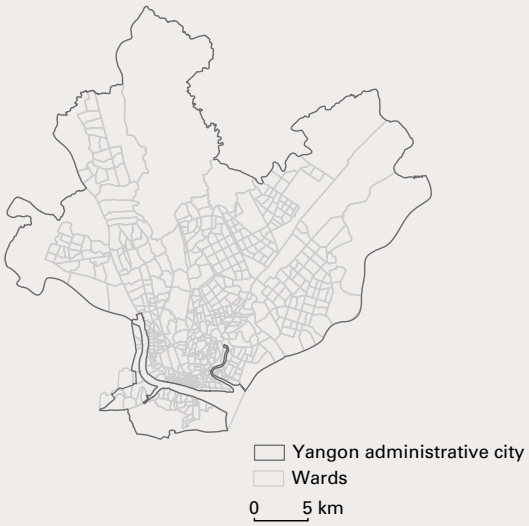
Sub-city level

The lowest level of administration is the ward *(Yatkwet)* or village tract *(Kyayywa Oksu)*. Yangon City's 33 townships have 630 wards and 54 village tracts within the administrative boundaries (Figure 3.30), but the YCDC is only responsible for administering the wards. By definition, a ward usually has urban characteristics while a village tract is mostly rural. This is not necessarily the case in Yangon where many locations are village tracts in name only but maintain the same urban characteristics of the ward. The 54 village tracts are officially serviced by the Yangon regional government discussed in greater detail later in this report.)

In Bangkok a sub-district (Kwaeng/Tambon) is the second-tier sub-city administrative level. It is the administrative level widely used to present statistics at a lower scale than the entire district. There are 169 Khwaeng in Bangkok. A Khwaeng is roughly equivalent to a Tambon in other provinces of Thailand.

[27] The BMR is known in Thai as *Krung Thep Mahanakhon Lae Parimonthon; literally*, 'Bangkok and surrounding provinces'.
[28] The Region Minister of Security and Border Affairs is a militarily appointed position, the Region Advocate General is the legal advisor who serves as a Public Prosecutor and is a member of the cabinet and the Minister of Municipal Affairs has already been appointed when the government formed. Additionally, the region representative of the General Administration Department of the Ministry of Home Affairs is not a member of the cabinet, but serves as the executive secretary.

Figure 3.30: Yangon's 630 Wards



Source: LSE Cities 2016. Based on Bangkok GIS data

3.7.2 Governance structures and political representation

Administrative entities can be under the authority of various government levels: national, regional and local. In order to understand who is managing key urban sectors and to compare the governance structures of a large range of cities (in this case, Yangon and Bangkok), LSE Cities selected six sectors related to urban governance: environment and planning; economy; infrastructure and transport; health and social services; education and culture; and security.

Until changes are made by the new government formed in April 2016, all administrative duties and service provisions are made by the regional government based on the order of the Myanmar central government.[29] Both the Ministry of Development Affairs and the YCDC are responsible for municipal services. The YCDC takes responsibility for all the wards within Yangon's 33 townships. The Development Affairs Office serves the remaining regional townships and the 54 village tracts within the townships.

This division of duty between regional and city government is problematic due to an overlap in mandate and a lack of clarity regarding responsibilities.[30] The regional level provision of service is further complicated by changes made in the 2008 Constitution that extended the power of the YCDC and left the central government and divisional offices with a less than clear mandate on how, where and by whom services are delivered.

The planning, decision-making, implementation and operati on of services and facilities can occur at one or multiple levels of government. Education, health and electrical power are planned by their corresponding union ministries, but are carried out by a lower administrative office, like the township. Public services like water, sewage and waste are planned and implemented by the

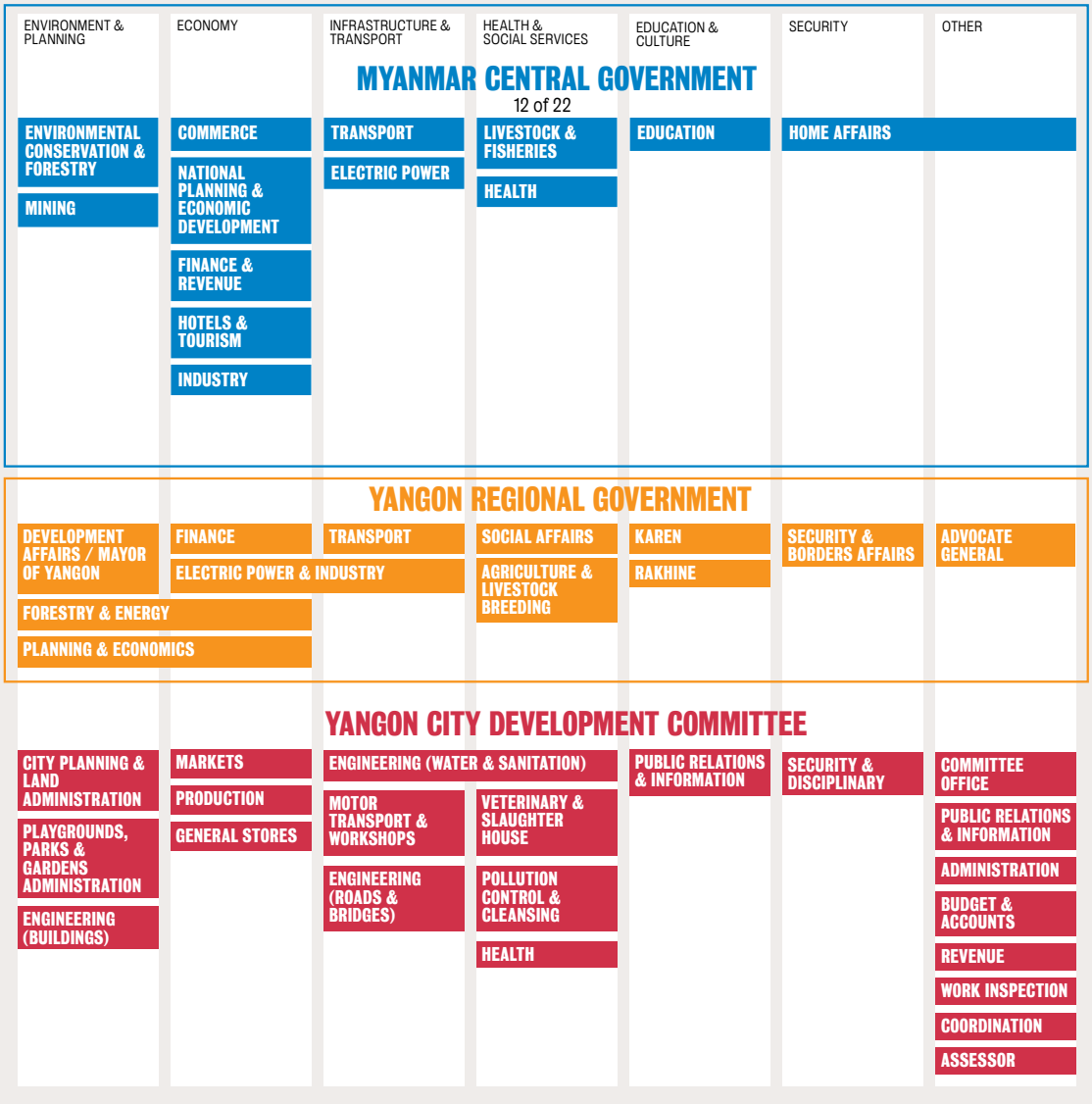
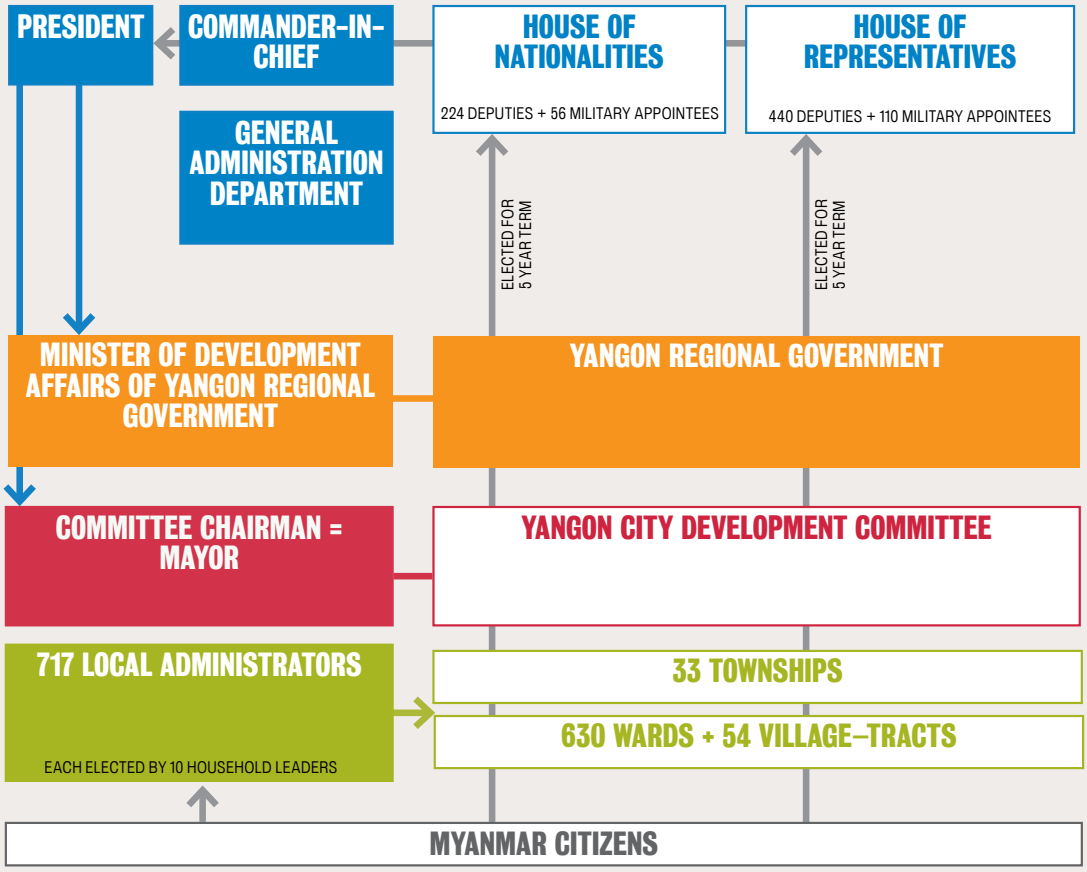


Figure 3.31: Yangon governance structure

Source: LSE Cities 2016. Based on data from Nixon et al., 2015.

Figure 3.32: Yangon political representation[31]



Source: LSE Cities 2016. Based on data from Chit Saw & Arnold 2014 & Nixon et al., 2015

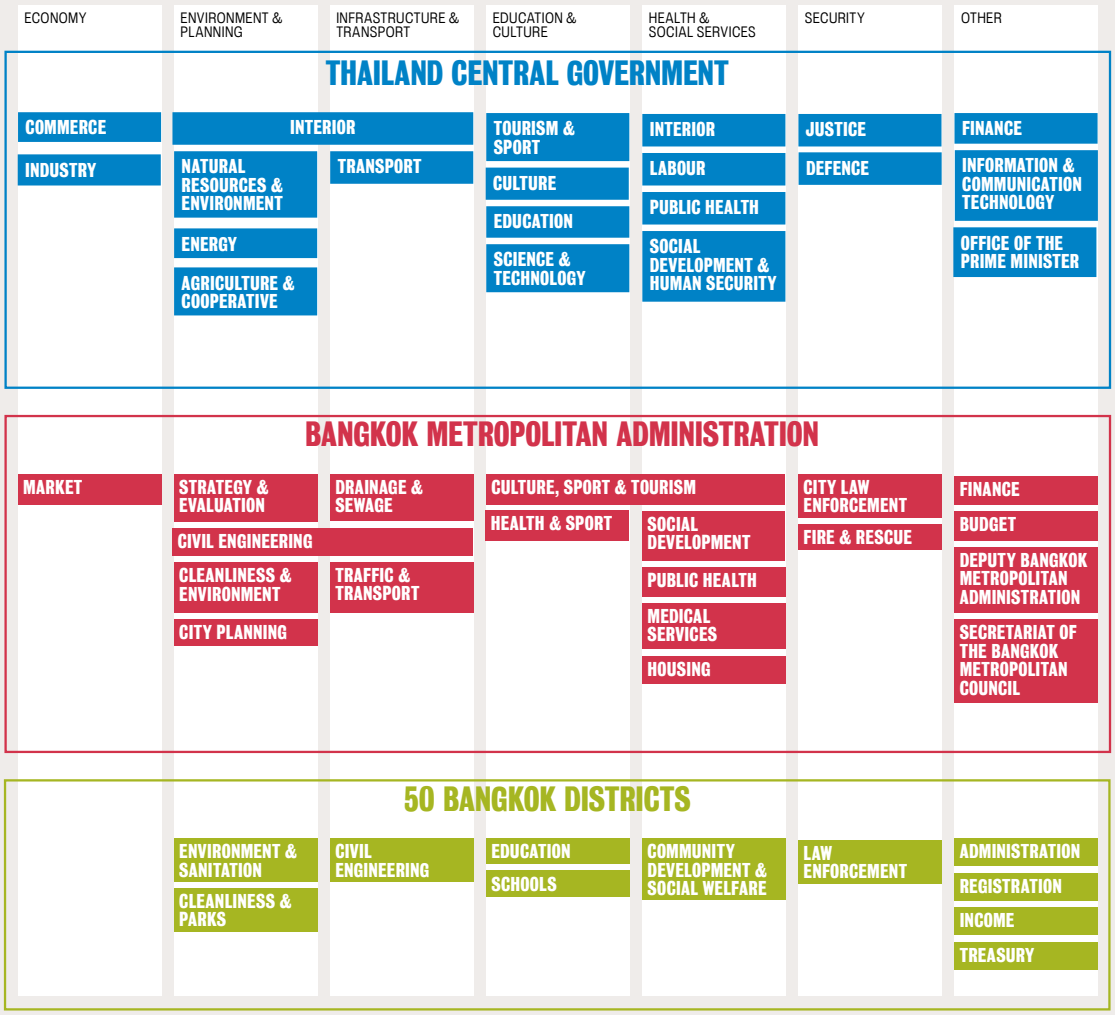
respective departments of the YCDC. Transport infrastructure and the maintenance of roads are mainly executed by the YCDC, but the planning and budget are determined by the regional and union ministries. Infrastructure and public facilities are planned and operated by the union and regional governments with their related agencies and district and township offices executing works ordered by the union when necessary. Other specific services (i.e. rail transport, power distribution, the issuing of permits and the operation of some reservoirs) can be planned and implemented at the union level or by public organisation, at a regional level and implemented by a public organisation, or planned at a regional level and implemented by the YCDC.

Since 2005, Yangon City has no longer been the political capital of Myanmar and since 1990, Yangon residents have been governed directly by 717 local administrators under the supervision of the YCDC. Of the nine-member municipal committee that makes up the YCDC, four of those members are elected representatives from each district and five are appointed. The municipal services of Yangon Region, including the 33 townships that form Yangon City, are managed under the authority of the regional minister of development affairs, who is appointed by the president and serves as the mayor.

The Yangon region is made up of 45 townships and the region *Hluttaw* has 90 elected seats[32] and 31 seats reserved for military appointments. In the region *Hluttaw* (House of Nationalities), each township is divided into two constituencies regardless of land area or population. Each constituency elects one representative for a five-year term. Similarly, 440 deputies are elected in the Pyithu *Hluttaw* (House of Representatives), while 110 are appointed by the military. A presidential electoral college consists of deputies of the region and Pyithu Hluttaws and of military appointees. This body of three committees nominates a candidate and elects the union president.[33]

[29] The administrative duties are executed by the township offices (Figure 3.31).
[30] For example, at the ward and village tract level in the 33 townships, while the village tracts are often considered part of the city and even vote in municipal elections, they still have services provided by the development affairs office and are under the budget of the regional government.
[31] This graph was accurate in early 2016, but the new government may change the political structure.
[32] Two elected seats are added to represent registered Kayin and Rakhine ethnic communities.
[33] The president is elected for five years, and the term is renewable once.

Figure 3.33: Bangkok governance structure



Source: LSE Cities 2016

The governance structure differs between Yangon and Bangkok. At least 19 central government organisations are directly responsible for managing various aspects of the urban space in Bangkok (Figure 3.33). The BMA is responsible for governing the city. The existing institutional organisation of the BMA is divided into three offices, 16 departments and 50 district offices (responsibilities listed in Figure 2.34). The three offices serve as the secretary to the governor, the Bangkok Metropolitan Council and the Civil Service Commission.

Constitutionally, the powers and role of the office of Governor of Bangkok are to (1) formulate and implement policies for the Bangkok Metropolitan Area; (2) head the Bangkok Metropolitan Administration; (3) appoint and remove deputy governors, advisors, board members, city officials and public servants; (4) coordinate and carry out the orders of the Cabinet of Thailand, the Prime Minister of Thailand and the Ministry of the Interior; (5) oversee the smooth running of the various agencies and services of the city; (6) draw up legislation and bills for the city, to be considered in the Bangkok Metropolitan Council; and (7) the Governor is also invested with the same powers as any other governor of a province of Thailand (Office of the Council of State, 1985).

The 16 departments are responsible for the duties assigned to them by law, whereas each district office also provides services at the district level (Figure 3.33). Most of these responsibilities concern the city's infrastructure and include city planning, building control, transport, drainage, waste management and city beautification, as well as education, medical and rescue services. For instance, looking at Bangkok's transport sector, the BMA is responsible for the construction and maintenance of the road network and most transport systems through its Public Works Department and Traffic and Transportation Department. Nevertheless, there are many other government agencies in charge of individual systems, especially transport-related policy planning and funding.

In many aspects, the BMA acts independently, but several of the city responsibilities are provided in collaboration with other agencies and national departments (Figure 3.33). For instance, the BMA has the authority to implement local regulations even though civil law enforcement falls under the

jurisdiction of the Royal Thai Police. Due to Bangkok's importance, every significant development project in and around the BMA has to be approved by the national cabinet. These developments ostensibly have to harmonise with the BMR regional plan.

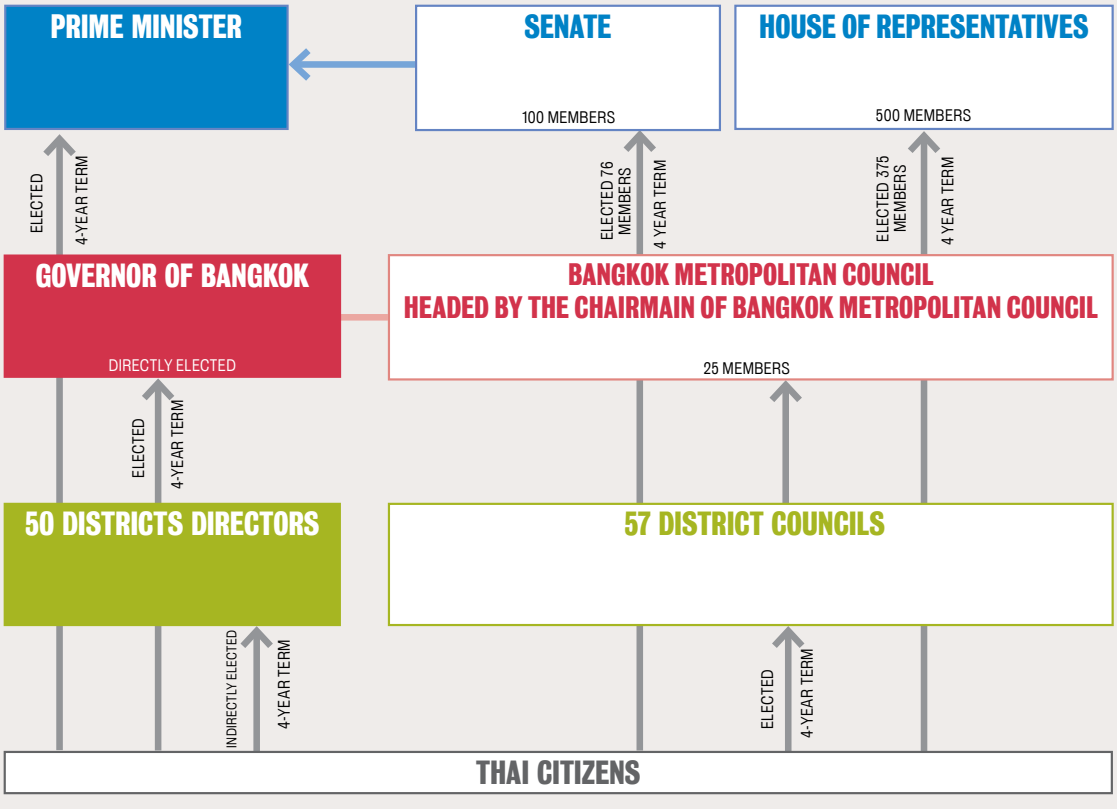
Due to the pace of urban sprawl over the past few decades, the BMA has sought to tackle rising problems of commute times, pollution and deteriorating air quality. Since several services are provided jointly with other agencies, sometimes institutional conflicts can arise. For a long time, the many agencies in the BMA and those from surrounding provinces have not always co-operated effectively. This has produced negative consequences particularly for urban planning and land zoning (Marks, 2015; Phanthuwongpakdee, 2016).

As mentioned above, Bangkok functions differently from Yangon in some key ways. Apart from being the capital and largest city of Thailand, the whole of Bangkok is *de facto* an urban area, while Yangon currently has a mixture of urban and rural areas.

Bangkok's political representation is also different from Yangon's. The governor of Bangkok is the head of the local government and also the chief executive of the Bangkok Metropolitan Authority (BMA). The governor is elected to a renewable term of four years. Together with four appointed deputies, the governor forms the executive body that implements policies through the BMA civil service, headed by the permanent secretary for the BMA.

In separate elections, each district elects one or more city councillors who form the Bangkok Metropolitan Council. The Council is the BMA's legislative body and has power over municipal ordinances of the city's budget. The Council is headed by the Chairman of the Bangkok Metropolitan Council. Each district is managed by a district director appointed by the governor (indirectly elected by the people). District councils, elected to four-year terms, serve as advisory bodies to their respective district directors.

Figure 3.34: Bangkok political representation



Source: LSE Cities 2016

Key findings

◆ Urban governance structures differ significantly between Yangon and Bangkok. In Bangkok, the responsibilities of the city and regional government are combined within a single political entity (BMA), while Yangon has two distinct political levels for the city and the region respectively (Yangon Regional Government and YCDC).

◆ In terms of governance powers, the YCDC and the BMA have comparable responsibilities that include city planning and land use. The key difference is that Bangkok is simultaneously regarded as both a city and also an entity similar to a province, explaining, for example, why transport in Bangkok is entirely managed by the BMA, while in Yangon it is shared between municipal and regional authorities.

◆ The lack of collaboration between municipal and city services in Bangkok has had negative consequences for urban planning and land zoning. Poor coordination has also led to ineffective management in times of emergency. In Yangon, the problem seems to be more that there is not enough clarity on the division of responsibilities between the city and regional government.

Future research questions

◆ What are the challenges, opportunities and limitations related to the development of the Greater Yangon area as a new administrative entity?

◆ How can a clear urban governance structure and division of responsibilities, which includes both horizontal and vertical coordination between different institutional actors, be achieved?

4

YANGON AND BANGKOK IN A GLOBAL URBAN CONTEXT

4 YANGON AND BANGKOK IN A GLOBAL URBAN CONTEXT

While for the purposes of this report the primary comparison has been between Yangon and Bangkok, this section aims to demonstrate how the approach can be expanded to include a global overview of cities, situating Yangon in a wider international context. To illustrate this, the following section looks at a selection of key performance indicators for Yangon and Bangkok and compares them to 12 cities that were previously the subject of LSE Cities research, part of a worldwide investigation into the future of cities called the Urban Age Programme.

Behind the statistics of global city growth lie very different patterns of urbanisation with diverse spatial, social and economic characteristics that dramatically affect the urban experience. In addition to standard measures of population growth and the economy, LSE Cities has assembled spatial, social, transport and environmental data from a range of official sources, providing an overview of how the selected cities compare to each other. The graphic overview of these results (Table 4.1) highlights some striking differences, but also some unexpected similarities.

This form of wider comparative international contextualisation can help uncover some of the urban realities that can remain hidden behind fairly abstract performance indicators.

4.1 Population and density

Yangon and Bangkok have fairly similar city populations (5.2 and 5.7 million respectively), meaning both are on the smaller side when compared to most cities on this list, particularly some of the other Asian metropolises such as Shanghai (24.2 million) or Delhi (16.3 million). Looking at their wider metropolitan populations, Bangkok is significantly larger, although this may be partially due to differing methodologies when estimating the wider urban population. For the purpose of this international comparison, standardised international data sources were used wherever possible and reveal some startling discrepancies between population figures from different sources. The official United Nations World Urbanisation Prospects Database reports the Yangon urban agglomeration as having a population of 4.7 million – lower even than the official statistics for Yangon City, and certainly much lower than the JICA estimate of the 6.5 million inhabitants thought to live in Greater Yangon. The same is true for Bangkok where the UN reports an urban agglomeration population of about 9 million, compared to other official estimates that put the Bangkok Metropolitan area at nearly 15 million (Figure 2.6). This highlights the difficulties of comparative data analysis across indicators drawn from different sources and based on different methods of data collection. According to UN population estimates, Yangon will grow by 13 people per hour between 2014 and 2030, while Bangkok's population will increase by 16 people per hour – much faster than mature cities like Hong Kong and Berlin but not quite as rapidly as large young cities like Shanghai or Delhi, where predictions place growth at a massive 53 and 79 people per hour over the same period.

Looking at the overall size of the administrative city reveals a wide range of urban footprints and corresponding population densities. While the 12.5 million inhabitants of Mumbai live on just 479 km^2, leading to an average density of 34,656 people/km^2, Berlin's 3.4 million residents are spread across 891 km^2, making it the city with the lowest average density at just 4,211 people/km^2. Density is calculated here using the ambient population over a 24-hour period within the built-up area of the city. This explains why Bangkok, although twice the size of Yangon in terms of total area, is only slightly denser. Based on these calculations, Yangon's density (6,275 people/km^2) is similar to London's (6,456 people/km^2) and Bangkok's (8,695 people/km^2) is comparable to that of Mexico City (9,406 people/km^2).

Table 4.1: International city comparison: How Yangon and Bangkok compare

Source: LSE Cities 2016. Graphic based on multiple sources

	Current population in the administrative city (millions)	Current population in the urban agglomeration (millions)	Administrative city area (km²)	Average density of built-up area (people/km²)	Projected growth of urban agglomeration to 2030 (people per hour)	GDP per capita in urban area ($, PPP)	Average annual GDP growth in urban area to 2030 (%)
YANGON	5.2 2014	4.7 2014	784 GIS	8,695 GIS	13 2014	2,278 2012	8.0 2012
BANGKOK	5.7 2015	9.0 2014	1,568 GIS	6,275 GIS	16 2014	19,705 2014	4.4 2012
LONDON	8.5 2014	12.3 2014	1,595 GIS	6,456 GIS	9 2014	57,157 2014	2.8 2012
BERLIN	3.4 2012	5.0 2014	891 GIS	4,211 GIS	1 2014	36,259 2014	1.3 2012
ISTANBUL	14.2 2013	14.2 2014	5,469 GIS	10,582 GIS	19 2014	24,867 2014	4.8 2012
NEW YORK	8.5 2014	18.6 2014	787 GIS	11,531 GIS	10 2014	69,915 2014	2.9 2012
MEXICO CITY	8.9 2010	20.8 2014	1,483 GIS	9,406 GIS	22 2014	19,239 2014	2.8 2012
RIO DE JANEIRO	6.5 2014	12.8 2014	1,225 GIS	11,001 GIS	10 2014	14,176 2014	2.4 2012
SÃO PAULO	11.9 2014	20.8 2014	1,523 GIS	12,656 GIS	18 2014	20,650 2014	3.5 2012
JOHANNESBURG	4.4 2011	9.2 2014	1,643 GIS	2,744 GIS	2 2014	16,370 2014	4.2 2012
MUMBAI	12.5 2011	20.7 2014	479 GIS	34,656 GIS	51 2014	7,005 2014	6.7 2012
DELHI	16.3 2011	25.0 2014	1,465 GIS	19,698 GIS	79 2014	12,747 2014	7.0 2012
HONG KONG	7.3 2014	7.3 2014	1,098 GIS	14,471 GIS	4 2014	57,244 2014	3.0 2012
SHANGHAI	24.2 2013	23.0 2014	6,249 GIS	6,706 GIS	53 2014	24,065 2014	6.8 2012

Percentage of country's GDP produced by the urban area	City Income inequality (GINI Index) UN international alert level: 0.40	Population under 20 (%)	Average life expectancy (years)	Murder rate (homicides per 100,000 inhabitants)	Percentage of daily trips made by public transport	Percentage of daily trips made by walking and cycling	Car ownership rate (per 1,000 inhabitants)	Annual mean PM10 levels (ug/m³) WHO guideline level: 20 µg/m³
27.5 2016	N/A	33.9 2014	66.0 2015	2.9 2007	42.0 2013	52.4 2013	38 2013	73 2013
29.1 2016	0.39 2013	23.6 2015	79.5 2015	2.7 2010	46.1 2011	14.0 2011	371 2014	38 2012
33.1 2014	0.34 2010	24.5 2011	82.1 2014	1.1 2014	29.3 2014	32.4 2014	303 2013	22 2011
4.3 2014	0.29 2010	16.7 2011	77.3 2011	1.0 2011	26.2 2013	43.5 2013	336 2012	24 2011
23.9 2014	0.39 2010	31.3 2011	77.2 2013	4.7 2008	25.6 2011	48.1 2011	145 2012	56 2013
8.1 2014	0.55 2012	24.4 2010	81.1 2012	5.1 2012	60.1 COMMUTING ONLY 2014	11.4 COMMUTING ONLY 2014	215 2013	23 2012
19.0 2014	0.44 2010	34.6 2010	76.1 2014	8.8 2011	50.0 2011	31.0 2011	294 2011	93 2011
5.4 2014	0.60 2010	26.7 2010	74.1 2010	23.1 2011	43.7 2012	31.8 2012	310 2011	67 2010
13.2 2014	0.60 2010	29.5 2010	76.0 2010	14.2 2012	37.8 2012	28.7 2012	465 2011	35 2012
11.8 2014	0.63 2009	30.3 2011	60.5 GAUTENG PROVINCE 2011	24.3 GAUTENG PROVINCE 2011	39.4 2013	27.6 2013	181 2009	98 2011
2.0 2014	0.45 MAHARASHTRA STATE - URBAN AREAS 2009	30.9 2011	56.8 2007	1.2 2010	54.0 2013	33.0 2013	64 2015	136 2010
4.0 2014	0.60 2012	37.1 2011	72.0 2010	2.7 2012	49.0 2013	32.0 2013	140 2011	286 2010
N/A 2014	0.54 2011	17.6 2011	84.0 2014	0.4 2012	75.5 COMMUTING ONLY 2011	11.6 COMMUTING ONLY 2011	68 2014	45 2010
3.3 2014	0.32 2005	16.0 2005	82.5 2013	0.7 2013	25.2 2009	39.7 2009	69 2013	84 2013

Measurement methodologies and calculations may vary and are not always directly comparable between cities. See reference list and lsecities.net/urbanage for data source references.

4.2 Economy and society

When it comes to economic performance, Bangkok finds itself right in the middle of the pack, with a per capita GDP of US$19,704, similar to that of Mexico City, Istanbul, Sao Paulo, Johannesburg or Shanghai. By contrast, Yangon's per capita GDP is just US$ 2,278. (It should be noted that Brookings Metro Monitor, from which the comparative GDP figures of the other cities are derived, did not have data on Yangon. The value was derived instead from a source that may be using slightly different accounting methodologies.) While Yangon may currently have the lowest per capita GDP on this list, it is also the city where the economy is projected to grow the fastest, at a remarkable rate of 8% per year up to 2030. This eclipses even other rapidly growing cities such as Delhi, Mumbai or Shanghai. At 4.4%, Bangkok's economy is growing at only half the speed of Yangon's, but still much faster than mature economies like London, Berlin or New York. While strong economic growth can be an important driver of urban development, it can also exacerbate income inequalities by widening the gap between the poorest and the wealthiest urban dwellers. London and Berlin boast some of the lowest levels of income inequality as indicated by the Gini coefficient – a measure of income distribution where the higher number represents greater inequality. By contrast, Delhi, Johannesburg, Rio and Sao Paulo are facing Gini coefficients of 0.6 and higher, demonstrating that their strong economic growth has created a more unequal urban society. Income inequality is also on the rise in Bangkok, which already has a Gini coefficient of 0.39, with some estimates even placing it as high as 0.46. There is no Gini data available for Yangon, although the World Bank has calculated an estimate of the Gini for urban areas in Myanmar of 0.36, which is under the UN international alert level of 0.4.

Another key factor in determining future urban economic growth is the number of young people living in the city. While mature economies tend to have a fairly old population, it is in the rapidly expanding cities of Asia, Africa and Latin America – where more than a third of the population is below the age of 20 – that the most change is likely to take place. In Yangon, 33.1% of the population is below 20, making it one of the youngest cities on this list after Delhi and Mexico City. By contrast, only 23.6% of Bangkok's population is below 20, lower than the young population of London or New York. Both Yangon and Bangkok are fairly safe cities, at least when the official crime statistics related to homicides are considered. Yangon has an average of 2.9 homicides per 100,000 inhabitants, compared to 2.7 in Bangkok. This is higher than in Hong Kong (0.4) or London (1.1) but much lower than in cities like Johannesburg (24.3) or Rio de Janeiro (23.1) that have a notoriously high level of crime.

4.3 Transport and air pollution

Figures for car ownership and mode share also vary widely, highlighting the cities' diverse transport infrastructures. Yangon has by far the lowest rates of car ownership at just 38 per 1,000 inhabitants, followed by Shanghai, Mumbai and Hong Kong (all with nearly double the number of cars per 1,000 inhabitants). Establishing the exact rate of car ownership for Bangkok is very difficult as vehicle registration figures are distorted by the fact that many people across Thailand register their cars in the capital because a Bangkok licence plate is a sign of prestige. While the motorisation rate for the BMR as a whole is 371 cars per 1,000 inhabitants, this rises to 667 per 1,000 when only Bangkok City is concerned, while the average for the provinces surrounding Bangkok is just 35 per 1,000. This would mean that only Sao Paulo has higher car ownership, with 465 per 1,000 inhabitants.

Using mode share as a proxy for motorisation allows for a slightly clearer perspective on car use in Bangkok, where a full 40% of trips are made by private transport. While this also includes motorised two-wheelers, it is still staggeringly high compared to Yangon, where just 5.5% of trips rely on private transport, and a remarkable 52.4% of trips are still completed on foot or bicycle, the highest rate out of any of the cities profiled. Public transport use is similar in both Yangon and Bangkok at 42% and 46% of trips respectively, higher than in London, Berlin, Istanbul or Shanghai but lower than in New York, Mexico City, Mumbai or even Hong Kong, where 75% of commuter trips are completed using public transport. Expanding public transport provision and continuing to invest in urban infrastructure that allows for walking and cycling will be essential to ensuring both cities do not become locked into a car-dependent model of urban growth. It must also be noted that high rates of public transport provision do not indicate the quality or efficiency of those systems.

[34] Yangon PM10 level data was sampled only during one month (November 2012) at one place (Traders Hotel). The only details given by the JICA Study team are that the data was given by 'the Environment and Social Collection Survey conducted for the Project for the Strategic Urban Development Plan of the Greater Yangon'.

Investing in public transport, walking and cycling not only has major benefits in terms of urban accessibility, it can also prevent dangerous levels of air pollution in cities. Transport is not the only source of air pollution, but it is often a major factor, especially during peak hours along major thoroughfares. At 73 μg/m^3, Yangon's PM10 level[34] is almost twice that of Bangkok's (likely due to older vehicles and continued high rates of manufacturing industries within the city boundaries), but still low compared to Mumbai and Delhi, which have the most polluted air of any cities on this list (136μg/m^3 and 286 μg/m^3). All cities on this list exceed the WHO's recommended PM10 standard of 20 μg/m^3.

5

CONCLUSIONS

5 CONCLUSIONS

As this report has highlighted, there are many lessons Yangon can learn from its regional neighbour Bangkok, although it is also important to acknowledge that every city has unique conditions that require targeted local solutions, and there are no one-size-fits-all urban development policies. It is hoped that this report will have contributed to the creation of a comparative information base that can help inform future research on strategic spatial development in Yangon, and that it will complement ongoing efforts by local government and other stakeholders working to develop evidence-based urban development policies.

Below is a synthesis of the key findings from the two stages of this initial investigation, as well as a list of research questions that emerged from this work and that may fruitfully be used in the ongoing dialogue about possible future research.

Findings from Stage 1: Data availability

The data collection phase of this project highlighted that, while there is some good data available, both cities lack some of the key indicators and spatial data essential for a more comprehensive urban growth analysis. There were also some limitations related to the incompatibility of data collection methodologies that made it impossible to adequately compare certain key urban development indicators. For this reason, the report does not touch upon some important issues such as housing, health, land use planning or industrial and environmental policy. These are all areas that are certainly of great importance to Yangon, but not enough comparable data was available for the purposes of this report.

The research also highlighted that much of the data, especially in the case of Yangon, is only available from non-local sources, such as international organisations and foreign development agencies. There were also some instances where it either was unclear what methodologies had been used to collect the data, or where the data sources were not deemed reliable enough or were too outdated to be used for the purposes of this analysis, limiting the themes that could be visualised. In order to produce meaningful policy recommendations that are tailored to specific local conditions, access to accurate and up-to-date data is an essential precondition. Greater coordination between data providers and different government agencies is needed to establish clear standards for how data is collected, organised and presented to ensure a higher level of usability and avoid contradictory data that undermines research efforts.

In future, and building on the overview table of data availability produced for this report (Annex 1), a more detailed gap analysis could be produced to assess the quality and reliability of an even wider range of indicators, and to make specific suggestions for best practices in data collection and presentation.

Findings from Stage 2: Data visualisation and description

Despite the limitations related to data availability, the comparative analysis revealed some interesting parallels between Bangkok and Yangon and highlighted opportunity areas that warrant future research to enable the development of specific policy recommendations.

Transport in particular seems to be a real opportunity – Bangkok provides a good lesson of 'too little, too late' and also demonstrates how a lack of investment in public transport can have undesirable impacts on urban form, leading to uncontrolled sprawl and suburban enclaves. Yangon, in contrast, still has a remarkably low motorisation rate and a rare chance to act now to avoid becoming locked into a car-dependent development pathway by expanding public transport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infrastructure and planning new residential and employment centres that ensure high levels of accessibility and connectivity. The specifics of how transport planning could support the growth of the city, limit congestion and improve quality of life are one important area where more research is required.

In terms of governance, there is an opportunity for Yangon to establish a metropolitan area (Greater Yangon) to be able to plan and manage development across the entire urban area, following the model of the BMR. Yet, as the experience of Bangkok has highlighted, merely designating a metropolitan area is in itself not a sufficient step to guarantee effective urban growth. It also requires a strategic plan that is complemented by a clear division of responsibilities and sustained coordination between all levels of government and other local, regional and national stakeholders. More research to better understand the urban governance challenges Yangon faces – and how best to address these – would be of great value.

The political, social, economic and spatial changes Yangon is currently experiencing are unprecedented, and present a formidable challenge for urban planning. If not carefully managed, this rapid growth has the potential to lead to urban sprawl, traffic congestion and associated productivity losses, environmental degradation, an increase in inequality and urban poverty and an overall loss in quality of life for all residents. Rising housing prices and increasing congestion in recent years are already beginning to highlight this. It is clear that thoughtful and evidence-based strategic planning now will prevent irreversible dysfunction in the future.

While the challenges facing the city are significant, there are also considerable opportunities to use the current momentum to upgrade urban infrastructure, improve service delivery and plan for a modern, sustainable and equitable urban future. If Yangon can find a way to manage rapid population growth and economic development while protecting existing assets so as not to erode the character of the city and ensure continued high liveability for all, it has the potential to become a model for other cities in Myanmar and the wider region.

6

ANNEX

6 ANNEX

6.1 Data availability table

The table below is the result of the data availability assessment undertaken in the first phase of the project. The data listed in the table was selected due to its importance to the analysis of urban spatial development of Yangon and Bangkok.

The resulting comparative table shows in the first columns some of the most important characteristics of the data, such as year(s) of reference and scale. The last columns are LSE Cities' main contribution to a comparative information base for both cities. In these columns, the table indicates if that particular dataset/indicator is available and, when possible, includes the data location/source and type (for example, international or local) and an assessment of how reliable the data is. Reliability is deemed higher when the dataset is produced institutionally within any of the countries/cities, in reputable international agencies or through peer review processes (e.g. Open Street Map).

This table demonstrates that there is still an extensive list of unavailable data essential to a more comprehensive urban growth analysis, but also that there is a wide variety of non-local and low-reliability data sources for even the existing data. The mix of data, years, scale and sources clearly exhibit some of the limitations to its use, as discussed in Section 2.3.

Maps and imagery

Land Use & Urban form	Format	City	Years	Scale	Data source	Source type	Reliability
Land topography (DEM)	Spatial	Yangon	2014 & 2016	National/ Regional/City	NASA – DIVA GIS – BBIKE	International	Medium
		Bangkok	2016	National/ Regional/City	Diva GIS	International	High
Principal land cover	Spatial & graphical	Yangon	1991–1992	City	Myanmar Information Management Unit	Local	Medium
		Bangkok	2016	City	Diva GIS	International	High
Location of major development sites	Graphical	Yangon	2013	City	JICA Final Report I Current Conditions	International	High
		Bangkok	2013	Regional/City	Bangkok City Planning Department	Local	High
Land use classification	Graphical	Yangon	2013	City	JICA Final Report I Current Conditions – BBIKE	International	High
		Bangkok	2013	Regional/City	Bangkok City Planning Department	Local	Medium
Open space classification	Spatial & graphical	Yangon	2013	City	JICA Final Report I Current Conditions	International	Medium
		Bangkok	2015	Regional/City	Openstreetmap	International	Medium
Urban growth	Spatial	Yangon	NA		-	-	-
		Bangkok	1850–2015	Regional/City	Lincoln Institute	International	High
Empty land with the potential for growth	Spatial	Yangon	NA	-	-	-	-
		Bangkok	2016	National/ Regional/City	BBIKE	International	Low
Building characteristics and building use	Spatial	Yangon	2016	National/ Regional/City	BBIKE	International	Low
		Bangkok	2016	Regional/City/ Sub-city	Openstreetmap	International	Medium
Strategic facilities	Spatial	Yangon	NA	-	-	-	-
		Bangkok	2015	City	Bangkok GIS	Local	High
Parks and playgrounds	Numerical	Yangon	2013	City	JICA	International	High
		Bangkok	2015	City	Bangkok Environment Department	Local	High

Transport infrastructure	Format	City	Years	Scale	Data source	Source type	Reliability
Motorways and strategic roads	Spatial & graphical	Yangon	2013	City	DIVA GIS & JICA	International	Medium
	Spatial	Bangkok	2014	Regional/City	Bangkok Metropolitan Administration & Openstreetmap	Local & International	High
Local and neighbourhood roads	Graphical	Yangon	2013	City	JICA	International	Low
	Spatial	Bangkok	2015	Regional/City	Bangkok Metropolitan Administration & Openstreetmap	Local & International	High
BRT and bus networks	Numerical & graphical	Yangon	2013	City	JICA	International	Low
	Spatial	Bangkok	2015	Regional/City	Bangkok Metropolitan Administration & Openstreetmap	Local & International	High
Light rail networks	Spatial	Yangon	2016	City	Openstreetmap	International	High
		Bangkok	2015	Regional/City	Bangkok Metropolitan Administration & Openstreetmap	Local & International	High
Rail networks	Spatial & graphical	Yangon	2013	City	JICA	International	High
	Spatial	Bangkok	2015	Regional/City	Openstreetmap	International	High
Ferry networks	Graphical	Yangon	2013	City	JICA	International	High
	Spatial	Bangkok	2015	City	Bangkok GIS & Openstreetmap	Local & International	High
Parking on road or dedicated parking area	Graphical	Yangon	2013	City	JICA	International	High
	Spatial	Bangkok	2015	City	Bangkok GIS	Local	High
Bicycle lanes	Spatial	Yangon	NA	-	-	-	-
		Bangkok	2015	City	Bangkok GIS	Local	High

Administrative and statistical units	Format	City	Years	Scale	Data source	Source type	Reliability
Administrative boundaries	Spatial & graphical	Yangon	2016	City/Sub-city	YCDC, MIMU & JICA	National & International	High
	Spatial	Bangkok	2015	Regional/City/ District/Sub-district	Bangkok GIS & ArcGIS	Local & International	High
Lowest available census	Spatial & graphical	Yangon	2016	Sub-city/ward	YCDC	Local	High
	Spatial	Bangkok	2015	Regional/City/ District/Sub-district	National Statistic Office of Thailand	National	High

Imagery	Format	City	Years	Scale	Data source	Source type	Reliability
Aerial photography / satellite imagery	Graphical	Yangon	1980s onwards	National/ Regional/City/ local	Google Earth & USGS Earth Explorer	International	High
		Bangkok	1980s onwards	National/ Regional/City/ Local	Google Earth & USGS Earth Explorer	International	High
Photography of key city areas and transport infrastructure	Graphical	Yangon	Numerous	City	Flickr, Picasa, Instagram, etc	International	High
		Bangkok	Numerous	City	Flickr, Picasa, Instagram, etc	International	High

Indicators

Spatial development

Land use	Format	City	Years	Scale	Data source	Source type	Reliability
Land ownership share (public/ private/informal)	Numerical	Yangon	2013	City	JICA	International	Low
		Bangkok	NA	-	-	-	-
Principal land cover ratio	Numerical	Yangon	1991–1992	City	MIMU	National	Medium
		Bangkok	NA	-	-	-	-
Ration of open space classification	Numerical	Yangon	2013	City	JICA	International	Medium
		Bangkok	NA	-	-	-	-
Number of strategic facilities	Numerical	Yangon	NA	-	-	-	-
		Bangkok	2015	City	Bangkok Metropolitan Administation	Local	High
Cultural heritage / protected areas	Numerical	Yangon	2012	City	SUDP	International	Medium
		Bangkok	2014	City	Bangkok Metropolitan Administation	Local	Medium
Religious sites	Numerical	Yangon	2012	City	SUDP	International	Medium
		Bangkok	NA	-	-	-	-
Shopping malls / markets	Numerical	Yangon	2012	City	Myanmar Travel Information in YUTRA	National & International	Medium
		Bangkok	2014	City	Bangkok Metropolitan Administation	Local	High
Land value	Numerical	Yangon	2013	City	JICA	International	Medium
		Bangkok	NA	-	-	-	-

Transport infrastructure	Format	City	Years	Scale	Data source	Source type	Reliability
Circulation space ratio	Numerical	Yangon	NA	-	-	-	-
		Bangkok	NA	-	-	-	-
Road surface ratio	Numerical	Yangon	2013	City	JICA	International	High
		Bangkok	NA	-	-	-	-
Parking surface ratio	Numerical	Yangon	NA	-	-	-	-
		Bangkok	NA	-	-	-	-
Pavement/ pedestrianised space ratio	NA	Yangon	NA	-	-	-	-
		Bangkok	NA	-	-	-	-
Micro accessibility	Numerical	Yangon	NA	-	-	-	-
		Bangkok	NA	-	-	-	-

Social patterns and activity

Socio-economics	Format	City	Years	Scale	Data source	Source type	Reliability
City population	Numerical	Yangon	2014/1983/1973/1931/1921/1911/1901/1891/1882/1872	City/Sub-city/Ward	Department of Human Settlements and Housing Development prepared by MIMU	National & International	High
		Bangkok	1994–2015	City/Sub-city	Department of Provincial Administration	National	High
Regional population	Numerical	Yangon	2014	Regional	Department of Human Settlements and Housing Development prepared by MIMU	National & International	High
		Bangkok	1994–2016	Regional	Department of Provincial Administration	National	High
Metropolitan population	Numerical	Yangon	2014	Metropolitan	JICA	International	High
		Bangkok	2008–2014	Metropolitan	Bangkok Metropolitan Administration & Official Statistics Registration Systems	Local & National	High
National population	Numerical	Yangon	2014/1983/1973/1941/1931/1921/1911/1901/1891/1881	National	Department of Population. Ministry of Labour, Immigration and Population	National	High
		Bangkok	2000–2014	National	Official Statistics Registration Systems	National	High
Ambient population	Spatial & Numerical	Yangon	2010	National/Regional/City/Sub-city/km^2	Landscan	International	High/Medium
		Bangkok	2010	National/Regional/City/Sub-city/km^3	Landscan	International	High/Medium
Population age structure	Numerical	Yangon	2014	City	Department of Human Settlements and Housing Development prepared by MIMU	National	High
		Bangkok	1994–2015	Regional/City/Sub-city	Department of Provincial Administration	National	High
Life expectancy	Numerical	Yangon	2004–2013	National	Central Statistical Organisation	National	Medium
		Bangkok	2015–2020	City	Population Projections for Thailand 2000–2020 National Economic and Social Development Board	National	High
Size of household	Numerical	Yangon	2014	City	Department of Human Settlements and Housing Development prepared by MIMU	National	High
		Bangkok	2000, 2010	City	National Statistic Office of Thailand	National	High
House ownership	Numerical	Yangon	2014	City	Department of Human Settlements and Housing Development prepared by MIMU	National	High
		Bangkok	2000, 2010	City	National Statistic Office of Thailand	National	High
Sample household/type of structure	Numerical	Yangon	2007–2016	City/Sub-city/Ward	Housing Journals collected by David	National	High
		Bangkok	NA	-	-	-	-
Main households/material for housing	Numerical	Yangon	2014	City	Department of Human Settlements and Housing Development prepared by MIMU	National	High
		Bangkok	NA	-	-		-

Social patterns and activity

Socio-economics	Format	City	Years	Scale	Data source	Source type	Reliability
House price	Numerical	Yangon	2007–2016	City/Sub-city/Ward	Housing Journals collected by David	National	High
		Bangkok	1991–2010	City	Asia-Pacific Housing Journal	International	Low
Building permits applied / approved by new build and extention	Numerical	Yangon	1985–2014	City	YCDC	Local	Medium
		Bangkok	NA	-	-	-	-
Location and number of jobs	Spatial & Numerical	Yangon	2014	City	Department of Human Settlements and Housing Development prepared by MIMU	National	Low
		Bangkok	2010–2013	City	Bangkok Metropolitan Administration	Local	Medium
Employment by sector	Numerical	Yangon	2013	City	Department of Human Settlements and Housing Development prepared by MIMU		High

Tourism	Format	City	Years	Scale	Data source	Source type	Reliability
Number of tourists	Numerical	Yangon	2015	National/City	Myanmar Ministry of Hotels and Tourism	National	High
		Bangkok	2009–2015	National/City	Department of Tourism, Ministry of Tourism and Sports	National	High
Number of tourist accommodations	Numerical	Yangon	2015	National/City	Myanmar Ministry of Hotels and Tourism	National	High
		Bangkok	2014–2016	City	Tourism Authority of Thailand	National	High

Mobility	Format	City	Years	Scale	Data source	Source type	Reliability
Modal share	Numerical	Yangon	2013	City	JICA & YCDC Data through Myanmar Statistical Information Service	National & International	High
		Bangkok	2013	City	Office of Transport and Traffic Policy and Planning	National	High
Origin-destination data	Numerical	Yangon	NA	-	-	-	-
		Bangkok	NA	-	-	-	-
Motorisation rate	Numerical	Yangon	2013 & 2015	City	Kojima and Futose & JICA	International	Low
		Bangkok	NA	-	-	-	-
Vehicle registration data	Numerical	Yangon	1990–2013	City	Kojima et al.	International	Medium
		Bangkok	1989–2015	Regional/City	Department of Land Transport	National	High
Passenger kilometres travelled by mode	Numerical	Yangon	2013 & 1990–2011	City	JICA & YCDC Data Through Myanmar Statistical Information Service	International	Medium
		Bangkok	NA	-	-	-	-
Congestion levels	Graphical	Yangon	2013	City	JICA	International	Medium
		Bangkok	NA	-	-	-	-
Average commuting times	Graphical	Yangon	2013	City	JICA	International	Low
		Bangkok	NA	-	-	-	-
Overall commuting time	Numerical	Yangon	NA	-	-	-	-
		Bangkok	NA	-	-	-	-
Annual road fatalities	Numerical	Yangon	2008–2015	City	Kojima et al., JICA and Traffic Rule Enforcement Supervisory Committee	International	High
		Bangkok	2015	City	Bangkok Traffic Office	Local	High

Environment	Format	City	Years	Scale	Data source	Source type	Reliability
Annual CO_2 emission	Numerical	Yangon	NA	-	-	-	-
		Bangkok	2016	Regional/City	Pollution Control Department	National	High
Air pollution disaggregated by main sectors	Numerical	Yangon	2012	City	JICA	International	Low
		Bangkok	2016	Regional/City	Pollution Control Department	National	High
Noise disaggregated	Numerical	Yangon	2012	City	JICA	International	Low
		Bangkok	2014	Regional/City	Pollution Control Department	National	High
Main source of drinking water	Numerical	Yangon	2014	City	Department of Human Settlements and Housing Development prepared by MIMU	National	High
		Bangkok	2010	City	National Statistic Office of Thailand	National	High
Main source of non-drinking water	Numerical	Yangon	2014	City	Department of Human Settlements and Housing Development prepared by MIMU	National	High
		Bangkok	2011	City	National Statistic Office of Thailand	National	High
Main source of energy of lighting	Numerical	Yangon	2014	City	Department of Human Settlements and Housing Development prepared by MIMU	National	High
		Bangkok	2012	City	National Statistic Office of Thailand	National	High

The information in these table was constrained by the time available for this research project and is therefore not exhaustive.

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