A Work Process Analysis for Office Facility Management Standards in Upstream Oil and Gas Sector Republic of Indonesia

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von
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Foreword of the Supervisor

The end of the exploitation of fossil energy sources has been decided politically and socially. The real implementation of this goal will take several more years, during which both upstream and downstream oil and gas companies will have to continue to function. In the main, many of these companies are in the process of developing their future viability, while at the same time upgrading current processes and their resources for sustainability, efficiency and effectiveness. Such measures are the result of the impact of several influences, such as the volatility of raw material prices or changes in regulations for occupational health and safety and environmental protection.
The real estate portfolio is a relevant factor both in the corporate sector and in the area of public administration, which has savings potential in terms of emissions and in terms of the economical use of funds. On the initiative of companies in the upstream oil and gas industry of the Republic of Indonesia, it should have been investigated, how the existing work systems in the administration, coupled with adequate facility management of the occupied office buildings, can be upgraded in order to improve the productivity of the system and at the same time to reduce operating costs. This question is the subject of the research work of Ms. Ashleika Adelea M.Sc., the results of which are documented in the present doctoral thesis "A Work Process Analysis for Office Facility Management in Upstream Oil and Gas Sector Republic of Indonesia".
The research work presented by Ms. Adelea is an interesting and valuable contribution to the research complex of real estate management, and through the precise investigation of a state institution also to the field of public real estate management. The doctoral thesis is based on an analysis of the predominantly English-language literature, on data collection in Indonesia and on combination of different methods for the evaluation of work systems. The special value of this work lies in the status of work systems and work practices during the COVID-19 pandemic as well as in the comparison with the time before. The research work also has strong practical relevance, as the interim results have already been successfully used in the upstream oil and gas sector in Indonesia. This proves the viability of the efficiency and effectiveness approaches developed. It has to be taken into account that the research work was done in the times of the COVID-19 pandemic. Ms. Adelea had to conduct her research under difficult conditions, including lock-down phases. Despite these difficulties, the research project was brought to a successful finish.

I congratulate Ms. Ashleika Adelea on her doctoral thesis and wish her all the best for the future.

Darmstadt, in July 2022 Univ.-Prof. Dr.-Ing. Christoph Motzko

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This research project was conducted during my scientific work as a doctoral candidate of the Institute of Construction Technologies and Management in the Technical University of Darmstadt, Germany. I would not be able to finish this study without support system and accordingly I would like to express my gratitude through these written words.

Firstly, I am genuinely grateful to be given the opportunity to work closely with a noble Professor, Univ.-Prof. Dr.-Ing. Christoph Motzko, as the First-Reference of this research who has provided me the great inspirations of scientific knowledge. Highly appreciation is addressed for his timely dedication, scholar supervision and impressive feedback on my work. I also realise that this research processes were not all smooth, however, words are insufficient to express my respect for his patience and moral support that he has shown me as a Doctor-Father in which encourage me to be able to finish this task.

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Finally, I would like to heartfully grateful on the supports and cares that my family and friends have showered me. My dearly mother and father that have patiently granted me to live 11,000 km away from home for several years to pursue a higher education. I thankful for continuous prayers they have sent me and reminding me to always remember on my origin roots. My cherished husband, Ocky Yudho Pratomo, for the unstoppable supports and understanding no matter how difficult the circumstances are. A little family of my sister that always boost me with joyful spirit. My in-laws that give their biggest kindheartedness during my time of pursuing doctoral degree. Special gratefulness to Tiur Henny Monica that assists me during difficult time of this study. Last but not least, I thank all of my bestfriends who intensely believe in me that I am able to finish this tough work.

Darmstadt, in July 2022 Ashleika Adelea M.Sc

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List of Abbreviations

A	Actualisation
AA	Ancillary Activity (*Nebentätigkeit*)
BOMA	Building Owners and Managers Association
BCO	British Council for Offices
BP	BP Berau Ltd.
Capex	Capital Expenditure
CABE	Commission of Architecture & Built Environment
CBRE	Coldwell Banker Richard Ellis
CCTV	Closed-Circuit Television
D	Disturbance Related Activity Interruption (*Ablaufbedingtes Unterbechung*)
DIN	Deutsche Institut für Normung
E	Expected
e.g.	*exempli gratia* (for example)
Eni	Eni Indonesia Ltd.
FM	Facility Management
GEFMA	German Facility Management Association
GL	Germanischer Llyoid
GS	General Services
GA	General Affair
HR	Human Resources
HSSE	Healthy, Safety, Security, Environment
HB	Halliburton
KEI	Kangen Energy Indonesia
i.e.	*id est* (which is)
IWFM	Institute of Workplace and Facilities Management
IT	Information Technology
JLL	Jones Lang LaSalle
JLL G	Jones Lang LaSalle German
JLL I	Jones Lang LaSalle Indonesia
MA	Main Activity (*Haupttätigkeit*)
MEFMA	Middle East Facility Management Association
MEPI	Medco Energi Persada Indonesia
MNC	Multi National Company
NHS	National Health Service

OFM	Office Facility Management
OG	Oil and Gas
ORBIT	Organisation, Buildings and Information Technology
OS	OneSubsea
OPEC	Organization of Petroleum Exporting Countries
Opex	Operational Expenditure
P	Process Related Activity Interruption (*Ablaufbedingtes Unterbechung*)
PFI	Private Finance Initiative
PI	Personal Interruption (*Persönlichbedingtes Unterbrechen*)
PSC	Production Sharing Contract
PSCs	Production Sharing Contractor
PwC	PricewaterhouseCoopers
R	Recovery Related Activity Interruption (*Erholungsbedingtes Unterbrechen*)
RealFM	Association for Real Estate and Facility Managers
REFA	Reichsausschuß für Arbeitszeitermittlung
SA	Supplementary Activity (*Zusätliche Tätigkeit*)
SAFMA	South African Facilities Management Association
SKK Migas	Special Task Force for Upstream Oil and Gas Business Activities Republic of Indonesia
TEPI	Total Exploration & Production Indonesie
UCL	University College London
UK	United Kingdom
UOG	Upstream Oil and Gas
US	United States
USD	United States dollar
WHO	World Health Organization
WIP	Works in Progress
PHE	PT. Pertamina Hulu Energi
PHE NSB NSO	PT. Pertamina Hulu Energi NSB & NSO
VDMA	Verband Deutscher Maschinen- und Anlagenbau

1 Introduction

This dissertation was conducted during 3 (three) momentous events: originally initiated in response to the drop oil prices in 2016, developed during the novel virus Covid-19 Pandemic in 2020 and finalised during the global oil and gas crisis in connection with Ukraine War in 2022.

1.1 Problem description

Drop of Oil Prices

Oil and gas (OG) industry upholds a vital role to the world economic growth, both in production and consumption perspective. Victory and inferiority circles have insisted the sector to be adaptable with volatility returns that would be possibly happened in the future. Since the stability of crude oil pricing in 2011 to Q2 2014 by 100 United States dollar (USD) per barrel, Q3 2014 had been the beginning of a shocking oil price decline rate to around 30 USD per barrel. The decreasing oil prices were assumedly caused by oil over-supply in non-Organization of Petroleum Exporting Countries (OPEC), OPEC's failure to reach a deal in negotiating the decline in oil production, and the world's geopolitical and security issues (SKK Migas, 2015, p. 12). Furthermore, these circumstances had been followed by rising inflation and recessions in many countries. By changing cumulative demand and supply and generate policy responses, decreasing oil prices frequently affect activity and inflation (WB, 2015, p.158). On the supply side, lower oil prices force to a decrease in the cost of production (Finn, 2000).

OG industry has experienced various period of ups and downs. During periods of prosperity, on the one hand, oil and gas organisations invest massively for new assets of facility and human resources to push the growth of the business. On the other hand, when the business is indicated in downturn periods, organisations drastically cut the operational costs to survive. The decline of oil prices forces the industry to be more efficient and cost effective without negotiate the quality of Health, Safety, and Environment (HSE) of their projects (Ernst & Young, 2015, p.1). However, it is rational to expect that there are still challenges in every project, e.g. construction, which involve the issues of cost, time frames, and quality (Motzko 2013, Girmscheid&Motzko 2013, Hofstadler 2014). Therefore, current developments in the application of agile methods in construction management allow the assumption that construction projects will be realised on the basis of stable processes in the future (Hofstadler&Motzko 2021).

In Upstream OG (UOG) cases, the dramatic drop of oil prices distracts OG exploration and production activities due to the operational cost that was no longer affordable compared to the expected total state revenue. As a result, to compress the budget, several programmes cannot be actualised; project development was delayed, drilling activities were reduced, and HR recruitment was hold. By then, international and national OG producers attempted to cut off 30% of their capital expenditures in 2016; negotiate oil-field service providers for 10% to 30% decreased fees, cancelled and postponed projects with $200 Billion expected revenue, laid off headcounts to 200,000 employees from the sector (PwC, 2016, p. 4-5).

In UOG Industry in Indonesia, one of the main responsibilities of SKK Migas is to supervise and control the Production Sharing Contract (PSC) by reviewing and approving their Working Program and Budget (WP&B) annually in which there are at least 95 Production, 65 Exploration, 24 Coalbed Methane (CBM) PSCs/ companies in Indonesia in 2020 (SKK Migas, 2020).

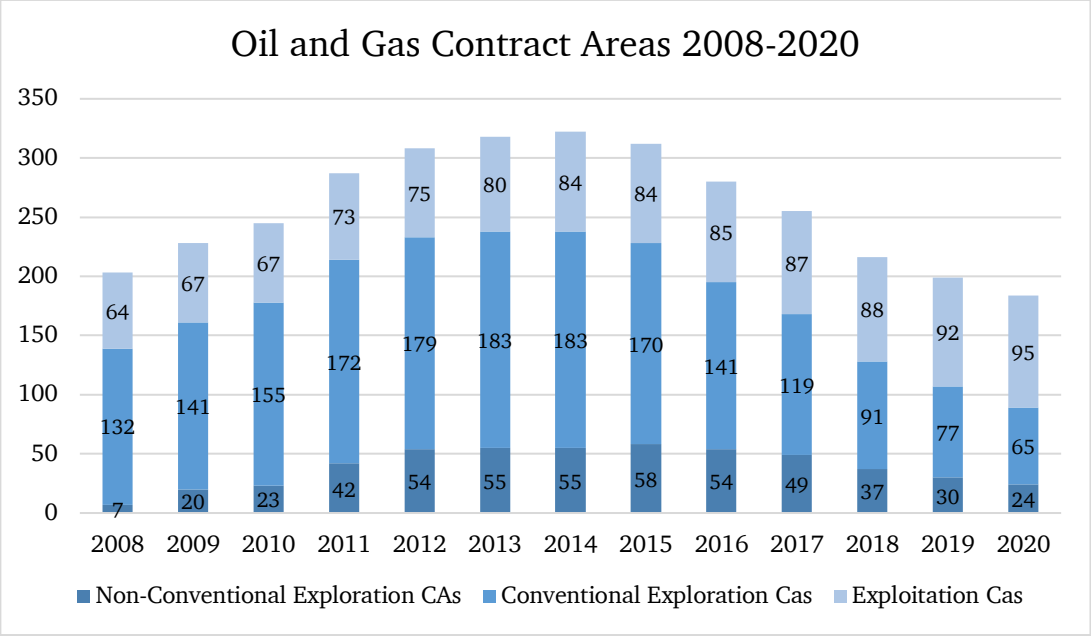


Figure 1.1: Oil and Gas Contract Areas (SKK Migas, 2020)

SKK Migas (2015) decided strategically during the drop prices that Upstream OG industry in Indonesia needed to retain the total state revenue contribution through:

1. Capex and Opex efficiency.
2. Optimalisation on exploration activities (studies, surveys, and drilling) during decreased rate of oil equipment and services.

3. Reorganisation on Human Resources over standardised training and business trip allowance, rearrange working hours, and natural retirement.
4. Enhancement on the contribution of local contents to avoid negative chain reaction to the OG support companies.
5. Improvement on a better partnership between SKK Migas, PSCs, related government and stakeholders to work more efficiently.

To respond to the commitment of SKK Migas for efficiency, Procurement and Asset Management of the industry had shown massive savings from Joint Procurement by 2.15 Billion USD in 2016-2017 and from Asset Utilisation by 69.93 Million USD in 2017. This impressive movement was then used to support production activities, conducting workover and well service, and perform maintenance activities of production facilities (SKK Migas, 2017, p. 45). It motivated the industry that significant contributions can be also possibly done by Support-Function, i.e. in this case Supply Chain Department, of the industry.

Covid-19 Pandemic in Indonesian Upstream Oil and Gas Sector

The necessity on massive efficiency in oil and gas sector was not only about responding to the drop of oil prices, yet to adapt to the life during pandemic. Oil and gas sector throughout the world and not exception in Indonesia must deal with dual challenges, i.e. drop of oil prices and pandemic, that made oil demand remain low until at least the third quarter (Obuchowski & Walter, 2020) as economic and value chains on goods and services both global and regional disrupted (Arezki & Nguyen, 2020).

SKK Migas was initially optimist that the performance of the industry will improve compared to year 2019, until the pandemic started and limited the mobility and activity of the industry due to Covid-19 in which then had caused a relative stable oil prices in Q1 2020 to further dropped significantly in Q2 and Q3 2020. In addition, Indonesian oil and gas work areas are dominantly located in inaccessible field that gives challenges for the industry to regulate the mobility of workers and provide equipment for operational activities (SKK Migas, 2020).

The first case of Covid-19 in Indonesia was declared directly by the President in 2nd March 2020. Not long after the announcement, strategies were taken by the government to react to the pandemic. It included the lockdown of non-essential activities related. Office activities, however, were partially prohibited depends on the sector. Sectors that were allowed to still open their offices were health, food and beverage, energy, telecommunication and information technology, finance, logistic, hospitality, construction, strategic industry, public service as well as daily supply

(Governor of The Greater Area Jakarta, 2020). Still, the maximum occupancy rate at one time was set to maintain the physical distance within office building.

To support the Indonesia Government strategies regarding Covid-19 pandemic, SKK Migas distributed Circular Letters that called the Covid-19 protocols, including healthy lifestyle, the restriction of business travel, comply with the strategies of Indonesian Government, perform health surveillance and monitoring for workers leaving and returning from work site. Although the efforts were forced, the industry had risen the number of confirm cases due to the outbreak in one of the oil and gas operation areas in Easter part of Indonesia that involved 8,993 workers. Still, together with the PCSs, SKK Migas hold HSE Meeting to regularly remind the workers and employers of the industry to conduct health screening, general service pre-caution, regulation regarding accommodation, transportation, and infrastructure, as well as Covid-19 pre-caution campaign.

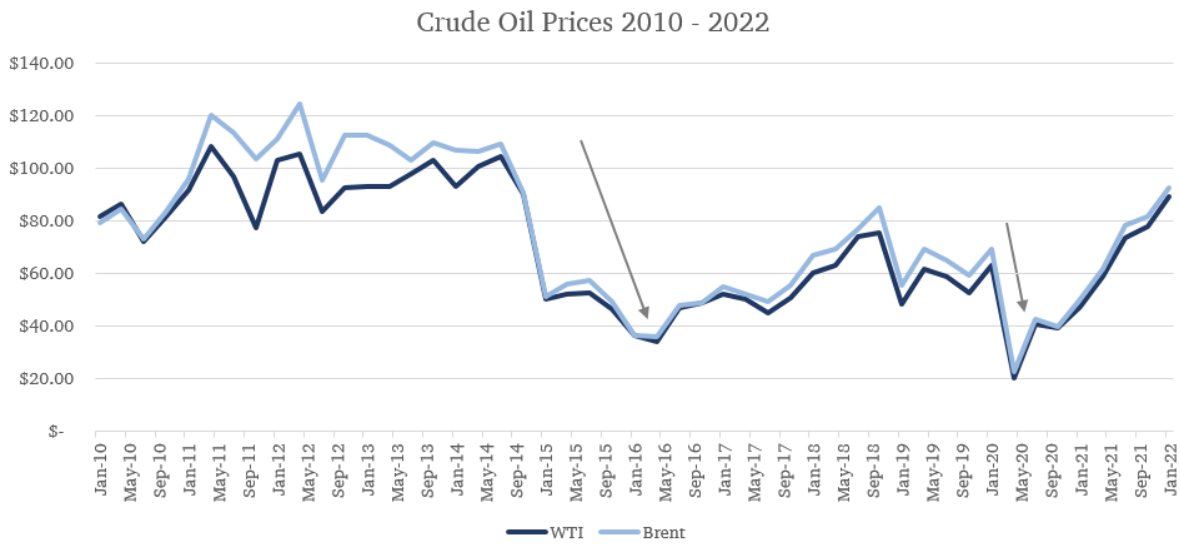


Figure 1.2: WTI and Brent Crude Oil prices per USD per barrel in 2010 to 2022 (US Energy Information Administration)

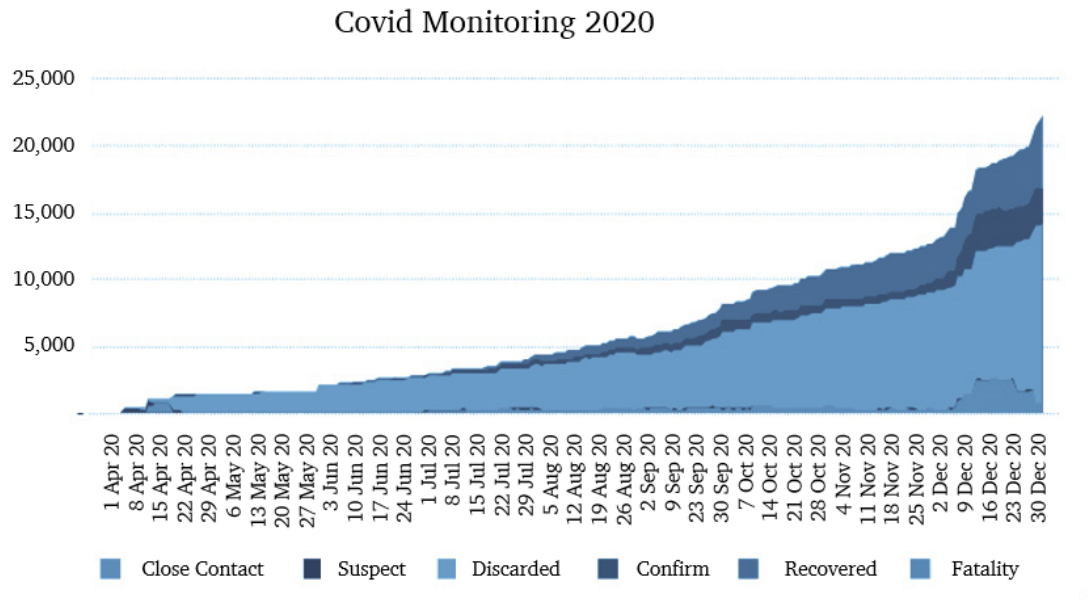


Figure 1.3: Covid Monitoring 2020 in Upstream Oil and Gas Sector

1.2 Office Facility Management Potency in Succeeding Cost Efficiency Program and Roles during Drop of Oil Prices and Covid-19 Pandemic Situation

Facility Management (FM) upholds an important role in managing facilities and services of an institution. It involves interdisciplinary professionals to arrange the usage of the built environment by integrating people, place, and process (IFMA, 2014). The profession itself emerged within the last 40 years and evolved massively without a firm based depending on the originator's taste, environment, and demographics at actual time (Nor et al, 2014).

According to the European Standards of Facility Management Model (EN 15221-1), Facility Management is "integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities". There are 3 (three) levels of FM functions as follows:

1. Strategic; "to achieve the objectives of the organisation in the long term" (EN 15221-1). Strategic level involves consultancy and non-routine planning that may lead the whole organisation to certain direction and future (Johnson & Scholes, 2002).

2. Tactical; “to implement the strategic objectives in the medium term” (EN 15221-1). This level includes routine, specific and short-term preventive or managerial operations (Johnson & Schloles, 2002).

3. Operational; “to create the required environment to the end users on a day-to-day basis” (EN 15221-1). The roles of this activity are short-term scope, specific processes, simple and direct (Barrett and Owen, 1992).

However, a wide range of FM function complicates the profession to focus on strategical, it blurs the value of FM that potentially contributes the productivity of an institution through a more effective and efficient solution. Therefore, it is important for FM to become a strategic planning function and contributes a competitive advantage; beyond-expectation performers, cooperative to stakeholders, and experts of the non-core business operations (Ee, 2015).

Based on SKK Migas State Budget and PSCs annual WP&B in Office FM (OFM) area, office rental contributes the budget consumption prominently, so that office spatial planning is apparently a potential area for giving a significant impact of cost cutting programme in the industry. However, reviewing facility means expecting a potential change of management at the same time while based on Sirkin et al (2005) change management requires duration, integrity, commitment, and effort as the successful key factor. Strebel (1996) argues that unsuccessful change of management of companies have at least one common root problem in which managers and employees have different view of change; Top-level Managers thought that change management offers business improvement and on the other hand, for employees (including Mid-level Managers) see change as disruption and intrusion that affects the balance. It needs at least participation and involvement of impacted group in some aspect of the design and implementation of the change (Kotter & Schlesinger, 2013).

As partnership form of SKK Migas and PSCs in performing UOG Business in Indonesia and based on above arguments, change management in OFM then has a bigger chance to succeed if PSCs are involved in studying the new concept of efficient office in UOG Industry to support SKK Migas cost cutting program, by including their thought as well as direct space observation to their offices to identify work-system and process design of the industry as well as evaluate spatial planning with its relation to the organisations in which before the research is initiated, the study regarding these matters is limited.

Moreover, after reviewing the UOG industry’s concern in preventing the spread of Covid-19 virus, the keyword strategies were mostly related to the tasks of Facility

Management of the organisations within the industry; facility, general service, accommodation, transportation, and infrastructure (SKK Migas, 2020). The roles of Facility Management of the industry in Covid-19 era were forced to continuously adapt to the uncertain and evolving conditions of the pandemic; they had to ensure health and safety of the facilities, considered the time and budget involved to maintain the facilities and risk mitigation of infection. This can be the biggest challenges but at the same time valuable momentums for FM of the industry to finally react, adapt, and reshape their roles through short-, medium-, and long-term strategies.

The above-mentioned reasons gave rise to the idea of conducting a research project to study the complexity of Facility Management of the UOG Sector in order to derive measures to rationalise the operation of buildings in this industry in the Republic of Indonesia. The results of this research project are presented in the frame of the dissertation. This dissertation continues the research work at the Institute of Construction Technologies and Management at Technische Universität Darmstadt in the field of Public Real Estate Management, which is documented with the work of **Schultheis (Schultheis 2006), Hinrichs (Hinrichs 2009), Dölzig (Dölzig 2011), Kometova (Kometova 2011), Scheidecker (Scheidecker 2014), Lorenz (Lorenz 2016) and Raynaud-Duprospert (Raynaud-Duprospert 2021).**

1.3 Research Objectives

Problems have been described above; the drop of oil prices and Covid-19 pandemic were dual issues that oil and gas sector had to deal with. Office Facility Management as one of the functions within the sector take important parts to adapt to both of conditions above; (1) involved in Capex and Opex efficiency and (2) transformed workplace that complies to Covid-19 protocols. Therefore, research objectives are set, as follows:

- To find out the working culture of oil and gas sector before and during pandemic.
- To adapt to the drop oil prices and Covid-19 pandemic; both based on culture and cost.
- To standardise the office facility management in upstream oil and gas sector; based on best practice and evidence.
- To be anticipative to the future changes.

1.4 Research Questions

- How is the working culture of Upstream Oil and Gas Industry in Indonesia?
- Where does the work take place? In which area that is desirable for employees to work?
- How is the comparison between office administrative, physical and space occupancy rate of the offices?
- How is the relationship between spatial configuration and organisational behaviours?
- How is the working culture and occupancy rate during pandemic?
- How can FM in office spatial planning particularly contribute to the cost efficiency program? What area of the office spatial planning can be optimised to increase productivity and to save office facility cost?

1.5 Research Organisation

To be able to answer these research questions, this dissertation is organised orderly, started with **CHAPTER ONE**, which discusses the background of this research and potential area to solve the current issues in OG Industry in Indonesia as research objectives. This also set the research questions to get the pictures of current condition in OG Companies Offices and develop argument of potential contribution of FM in cost cutting program of the industry.

CHAPTER TWO, gathers literatures through historical documentation, regulation, knowledge, theories, arguments and other information that are related to the topic. There are 4 (four) main relevant focus of the reviews, which are (1) OG history in Indonesia, (2) FM knowledge, (3) REFA work-system and process design, and (4) office spatial planning and its impact to an organisation.

CHAPTER THREE, constructs the methodologies used for this research to answer the research questions. Qualitative methods are outlined to be able to understand current condition of OFM through the eyes of companies, OFM Persons, OFM Consultants, and researcher (analysis of companies' documents, semi-structured elite interviews, semi-structured expert interviews, and OFM & HSE assessment), while quantitative methods focus on finding evidences on how actual activities emerged within the offices (structured space observation).

CHAPTER FOUR, introduces case studies that are chosen based on their background and scale of organisation. This chapter also categorises the case studies to identify the data relevancy to the result of observation.

CHAPTER FIVE, the office of case studies is discussed to evaluate their office planning and size against regulation, employees' satisfaction, and occupancy rate.

CHAPTER SIX, serves the result of structured-space observations. It aims to find out how employees work and to measure their offices productivity. This chapter also reveals the result of special office observations during pandemic in one of the case studies that gives the review of occupancy rate and working processes analysis by adopting partly the same methodologies applied in Chapter Five and Six. This chapter further compares the characteristic between work life before and during pandemic.

CHAPTER SEVEN, concludes this research that has been discussed in the earlier chapters and provides recommendation for office strategies of the sector. It also discloses the contribution and impacts of this research as well as suggests potential further research tthat is considered essential to conduct.

2 Literature Review

2.1 Indonesia OG History

The first oil exploration in Indonesia was started in 1871 and began the first commercial production 14 years after, though most of explored resources remained unexploited until Indonesia's independency in 1945 (IPA, 2019).

As the top 20 oil producers in the world, Indonesia had been a member of OPEC in 1962. However, since the declined of oil production and significantly higher demand of oil consumption, Indonesia had become a net oil importer in 2004 and resulted the state's withdrawal from OPEC membership in 2008.

Higher demand of oil consumption in Indonesia was a distortion of the subsidies cost in which contributed 20% of the country's annual debt in 1999 (World Bank, 2000). World Bank suggested the subsidies elimination as its potential expenditure savings by USD 22 billion for 5-year period. After since, the government strategy was to gradually reduce the fuel subsidy in 2009-2014, to hold the demand of oil consumption from the inclined of world crude oil prices by USD 94-98 per barrel in 2011-2014. In 2015, Indonesia re-joined OPEC, although it set back again in 2016 due to the OPEC proposal to Indonesia to reduce the oil production by 37,000 barrels per day had been disagreed by Indonesia as it would cut 5% of the outputs while oil and gas has been still one of the depended industries of the state revenue.

2.1.1 Business Process of UOG Industry in Indonesia

Indonesia had pioneered the Production Sharing Contract (PSC) in 1966 and followed by many countries throughout the world until today. The mechanism allows the OG companies as Contractors to explore the OG resources through studies and produce the OG with agreed Work Program and Budget (WP&B) by the state. At first, the Contractors recovered the costs of exploration and were only recovered back by the state if the Contractors successfully make a profitable discovery and enter on production. The cost recovery is reimbursed in-kind from the OG produced, rather than in cash.

The first Indonesian PSC was between Pertamina (the state OG Company) and the US independent company for the Offshore Northwest Java (ONWJ) working areas. It was

signed on 18 August 1966 and once extended from its original expiry date in 1997 before the final termination on 18 January 2017 (Roach & Dunstan, 2018). This expired contract, however, had been the first case to return to the new Gross-Split PSC model used by Indonesia, following the Ministry of Energy and Mineral Resources (ESDM) of the Republic of Indonesia Regulation No. 8 of 2017 regarding the Gross-Split PSC Regulation.

2.1.2 The Shocking Events

Dissolution of BPMIGAS

BPMIGAS, established in 2002, had been a government representative, which was responsible to manage and control the business of upstream oil and gas industry in Indonesia by giving financial and technical evaluation of PSCs end-to-end project activities; from planning to closed-out phase. However, the organisational body had been dissoluted by Constitutional Court through Decision No. 36/PUU-X/2012 on the judicial review of the Oil and Gas Law (Law No. 22/2001).

To response the Constitutional Court Decision, within hours the President of the Republic of Indonesia announced the Presidential Regulation No. 95/2012 regarding the Transfer of the Duties and Functions of the Upstream Oil and Gas Activity Agency, in which proclaim: (1) transfer of duties and functions of the upstream oil and gas activity agency to the Ministry of Energy and Mineral Resources, (2) PSC that was signed by BPMIGAS remain valid until the expiry date of the contract, (3) the management of oil and gas activity is continued by the Ministry of Energy and Mineral Resources.

The same day after the Presidential Regulation, Minister of Energy and Mineral Resources issued Decree No. 3135K/08/MEM/2012 regarding the Transfer of the Duties, Functions, and Organisational Structure of the Upstream Oil and Gas Activity Agency, which then the employees, budgets, and assets of BPMIGAS transferred directly to the Temporary Task Force for Upstream Oil and Gas Business Activities Republic of Indonesia (SKSP Migas).

Further, SKSP Migas had changed according to the Presidential Regulation No. 9 of 2013 regarding “the Management of Upstream Oil and Gas Activities” that officially replaced SKSP Migas to become SKK Migas and assign Supervisory Committee to

control, watch, and evaluate the performance of SKK Migas. Nonetheless, all the related regulation discussed above has cleared that the status of SKSP Migas and SKK Migas are both temporary until the new Oil and Gas Law is issued (Mujiburohman, p.472, 2013).

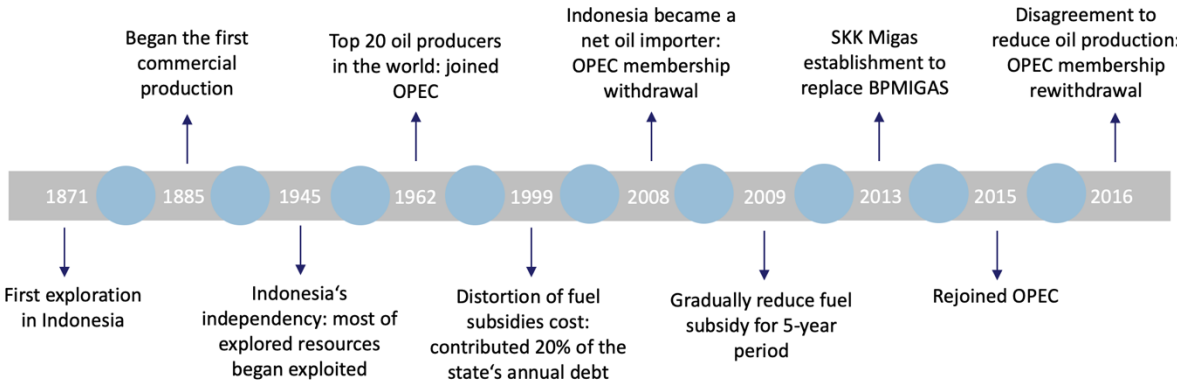


Figure 2.1: Significant events of Oil and Gas History in Indonesia

Covid-19 Pandemic and Its Impact in Oil and Gas Sector

Oil prices are determined not only by demand and supply, but conjointly geopolitical issues. As already mentioned in previous Chapter, OG sector has past-life experienced circumstance in which oil prices dropped due to the price conflict as well as the downfall of demand affiliated with the Covid-19. In the beginning of the pandemic, initiated by Saudi, OPEC countries pushed Russia to cut back the oil production as the global demand is predicted by International Energy Agency (IEA) will fall by nearly 30 million barrels per day due to the lockdowns in response to the Covid-19 pandemic. Despite the negotiation failed in which Russia refused to reduce the production (BLS, 2020).

As supply chain disruption due to Covid-19 pandemic, in some basic facts it is more and more difficult for the operations to continue since dramatic decrease in revenues will not cover the production cost. Often, industry participants will count on the Force Majeure clause of their contracts to escape from the business failure. Fortunately, supports to the local oil and gas industry considering global pandemic are provided by governments as energy supply is apparently national concern. Indonesian government, specifically, determines strategies for the sector: (1) reschedule work commitment between SKK Migas and oil and gas companies, (2) focus on low-cost production, (3) lower income tax rates from 25%, to 22% and finally to 20% (Mckenzie, 2020).

Oil and gas expert in Indonesia (Prawiraatmadja, 2020) states that the decline oil prices during pandemic will somewhat give contradictive impacts to the country: (1) on the one hand, since Indonesia is a net oil importer, the low oil prices will generally advantage the economy, whereas (2) on the other hand, as one the biggest contributors in state revenues, the income from the industry will also decrease. He also agrees that it is the right time for the government to rethink about the sector's policies and take action to help the industry to survive on the negative impact of Covid-19 pandemic.

Workers and Employers of Oil and Gas Sector in Adapting to the Pandemic

To be able to adapt to the pandemic situation, recommendations in some aspects, e.g. work safety and workforce, are addressed for workers and employers within the sector. For instance, US government specifically released guidance for oil and gas industry workers and employers in response to Covid-19 pandemic. Hazard assessment conducted by the US Occupational Safety and Health Administration (OSHA, 2020 & 2021) suggested the necessity of:

- Engineering controls: maintain physical distance between employees by at least six feet apart to each other, physical barriers (modified workstations, partitions, strip curtains, plexiglass), adequate ventilation to minimise workers' potential exposures (heating, opening windows, and air conditioner), and routine cleaning as well as disinfection.
- Administrative controls: provide vaccination for employees, instruction to stay home from work when employees have had close contact to infected person, education on Covid-19 policies and procedures, record and report Covid-19 cases, facilitate feedback from employees regarding Covid-19-related hazards, and follow other applicable mandatory OSHA standards.
- Safety Equipment: require surgical masks or respirator for specific work task.

International Association of Oil & Gas Producers (IPIECA, 2021) published pandemic management in the oil and gas industry that includes preparation, response and recovery or transition phase of the pandemic:

- Preparation:
    1. Communication to avoid confusion and misinformation,
    2. General preventive measures to prevent the spreading of the virus (pandemic illustrative risk visual, individual behaviours, Covid-19 test, contact tracing, quarantine, awareness training, arrival health screening,

hygiene, travel risk, physical distancing, air circulation and conditioning, additional protective measures for higher vulnerability individuals),

3. Medical care (medications, vaccinations, medical supplies, personal protective equipment, health facilities, medical training for key healthcare personnel)
4. Health facilities network and national health authorities
5. Geographical levels of business continuity preparedness: level 1 (global/regional, level 2 (national), level 3 (local), level 4 (remote sire/offshore installation).

- Response:

1. Level of notification: to identify necessary communication for specific target audiences (general, global, national, local and remote sites).
2. Transportation: to address appropriate transports during pandemic in three categories which are (1) international and national travel, (2) general travel, and (3) medical evacuations.
3. General measures: to examine remote site or installations with accommodations, include (1) accommodation and food provision, (2) hygiene/ cleanliness in office, remote site or installation, (3) air supply/ ventilation within enclosed spaces, (4) medical monitoring and mitigation, and (5) mental health.
4. Investigations of outbreaks: to inspect contract tracing and incident with the use of technology and involvement of experienced facilitator, health professionals, and local health authorities.

- Recovery or transition phase:

1. Reduced state of alert: to declare the end of outbreak in close collaboration with national health authorities and medical expertise.
2. Recovery and mitigation: to prepare permanent changes and mitigations to reduce pandemic long term risks.
3. Returning to site or workplace: (1) to provide healthy and safety workplace, (2) to equip clarity with risk assessment, (3) to consider preconditions (local health advice, criticality, safety), and (4) to inform employees the existing regulations and requirements.
4. Restock supplies: to implement long term stock levels.

5. Review lesson learned: to identify (1) improvement to the response, (2) common trends, (3) corrective actions, and (4) good practices from internal and external sources.

In terms of workforce, Human Capital Advisors (Obuchowski & Walter, 2020) suggest the employees in the field by replenishing specialised skills, as follows:

- Hold programs to attract and educate new employees in the crucial technical skills
- Better understanding of core competencies by using data analysis and upgrade current employees through training programs based on the findings
- Attract younger employees with some skilled positions by publishing the career opportunities as younger employees may currently experience their first major economic downturn
- Enhance documentation and propose technology solutions for management and decision-making processes
- Develop the understanding of diversity by providing leadership and management training
- Measure total cost of delivery instead of employee headcount to be able to consider the ratio of the cost between the capabilities need to do the task and the capacity in which a more cost-effective allows increasing capacity.

2.2 Facility Management

2.2.1 FM Worldwide History and Today

The role of Facility Management (FM) is changing over time. Previously FM was recognised as buildings maintenance with engineering systems practicing to all cycle life of the buildings (Maliene et al., 2008, p. 176). According to IFMA, historically in 1970s was the beginning of FM evolution as systems furniture and computer terminals had been introduced into workplace. It prominently emerged as a result of evolving actualisation of office physical environment to fulfil business requirement (Duffy, 2000). Previously there were no organisation paid attention to office environment until “Facility Influence on Productivity” had been initiated by Herman Miller Research Corp. in the USA, in which later settled the establishment of IFMA in 1980. Followed by other professional FM institutions throughout the world, including JGMA in Japan, BIFM in

the UK, and FMA in Australia, has proved that the profession is growing its importance (Linda and Ooi, 2001, p. 357).

Maliene et al. (2008) have compiled the FM development in the European countries. The study has shown that the UK is the first European country to concern on the existence of FM in which makes the USA and the UK as the two most influencing directions to the development of FM in the rest of the world. The American FM, on the one hand, focused on workplace efficiency and management of the facilities. Whereas the British FM focused more on the integrated services, health and productivity, improvement of the work environment and employees. However, the British FM, who was known formerly as BIFM, has changed their name effectively in November 2018 to become the Institute of Workplace and Facilities Management (IWFM) as they have identified that workplace and facilities professionals have the same level of responsibilities for services that enable and support business performance (IWFM, 2018). German FM, who is the second largest FM and IFM market in Europe (FM, 2018, p. 43), has been established increasingly in mid 90s (RealFM, 2007) and currently has been the top 6 industry sectors and become a stable factor of Germany's economy, contributed 134.28 billion Euro gross value with a share of 4.75% regarding the gross domestic product (GEFMA, 2018). Today, the focus of German FM has moved from initially cost reduction and efficiency to technical improvenent, workplace management and sustainability (FM, 2018, p-43). In the opposite to UK and Germany, French does not show their robust attention to the industry (Maliene, 2008) caused by their preference for single or bundled FM outsourcing, labour law controls, and unions long-held partially for self-delivery (FM, 2018, p. 45).

Influenced by the IFMA, Australian Facilities Managers set up the association of the profession in 1988. Started as local branch of IFMA in the country, the association initially named as IFMA Australia until a change in structure of a National Board and finally the name of Facility Management Association Limited (FMA) in formally registered in 1993. Established since three and half decades, FMA has involved in important events of the profession; international negotiations in the formation of Global FM, National Conference & Exhibition, strategic partnership to FM Association from other countries, participation with Standards Australia Technical Committee to establish a Policy Advisory Group, launches the Indigenous Engagement Strategy and Scholarship for the Diploma of FM, and adopts four ISO Standards for Facilities Management (FMA, 2022).

Middle East FM is relatively young if compared to Europe and North America (MEFMA, 2011, p.8). The promising market of the industry is driven by the construction growth of affordable housing caused by the increasing local populations, as well as "Build Operate Transfer" and "Public Private Partnership" trends in the region to finance the projects as well as to build with efficient implementation and execution to international standards (FM, 2018, p.7; MEFMA, 2011, p.8).

A study of Asian FM in 2000s (Moore and Finch, 2004) indicated that 50% of the companies had involved in FM market for at least 10 years (p. 7) with the market maturity 26% lower than the UK (p. 6). It shows that Asian FM is growing in response to: (1) general factors: globalisation, IT usage and demand, high cost of space, employee expectations for FM services improvement, and cost of mistakes, as well as (2) regional factors: cheap labour cost, business efficiency due to regional recession, increasing competition in property, escalating maintenance costs, relatively immature of the overall market, and Private Finance Initiative (PFI) trends (p. 3-4). Today, Asia-Pacific has been the largest market size compared to other regions as the region has given a higher acknowledgement of the industry through inclining presence of global FM participants, greater demand for outsourcing, and availability of comprehensive solutions (FM, 2018, p. 5), though the key players of the industry in Asia-Pacific are up to the present time the international FM providers (Moore and Finch, 2004, p. 8); FM, 2018, p. 7). For instance, Indonesian FM emerged and is derived from (1) the investment of multinational corporations in commercial and industrial sectors of the country, which then leads to the need of excellent FM services that require compliance in high standards and requirements, as well as (2) the local green building association that promotes green building awareness and initiatives (FM, 2018, p. 101). However, since the existence of this industry is relatively new, international FM providers in Indonesia, particularly, have to deal with unstable regulation of the country as a developing market, which then will force these providers to shift the models in operating and service delivery (FM, 2018, p.101).

African FM, in fact, is also an emerging and one of the most growing markets globally (Frost & Sullivan, 2016). Economic uncertainties have forced the business of the region to reduce operational costs through outsourced FM, while a greater revenue becomes a centre of attention of the core business activities in the region (FM, 2018, p.73-77).

FM in Pandemic Era

It becomes a fundamental awareness of FM to be always mindful to the pandemic conditions and implement correct principles guidelines. For instance, IFMA in the USA, specifically established Coronavirus Essentials that includes strategic framework, FM Covid-19 webinar series, and pandemic manual. IWFM in the UK, in collaboration with the industry experts, set guidelines allign with Covid Guidance of UK Government. GEFMA in Germany, at the same time also refers to the German Government and German Research Institution, Robert Koch Institut, in giving the recommendation related to the Covid-19, e.g. risk assessment, hygiene tips, and infection protection.

As the host of facilities of every organisation, FM now holds a vital responsibility to make sure the health and safety protocols fulfilled within their facilities when employees must return to workplace. Experts in FM revealed FM conditions during pandemic that the focus of FM has been readdressed to health and safety issues and spent in outsized portions (76%) of the budgets for Covid related (JLLT, 2021).

The shifted priorities and focus points of FM has brought the profession to become progressively prominent and strategic: the profession guard an organisation to redefine corporate culture through the integration of new office environment and working from home. In medium term, change in flexibility, layout of offices and contract renegotiation with suppliers will be taken to finally set the organisation strategic policy (Elen et al, 2020).

2.2.2 FM Definition

The centre role of FM has changed; in 1980s, FM appeared to contribute more on business efficiency, while in 2000s society took over the core of the role (Shah, 2007, p. 11). It shifted from low quality and reactive building management to the ability to manage changes in which aims to avoid crises rather than react to them (Duffy, 1992, p. 225). Driven by information technology, global competition, high cost of space, employee expectations and cost of mistakes (Becker, 1990, p. 9), FM nowadays has evolved to become a discipline that is not only focusing on operational or maintenance responsibilities, but more on the strategical management of facilities (Best, Langston and de Valence, 2003, p. 2).

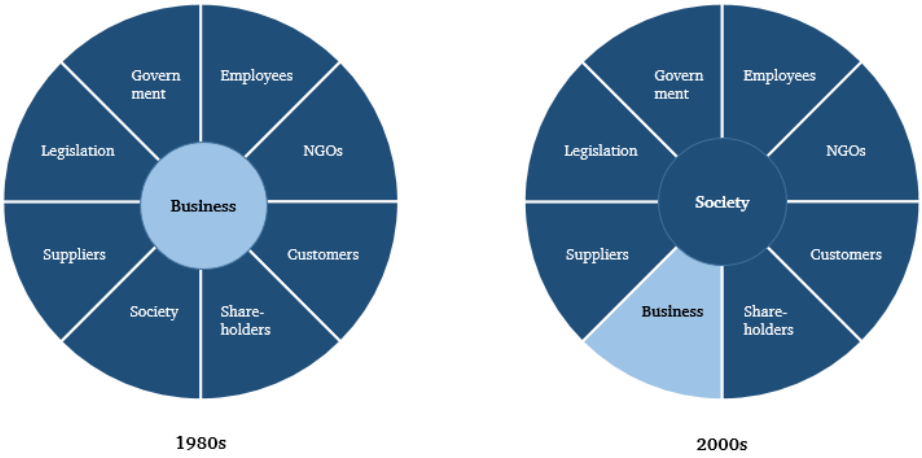


Figure 2.2: The centre focus of FM in 1980s and 2000s (Shah, 2007)

Nutt (2000, p. 2) suggests four main factors of FM, i.e. "the management of financial resources (Business), human resources (People), physical resources (Property), and the management of the informational resources (Knowledge)" as his institution has also defined FM as "the management of facility resources and services in support of the operations of an organisation" (UCL, 1993).

Those thoughts are likely agreed by the closeness of FM definition between FM-related organisations and other researchers as they define FM as the profession that responsible to organisation business performance and to the built environment.

Organisation	**Definition of FM**
ISO	"organisational function which integrates people, place and process within the built environment with the purpose of improving the quality of life of people and the productivity of the core business"
EN 15221-1	"an integrated process to support and improve the effectiveness of the primary activities of an organisation by the management and delivery of agreed support services for the appropriate environment that is needed to achieve is changing" objectives"

IFMA	"a profession that encompasses multiple disciplines to ensure functionality, comfort, safety and efficiency of the built environment"
GEFMA	"a management discipline that delivers result-oriented of facilities and services as part of planned, managed, and managed facility processes, satisfying people's needs, supporting core business processes, and increasing return on investment (ROI)"
VDMA	"the totality of services for the optimal use of the operational infrastructure on the basis of a holistic strategy"
FMA	"the practice of integrating the management of people and the business process of an organisation with the physical infrastructure to enhance corporate performance"
IWFM	"responsible for services that enable and support business performance"
MEFMA	"an interdisciplinary field primarily devoted to the maintenance and care of commercial or institutional buildings"
SAFMA	"an enabler of sustainable enterprise performance through the whole life management of productive workplaces and effective business support services"

Table 2.1: FM definitions from FM-related organisations' perspective.

Author	**Definition of FM**
Barret & Baldry, 2003	"an integrated approach to maintaining, improving and adapting the buildings of an organisation in order to create an environment that strongly supports the primary objectives of that organisation."
Ee	"the management of built facilities and support services, that facilitates organisations' core business operations."
Gustin	"the professionals most responsible for integrating people with their physical environment."

Nutt	resource management at the support levels of (1) strategic: "to provide better infrastructure and logistic support to business and public endeavours of all kinds and across all sector" and (2) operational: support to the operations of organisations, their working groups, project teams and individuals."
De Valence	"to help users get the most benefits from their properties and facilities."
Becker, 1987	"responsible for coordinating all efforts related to planning, designing, and managing buildings and their systems, equipment and furniture to enhance the organization's ability to compete successfully in a rapidly changing world."
Linda et al.	"the integrated management of the workplace to enhance the performance of the organisation"

Table 2.2: FM definitions from researchers' perspective.

Schneider (2001, p. 3-5) classifies the needs of FM based on the specific interests since he argues that the definitions of FM determined by FM-related organisation are more focused on the sales-oriented interests, as follows:

- Interests of the owners: demand an appropriate return on capital and substance preservation.
- Interests of the operators: to have a high level of management effort and enhance performance competition of the market.
- Internal operators: to control the services on their responsibility.
- External operators: to offer their expertise as service specialists, their willingness to develop the methods and tools, their high flexibility in changing needs and highly flexibility economic efficiency.
- Interests of users: to focus on the core business.

Nonetheless, appreciation and understanding for FM potential is lacking and some organisations even doubt the facilities planning capability within their business planning process (Green and Price, 2000). They are oftentimes understating the feature of FM role by thinking that one of the objectives of having FM in an organisation is to

contribute in cost cutting program for efficiency without comprehensively considers the effectiveness and the relevance of space use (Duffy, 2000, p. 373).

2.2.3 FM Tasks

Since presently FM has widely developed and IFMA (2004) has also defined FM as “a profession that encompasses multiple disciplines”, the scope of skills and knowledge required of Facility Managers is also wide-ranging, from the practical task, e.g. building reparation, to the strategical facility planning, e.g. the impact of economic change on real estate assets evaluation (Best, Langston, de Valence, 2003, p. 3).

IFMA (1989) outlined the core content areas of the profession, which are (1) facility planning and design, (2) facility operations and maintenance, (3) human and environmental factors, (4) organisational management, (5) financial theory and practice, (6) real estate planning and development practices, and (7) research and analytical methods.

According to German FM (GEFMA and RealFM, 2007), on the strategic level FM may perform by: (1) defining long-term goals of FM, (2) providing appropriate infrastructure systems, (3) developing efficient management concept, (4) setting the standards for area, (5) equipment processes and services, (6) developing FM personnel through further education, and (7) fulfilling laws and guidelines. Whereas on the administrative level, FM needs to measure the fruitfulness of strategic goals implementation through daily service tasks by their internal FM team or external service provider.

Best, Langston, and de Valence (2003, p. 403) suggest the change of FM role to become a strategic, rather than operational function by: (1) developing the methods of facilities performance measurement to meet a range of organisation performance standard, and (2) evolving FM professionalism by using analytical tools of modern workplace characteristics, e.g. locational decisions, space use, work patterns.

In addition, it is FM responsibility to satisfy users through excellent services with an economical consideration by integrating people, place, process and technology together (MEFMA, 2011). However, this strategic approach may lead to the conflict of FM objectives; while it aims to support the productivity and working effectiveness, one the other hand it has to consider the financial aspect at the same time. Nutt (2000, p. 125)

proposes that it is important to combine the positive and negative objectives of the property and facilities by mitigating the potential or unpredictable risk and opportunity.

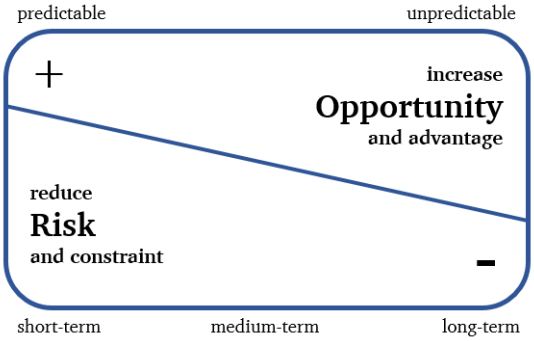


Figure 2.3: Risk and opportunity (Nutt, 2000, p.125).

On the opposite of the FM institutions' objectives to elevate the function of FM, the trend of PFI may become a threat since the core attentions of this financial scheme are on the operational value of facilities and infrastructure to achieve the output target of organisations, their staff and customers over a 25 to 30-year life cycle (Nutt, 2000, p 125).

2.2.4 Facility Managers

Since becoming a Facility Manager requires technical, organisational and commercial qualifications at the same time, the scope of the job overlaps between one to other professional fields, e.g. planner specialist/ architect, civil engineer, supply and waste technician, hygienist (GEFMA and RealFM, 2007). It is important for Facility Managers to understand the process and their dependencies among each other that must be specialised through knowledge in order to optimally design interfaces and coordinate processes (Hischner et al., 2018, p. 8).

Knowledge-based of FM is admitted fundamental as organisational sources to understand the relationship between the performance of physical resources and the impact on customers (Waheed and Fernie, 2009, p. 263-264). A study of Becker (1988a, 1990) has shown that major MNCs from various industry background used at least one or a combination of three strategies to enhance professionalism of FM:

1. Increase the competence of existing staff through internal and external staff development seminars, conferences, and training programs.

2. Hire new staff with formal educational background in facilities planning and management. The formal educational qualifications can be pursued through (1) Bachelor Degree, specialiasing on supply engineering, building technology, civil engineering, architecture and real estate management, (2) Master of Engineering to get in-depth knowledge in theoretical and research-oriented, and (3) professional additional qualifications, e.g. certification by the professional associations (GEFMA and RealFM, 2007).

3. Hire contract staff to cut HR cost, increase the existing staff's flexibility, and improve their performance.

Aside from the technical qualifications of FM, Becker (1990, p. 58) has also studied that it is important to an organisation to also focus on the FM skills, includes "innovative, able to think on feet, willing to take risks, able to cope with pressure, able to negotiate well, and ambitious". According to GEFMA dan RealFM (2007), the job skills include: (1) strategic: holistic thinking and cost orientation; (2) specialist knowledge: planning, construction, management, operation, administration, sustainability, and IT; as well as (3) interpersonal knowledge: process relationships, interfaces or interactions. Self-reliance, self-initiative, willingness to perform and being committed for their responsibilities are other skills of Facility Manager (Joachim, 2018, p. 8-9).

In addition, the profession is actually the owner's representative who is expert to accommodate the present and the future needs of the customer and the corporation and to deliver the project on time and on budget with the best situation, space, facilities, furnishings, and support systems (Rondeau, Brown, and Lapides, 2006). Therefore, to keep up to the organisation pace, it is important to put the Facility Managers as the part of decision makers within an organisation, i.e. board level (Payne and Rees, 1999). A study in a Health Organisation has shown that the percentage of FM Directors who were Executive Directors on the board increased by 14% within 2 years in 1995-1997 as the recognition of the role contribution to an organisation is realised (Rees, 1998). Since the FM function is already recognised, FM needs to elevate its contribution by managing expertise to be able to build a secure knowledge platform to support future development (Nutt, 2000, p. 11). To be able to do so, Facility Managers have to move out from their comfort zone within the day-to-day tasks to a longer term that ensures the buildings they provide today will suit the organisation in the future (Wiggins, 2010, p. 16).

2.3 The Office

2.3.1 Office History

Historically, the massive growth of office work started in 1920s as a result of large professional corporations that required co-ordination and administration (van Meel, 2000, p. 25). The American Engineer of office environment, Frederick Taylor, was the robust influencer (1856 – 1915) of large open floor spaces concept (p. 26) that dragged to the era of work dehumanisation in factory and office, which is well known as "Taylorism" (Duffy, 1997, p. 16). The Larkin Company was the pioneer to host the modern office building designed by Frank Lloyd Wright in 1906. The building was considered as the leading office of the century that had the most successful relationship between the architectural invention and organisational innovation (p. 21).

Although high-rise building is familiarised in the USA since 1920s, the post Second World War had triggered the significant growth of office building due to the economic expansion (van Meel, 2000, p. 29). The introduction of AC and fluorescent lighting in 1930s was also the gate to the visual innovation of glass façade.

Originally German, the *Bürolandschaft* (office landscape) concept was the early of collaboration office evolved in 1950s (Carswell, 2016), where employees could gather the team to work in the landscape without having a rigid boundary. It promotes plants, rather than partitions, to identify the separation between one function to another function more organically. It blurs the disturbing appearance of massive columns by installing mirror instead to reflect and give a wider feel of space (Unwin, 2016).

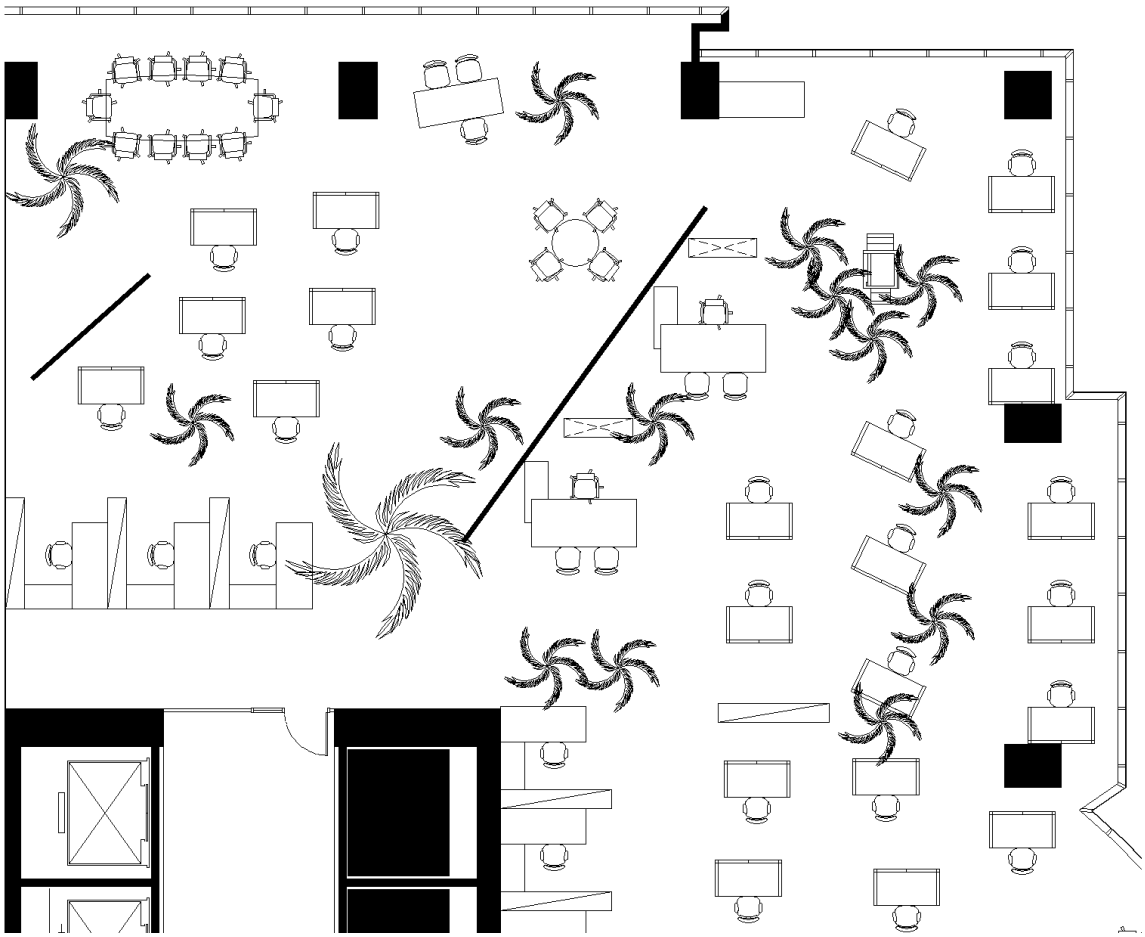


Figure 2.4: Illustration of Bürolandschaft concept of Bertelsmann Verlag offices in Gütersloh, Germany (developed from Unwin, 2016)

The office landscape concept then, had inspired Herman Miller in 1968 to invent the first modular business furniture system in the work, or more famously known as cubicle, to adapt to the new European workplace philosophy, which then known as the era of Action Office (GSA, 2014). It was responding to variative tasks occurred within office, identifying contradictive issues between privacy and communication within organisations, as well as allowing highly autonomy working culture (Worthington, 2006, p. 37).

Figure 2.5: example of the Action Office invented by Herman Miller (own documentation)

The use of cubicle spread significantly in 1980s as the emergence of worldwide web (Carswell, 2016). It also the year when IBM launched the Personal Computer and urged the use of computer on office desks instead of computer room, which was demanding the innovation of office use and design (Worthington, 2006, p. 40). Nonetheless, there were two notable variants in office design and use in 1980s, (1) Northern Europe, and (2) North America. The highly cellular, combi office, and shared spaces for interaction or group work concepts were proliferated to accommodate the high quality environmental standards demand in North European countries, e.g. Scandinavia, the Netherlands, and Germany (p. 42). Whereas, the office building types in the North America and the UK toward a more cost-effective and highly spatial efficiency standards (p. 44 – 45).

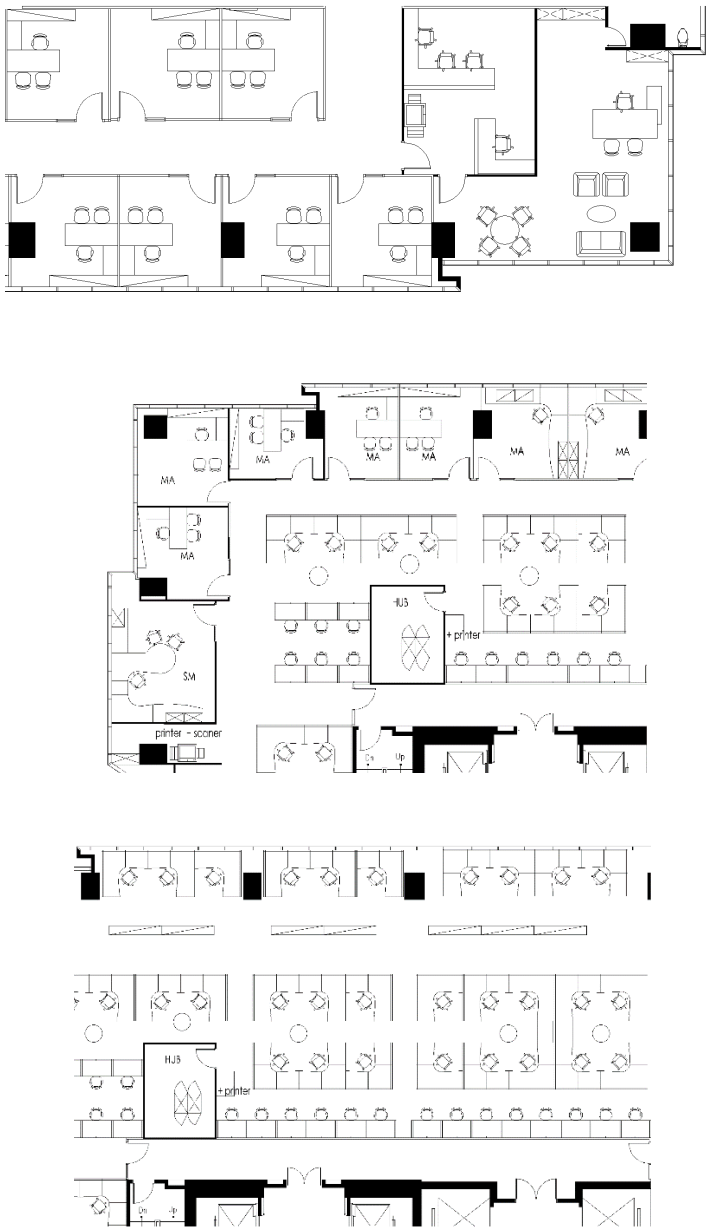


Figure 2.6: Illustration of cellular office (top), combi office (middle) and group room (bottom) (developed from Worthington, 2006)

Early 1990s, however, was the ending of office real estate victorious in Europe and North America. The robust development of office technology and the impact of energy crisis were not well anticipated through office design during these times (Duffy, 1992, p. 119). It pushed the corporate organisations to survive by terminating their premium culture and reconsidering the buildings and office environment that can offer added-value and minimise their costs at the same time (Worthington, 2006, p. 46).

This type of event that office environment affected to the energy crisis is, however, repeated in 2015.

Covid-19 Pandemic: The End of Office Era?

During the Covid-19 pandemic, organisations sent their employees to work from home to mitigate risk of infection. However, there are still aims of the office that still cannot be replaced; it is the place where employees encounter, share information, brainstorm ideas, socialise, build their working cultures and values, as well as bond through the same activities and experiences (FM, 2022). A poll of webinar asked their attendees whether they expect to return to their office and the answer is 66% of them prefer to work in an institution with hybrid workplace, whereas only small parts hope to go a hundred percent virtual working (JLLT, 2021).

2.3.2 Office Type

Office types evolve overtime as a result of economic, social, technological, and financial expansion (Duffy, 1997, p.14) in which in general use, office can be divided into two types: (1) corridor offices and (2) the open-plan office, (Duffy, 1992, p. 7).

O'Neill (2008, p. 1 & 3) compared open plan and cellular/enclosed private offices, and its relation to the work style, job satisfaction, indicator of status, collaboration, noise issues, learning and mentoring, as well as cost and strategic implications. Open plan, which is defined as "an environment comprised of systems furniture", supports the sense of community, better communication and exchange of information, as well as the feeling of sociable and included. Whereas enclosed office, which is defined as "workspaces completely enclosed with dry wall and a door", offers the crucial need of privacy, feel secure, reduction in noise and feel rewarded being in a larger amount of floor space.

According to Bielefeld (2018, p. 21), the different types of office rooms are distinct based on the number of workplaces, as follows:

Office Type	Number of workplaces	Criterias
Individual/ cellular offices	1 – 4 persons	- Distinct office rooms - Arranged in sequence along circulation corridors - High space per user - Can be used permanently or as retreat rooms
Group offices	5 – 25 persons	- Distinct units - Arranged along circulation corridors (open or separated by partition walls) - Size: between 7 – 30 m wide and between 5 – 10 m deep - Efficient use of space
Open-plan offices	Over 25 persons	- Landscapes designed without corridor - Size: over 1,000 sqm - Highly efficient use of space - Design challenge: data/ electrical installation and acoustic problems
Combi offices	Depending on requirements	- Combination of cellular and group offices - Located along a window façade - Combi-zone as access to the offices - Flexible and suit specific needs
Non-territorial work environments	Depending on requirements	- Highly autonomy and flexible - Non-assigned desks - Teleworking, digitalisation, company internal knowledge centre - Wide range of work and communication zones

Table 2.3: Office types based on the number of workplaces (Bielefeld, 2018, p. 21 – 28)

Van Meel (2000, p. 52 – 54), who studied focally on the European Office, argued that there are international historic differences in office design due to urban setting, market conditions, labour relations, culture and regulations that makes a country differs to another. Based on these contexts, he concluded the differences of workplace in the European Office, as follows:

Country	**Office Type**
UK	- Open-plan for staff and cellular office for management - Less spacious: 16.8 sqm per employee - Trends: more open, non-territorial and teleworking
German	- Cellular office - Spacious: 28.9 sqm per employee - Trends: combination between open and cellular office, few experiment on non-territorial offices and teleworking
Sweden	- High cellular office - Highly accomodated break areas - Spacious: 30 sqm per employee - Trends: advanced of highly open layout, non-territorial offices and teleworking
Italy	- Mix between cellular and group layouts - Spacious - Few experiment of new office concepts
Netherlands	- Cellular layouts - Spacious: 25 – 30 sqm per employee - Trends: Combination of open and cellular layouts, non-territorial offices and teleworking

Table 2.4: Comparison of European Offices (van Meel, 2000, p. 66)

He also underlined that UK is clearly unique compared to the rest of European Offices in which UK uses a denser space and open; staff occupies cubicle and only the managerial levels work in cellular office. On the other hand, the continental Europe use almost twice spacious compared to the British. However, the influence of cultural aspect

to the office type in UK is unclear, since based on literature the British culture is as highly individualistic as Germany. The more open and efficient space used in UK, instead, is driven by a highly expensive rents that pushes the organisations to cap their budget on accommodation. Whereas Germany, Sweden, and the Netherlands use larger space since the office space rents are relatively inexpensive and it represents the image of the labours' higher living standards (p. 155 – 156).

Duffy (1997, p. 58-59) studied the comparison between the conventional and future office cultures, in which he argued that the significant differences between these two depends on the how the work is done, the level of technology and the cultural values in the management of HR.

	Conventional office assumptions	**New ways of working**
Pattern of work	- Routine processes - Individual tasks - Isolated work	- Creative knowledge work - Groups, teams, projects - Interactive work
Patterns of occupancy of space over time	Central office locations in which staff are assumed to occupy individually 'owned' workstations on a full-time basis, typically over the course of the 9-5 day. The office assumes one desk per person; provides a hierarchy (planned or enclosed); and is occupied typically at levels at least 30% below full capacity.	Distributed set of work locations (which may be nomadic, mobile, in the office or at home) linked by networks of communication in which autonomous individuals work in project teams. Daily timetable is extended and irregular. Multifunctional work settings are occupied on an as-needed basis. Daily occupancy of space near to capacity.
Type of space layout, furniture systems, and use of space and buildings	Hierarchy of space and furniture related to status. Individual allocation of space predominates over interactive meeting spaces.	Multiple shared group work and individual task-based settings. Setting, layout and furniture of the office geared to work process and its tasks.

Use of information technology	Technology used for routine data-processing, terminals in fixed positions served by mainframes.	Focus on mobility of IT equipment used in a wide variety of settings. Technology used to support creative knowledge work, both individual and group. File serves serve a variety of IT tools, including PC's and laptops, and shared specialised equipment.

Table 2.5: Comparison between Conventional vs Future Office (Duffy, 1997, p.58)

He also compared two organisation variables: (1) interaction: "the personal, face to face contact that is necessary to carry out office tasks", and (2) autonomy: "the degree of control, responsibility, and discretion each office worker has over the content, method, location, and tools of the work process" (p. 60). To that, the potential office type based on the work pattern, space occupancy, office layout and use of information technology, is categorised (p. 66), which are:

	Office Type
The Hive	- Individual - Routine process work - Low level of interaction - Low autonomy
The Cell	- Individual - Concentrated work - Low interaction - Intermittent and irregular pattern of work
The Den	- Group work - Highly interactive - Moderately autonomous
The Club	- Highly interactive - Highly autonomous

Table 2.6: Categorisation of Office Type (Duffy, 1997)

2.3.3 Office Standards

Office standards are often applied for efficiency due to the difficulties of measuring effective space (Wood and Worthing, 2000, p.92). In a more strategical consideration, terms of efficient and effective are not just related to the quantity. Instead, it is fruitful for an organisation or even cross-organisation to apply organisational benchmarking to be able to confirm if facility management matches its organisation and its operating environment (Becker, 1990, p. 26). This also can be used to accountably measure, analyse, control, report, and improve the efficiency and effectiveness of FM performance and applies to insourced and outsourced services (Barrett and Baldry, 2009, p. 193).

Governments from distinct region throughout the world have concerned about the importance of developing office standards. They construct office standards and guidelines with periodical review to respond the changing direction of office through their own key objectives.

Government	**Goals**
Canada	functionality, cost effectiveness, flexibility, sustainability, consistency, equitability
Australia	safe, healthy, compliant, functional, cost effective, consistent, equitable, sustainable, adaptable
New Zealand	develop better, cost effective, consistent design, safe and secure environment, spaceless growth, adaptable
UK	health, safety, need based, suitable to all users (including disabled)
German	safety and health workers
Indonesia	functionality, safety, equity, environmentally friendly

Table 2.7: Comparison of governments' objective in office standards

To response the governments' principles, influencing organisations develop office standards as guidance to meet the requirement set within the governmental laws or

regulations. Having different key objectives, office standards of those organisations complement each other.

Focusing on technical and financial aspects, since 1915, the Buildings Owners and Managers Association International (BOMA International, 2017) consistently develops the standard method of measuring floor area in office buildings for as follows:

- Property managers: to increase total rentable square footage
- Asset managers: to increase revenue forecasting;
- Leasing professionals: to raise property value;
- Building owners/ sellers/ buyers: to increase net operating income,
- Tenants: to be accurate and defendable lease rentable square footage,
- Lenders and investors: to have a better marketing,
- Space planners and interior designers: to be accurate in architectural floor plans for planning and estimating,
- Contractors: to estimate construction costs, tax and operating expenses as well as net cleanable square footage,
- Security: to plan emergency and evacuation.

Other Offices Associations e.g. AEO (2014) in Spanish also constructed office standards to be applicable to other international standards and adapted to regular practices in the Spanish office market. While German Institute for Standardization (DIN 277, 2005, 2016) defined floor areas and volumes of buildings or parts of building in construction mainly for costs determination and costs control. It categorised building floor areas into three parts:

- ***Bruttogrundfläche* (BGF)**: the sum of the floor areas of a building.
- ***Nettogrundfläche* (NGF)**: the sum of the floor areas without the construction areas. NGF is divided into three parts:
  - ***Nutzfläche* (NF)**: the sum of the floor areas that is usable, e.g.: living area, office space, retail.
  - ***Technische Funktionsfläche* (TF)**: the sum of the technical floor areas >1sqm.
  - ***Verkehrsfläche* (VF)**: the sum of the circulation and safety floor areas.
- ***Konstruktionsfläche* (KGF)**: the sum of the construction areas.

Wustemann & Booty (Booty, 2009), also classified office space measurement, as follows:

- *"**Gross internal area**: the whole internal area of the building measured from wall to wall.*
- ***Net internal area**: the gross internal area minus service cores, toilets, lift lobbies, and stairways.*
- ***Net usable area**: the net internal area minus any areas that cannot be used for the purposes of space planning, such as area behind doors and narrow gaps between columns and walls.*
- ***Net lettable area**: the area on which an organisation pays rent in a leased building, usually somewhere between the net internal and the net usable area."*

WHO (2010), on the other hand, promotes healthy workplaces through framework and model. Ethical, business and legal aspects have been their background to convince enterprises/ organisations and government to understand the benefits of healthy workplaces and to improve knowledge, skill or tools. In accordance to DIN, VBG, bso, BAuA, and INQA-Büro, Quality Office Organisation specified the quality criteria for office workplaces through guideline (L-Q 01-06, 2008) to prevent illness and promote health under consideration of the latest ergonomic findings. Perry (2009, p. 3) reported that annually companies had to give up 4 to 8 percent of their gross trading profits as the cost of poor health and safety that resulted injuries, illnesses, and non-injury accidents of the employees. She also suggested that compliance on HSE law has been the employer's responsibility to suit their organisation, rather than stick to the rules that are not applicable to their certain situations (p. 5).

2.3.4 Office Design and Its Impact to an Organisation

Evaluated from the FM definition, it is coherent that the focus of FM is on workplace since it involves the location, type, quantity, quality, content, allocation, diversity and functionality of the workspace (Nutt and McLennan, 2000, p. 86; Linda and Ooi, 2001, p. 361-362). Financially, workplaces take a major part in FM operational cost as organisations undoubt the value of gathering their employees together in workplace to make linkage and produce collaborative purpose and direction (IWFM, 2018). IWFM argued that workplace has been a potential area for FM to increase productivity of an organisation if it is used effectively. It requires office design to corporate image and

most importantly allows the employees to perform well through a comfortable, safe and efficient working environment (Wustemann & Booty, 2009, p. 347). A well-designed and strategically considered office with an efficient, pleasant, dynamic workplace enhances performance and productivity of the employees, which then leads to a better business (Wiggins, 2010, p. 14).

Thus, office design has to consider the organisational objectives and business processes through variables, e.g. the size and age of organisation, organisational structure, and various kind of activities (van Meel, 2000, p. 11). Duffy, Elley, Gifone and Worthington (DEGW, 2005, p. 8) argued that considering organisational culture and workplace design have been important since spatial configurations provide space for individuals to communicate with one another and determine at which knowledge or information that employees can communicate in and out of organisation. These then shape the communication quality among employees, which affecting the rate of employees' turnover within companies. Studies show that there is a correlation between instrumental support during the process of finishing task and turnover as a result of distrust relationship among employees (Tews et al., 2013). Turnover then insists major spending of the business by USD 60,000 per employee in mid-level managers. This calculation includes separation, recruiting, selection, training and cultural induction costs, as well as lower productivity in cultural induction and in a long run (Becker et al, 2001, p. 90 & 99).

2.3.5 Office Design: What to Consider?

Different organisations will need different office concept by virtue of choosing the right office concept needs to identify the work processes, identity, and ambitions of the organisation that will promote the productivity, culture, flexibility, well-being and happiness of the employees (van Meel et al, 2006, p. 17). Some publications provide guidance for managers and designers to consider significant objectives in determining the concept for office design, as follows:

Authors	Objectives	Considerations
Van Meel et al., 2009	Enhance productivity, reduce costs, increase flexibility, encourage interaction, support cultural change, stimulate creativity, attract and retain staff, express the brand, reduce environmental impact.	• The need for new office concept • Problems that need to be solved • New office concept relation to organisational changes and future needs • Project business or cost-driven • Well-communicated to the users
Rayfield, 1994	Identify organisation resources, current and long-term needs	Review and evaluation of the current situation, development of requirement, sensitivity and trend of analysis, product definition, development and evaluation of alternatives, as well as recommendation

CABE & BCO, 2005	• Achieve appropriate levels of density, daylight, view etc., and balance it with occupancy cost • Working pattern that suits the business • Workplace as a catalyst for change • Concern on acoustic and visual privacy, work group size, vertical and horizontal travel distance, building depth • Concern on FM responsiveness, ability to control individual environment, simplicity and the building efficient operation and system • Ensure connectivity and environmental quality through multiple iterations of organisational change • Deliver full potential of efficiency, effectiveness and intended expression	• Staff productivity and satisfaction vs economic efficiency • New ways of working • Organisational change • Concentration vs communication • Individual vs central control • Infrastructural flexibility • Feedback as a design and monitoring tool
Bielefeld, 2018	• Functional • Functional and communication relationship • Building suits the local context • Natural daylight and high quality interiors • Accessible • Suits the depth and subdivision of the building	• Determine area and volume • The relationships between different function • Urban design context • Building types/ shapes • Circulation systems • Room types and structural systems

Becker et al., 1994	• Meet organisational challenges • Reassess how/ where work is done • Conduct fundamental changes in business practice • Develop alternative workplace strategies • Change management to support organisational change	• Business-driven vs cost-driven strategies • Process-oriented vs solution-oriented implementation • Strategic vs independent initiative
Kohlert & Cooper, 2017	To give a significant positive influence on human wellbeing (communication, collaboration, concentration and rejuvenation) to generate creative thinking: increase innovation, improve problem solving and decision making, more flexible, thorough, and efficient thinking, constructive and cooperative bargaining, increase helpfulness and interpersonal understanding, constructive suggestions and improve self-knowledge.	• Indoor planting • Light and views • Materials and haptics • Shapes • Colours

Table 2.8: Objective and consideration of office design

Based on the compilation of publications regarding office design, it is obvious that authors differ to each other in determining office considerations. This is in the interest of how authors promote the office objectives from different perspectives. Kohlert and Cooper (2017, p. 59-99), for instance, underlined the importance of creating positive human wellbeing in office environment and propose the biophilic design to support wellbeing. Biophilic design is defined by architect and designer as “designing in a manner that supports that innate connection with nature” and based on the research, this approach can promote stronger productivity and influence better creativity (p. 85).

CABE and BCO (2005), on the other hand, concerned on the changing trends in business management that affects design of office buildings. To be able to react on the rapid rate of change in organisations, they suggest that office design should not only consider linear transaction processes. Instead, it needs to support knowledge transfer and connect communities of people and autonomous employees with the contribution of technology (p. 65).

Since this research particularly attempts to find out the appropriate office design for UOG sector in Indonesia, trends and issues of the sector that have been discussed in this research background will be firstly compiled, as follows:

- The UOG business is whether high return or whether high risk. It can bring organisations of the industry to either reach victory or collapse easily.
- The governmental regulations of the business in Indonesia remains unstable.
- Consciousness on HSSE is high, yet there are no studies within the sector have proved whether the knowledge of HSSE in the office buildings is implemented or whether not.
- Budget concern vs performance has been debatable issues between the government and the UOG companies.

According to trends and issues mentioned above, related considerations will be chosen and reviewed in depth:

- **The changes**: to be prepared on rapid possible changes of the industry, includes economic and social impact, as well as political stabilities.
- **HSSE**: to assure health, security and safety of the employees during their work and protect the environment from negative impact of the industry.
- **Evidence-based Design**: to give a sufficient and proven justification for the program or project and budget proposed by UOG companies to the government based on evidence and best practice.

The Changes

The history of office design has shown that workplace environment changes rapidly, e.g. the era of German office landscape in 1960s was replaced not long after by the cubicles invented by Herman Miller in 1968. Moreover, financial issues often force employers to change their strategy immediately to survive, e.g. the recession in 1990s. On the other hand, if workplace is anticipated to the changes, employers then can be focus more on core issues of the business, rather than support activities. The strategy is to create high performance workplace with design innovation that measures organisational change through people, process, and place (Duffy, 2005). According to Duffy et al. (1992, p. 10-11), responsible workplace needs to consider at least 9 points of significant trends that may influence the design and use of office buildings, which are:

- Changing business: to accommodate a greater flexibility in the use of space and time, to be more responsive on the business and operational needs, to fulfil the employees' higher expectation of workplace quality.

- Changing user expectations: the importance of user feedback to build a better relationship between suppliers and users of the working environment.

- Changing technologies: to integrate buildings with the support of centralised database networks that allows employee to choose the place to work.

- Changing IT and intelligent buildings: to promote new types of shared spaces and meeting rooms, as well as better user control and mobility at work and between work and home.

- Changing in building performance: to elevate the existence of building services to be more accessible to end users and used to complement and assist natural systems more practically.

- Changing environmental issues: to manage buildings and its services for a better environmental performance through green products, the preparation of design and product guides for environmentally sensible design, the synchronisation of European higher standards, stronger transport policies, and the rising utilisation of Information Technology.

- Changing locations: new ways of working that encourage the use of telecommunication and office automation, transport and business infrastructures improvement, and increasing opportunities of international migration.

- Changing patterns of office work: employers' awareness to increase office productivity by effectively utilise the resources of space and time.

- Changing regulatory perspectives: to protect the right of end users to control the quality of their working environment.

However, the old strategy of FM in space planning was to oversize the office space to anticipate the growth of the business in which no longer applicable today (McGregor, 2000, p. 9) since organisational needs arguably can be predicted more than three to five years ahead due to the fast-growing of IT innovation has led to the fundamental changes to the nature and organisation of work (Nutt, 2000, p. 126 & 129). To that, design flexibility can support the change readiness by considering the role 'futurologist', 'technological forecaster' or 'foresight analyst' (Finch, 2011, p. 21-22) as effective strategies to address business variability and fluctuating demand levels (McGregor, 2000, p. 81).

Still, dealing with change is never an easy task. Most of the change management replace like with unlike (Finch, 2012, p. 11). For instance, when employers decide to reduce cost through space efficiency, employees may feel unrewarding experience in which makes facility managers oftentimes camouflage the background of the change to inform their employees (Becker, 1990, p. 154). On the other hand, the change of work environment that leads them to work more efficiently and improve their competence as well as professionalism may avoid the employees' resistance to change (p. 168). Therefore, to be successful on the change needs strategies by firstly (1) diagnosing resistance, e.g. misunderstanding and lack of trust or low tolerance for change, and finally (2) use methodologies for dealing with resistance, e.g. participation and involvement, facilitation and support, negotiation and agreement manipulation and co-optation or explicit and implicit coercion (Kotter and Schlesinger, 2013).

Grech and Walters (2008, p. 11) suggest to use the principle of applied research to facilitate the organisational changes: (1) involve the users through surveys to get to know their experience and needs to be accommodated, (2) use cultural anthropological techniques for in-depth and repetitive observation and interpretation through

workshops that engage at least architects, facilities managers and all level of management to experience the new prototype.

Space arguably leads to change, but it needs to support change and the effective organisational change can only be successful with parallel change in office design (Grech and Walters, 2008, p. 9-11). CABE and BCO (2005) reported that office buildings design in Europe evolved parallel to changing trends of business management in over last four decades of the twentieth century. Adopted to North American, European and Asia implemented design practices that required improved facilities management and became the beginning of intelligent building evolution. This provides a strong infrastructure for information technology, using integrated management and information communication technologies systems thus more responsive to changing user needs. Related to this, the change of office design become an attractive topic to architects, consultants and researches to reinvent the characteristics of future office, which was driven by information technology evolvement and management theory (van Meel, 2000, p. 10). It expands the thinking process to design office that accommodates a wide range of requirement and the impact of digitalisation as well as individualisation offers the opportunity of highly flexibility in terms of the location of work (Bielefeld, 2018, p.9).

Nevertheless, the frequency of an organisation to change may vary depending on the organisational working culture. Therefore, it is important to link trends e.g. employee's involvement in strategic decision making, more group working, multiple choice for accommodating the nature of their physical facilities, policies or processes for planning and managing them (Becker, 1990, p. 4).

DEGW (1983) conducted Organisations, Buildings and Information Technology (ORBIT) studies that mapped out organisations against two dimension: the nature of change and the nature of work. The nature of work determined whether the organisation's tasks are routine and predictable or whether varied and unpredictable. While the nature of change identified the frequency of changing as a result of internal re-organisation or relocation within the office. The change direction shown in the classification model may be occurred due to (1) internal re-organisation and the frequency of relocation within the building measurement, or (2) the change of headcount number (CABE and BCO, 2005).

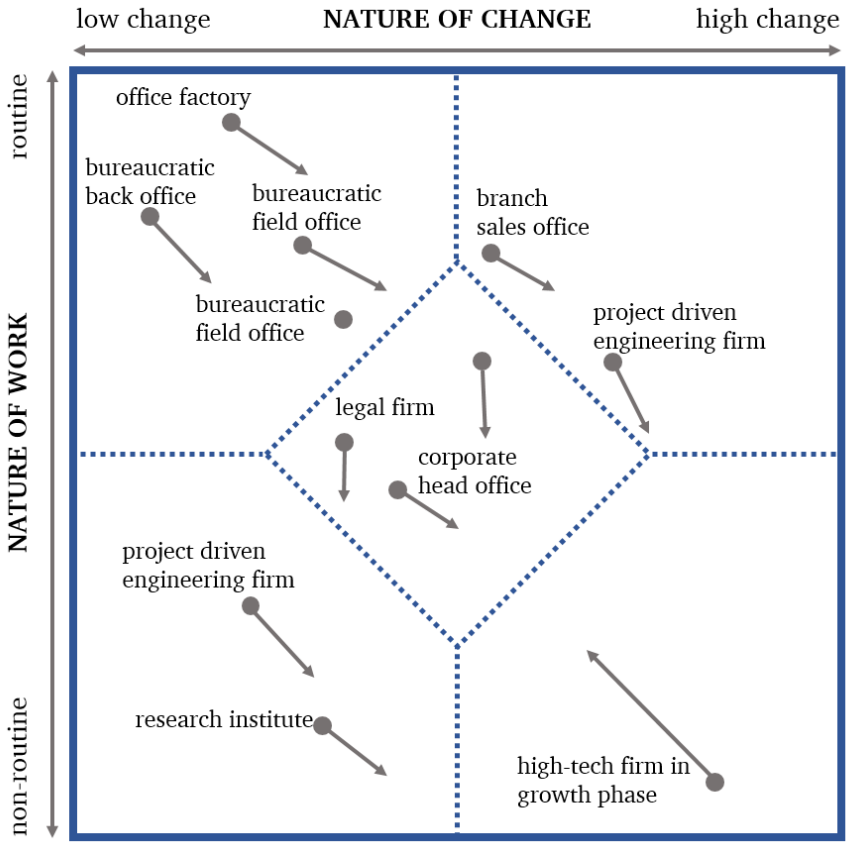


Figure 2.7: ORBIT organisation classification model (DEGW, 1983-1985)

DEGW (2005) made a simulation if employees in the future would work remotely from their office at least 1-2 days in a week, then the graphs show that the future office would be 20% emptier and at the same time the number of employees who finish their tasks within the office would be declined by 20% compared to the office in 2000s.

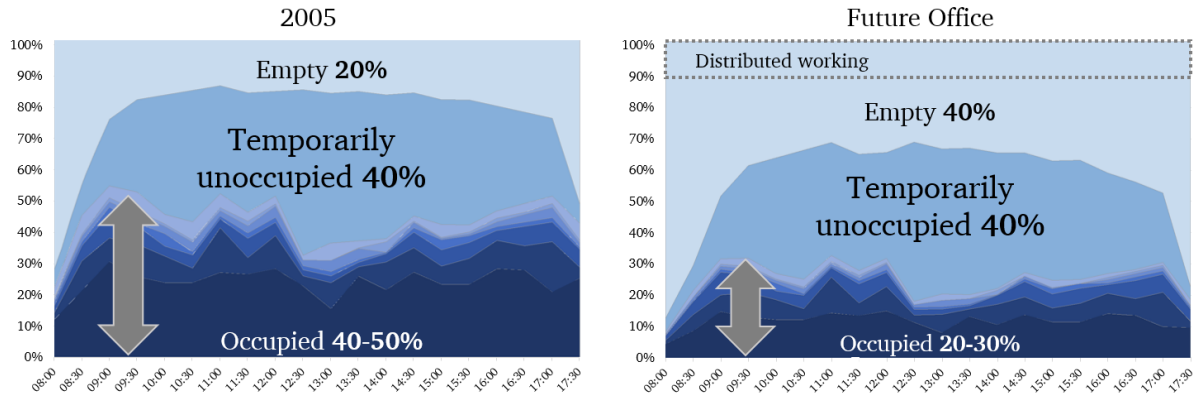


Figure 2.8: Simulation of occupancy comparison between office in 2005 and future office (DEGW, 2005)

Above argument can be validated to the research finding like what CBRE had done in studying the new workplace (2017). Their methodologies in defining the future workplace are by considering the importance of employees' generation background. Kraus (2017) who focused about the comparison between Generation X and Generation Y as presently their simultaneous involvement within organisations (p. 62), cited evidence that there are inconsistencies among researchers in determining group and name of the generations. According to this study, there are five generations based on the birth year that necessarily defined in the relation to the study, which are: (1) Traditionalist (1925 – 1945), Baby Boomers (1946 – 1964), Generation X (1965 – 1980) Generation Y (1981 – 2000), and Generation Z (born after 2000) (p. 63). He argued that the significant differences between Generation X and Generation Y are clearly on the characteristics and work values: Generation X is described as independent, self-reliant, sceptical, less loyal and flexible while Generation Y is indicated as idealist, optimist, independent, self-confident, and technologically competent (p. 72). However, both generations embrace autonomous work and independence in the workplace that makes them share the similarities of preferred emotional leadership styles, which are the visionary and coaching styles (p.73).

Furthermore, CBRE (2017) suggested that understanding millennials expectation about their workplace is fundamental since they will be 75% in 2025 of the workforce globally. The 78% of them even thought that the quality of workplace becomes one of the fundamental factors in choosing an employer. Furthermore, their survey found unexpected answers that were only one third of the respondents who preferred a collaborative working environment, while the rest two thirds wanted their own or a shared office. In comparison to non-millennials, however, the number of millennials who prefer activity-based working is higher (22%) than other generations (18%) (CBRE, 2016).

Alongside DEGW prediction regarding the future office, another study through a global survey in 75 countries with 4,364 respondents proved that 70% millennials expect flexibility in finishing their tasks (PwC, 2013). The study also defined a millennial-friendly environment as a fully digital, comfortable and creative at the same time that blends work and life, rather than working in an individual workspace the whole office-hour (PwC, 2011). It requires mobile, flexible and collaborative settings of the workplace in which will contribute to the drop in office space demand by 17% and 15% fewer desks per employee (Frost and Sullivan, 2016).

However, the increasing flexible working out of the office is unlikely to replace encounter that allows trust, visibility, face-to-face interaction and team-working (Wood and Worthing, 2000, p. 88). A case study of easyCredit office, a leading German consumer credit expert, mentioned in Kohlert and Cooper (2017, p. 144) encourages encounters through “meet and create zone” that will support incidental discussions and chats as the best way for starting innovative ideas.

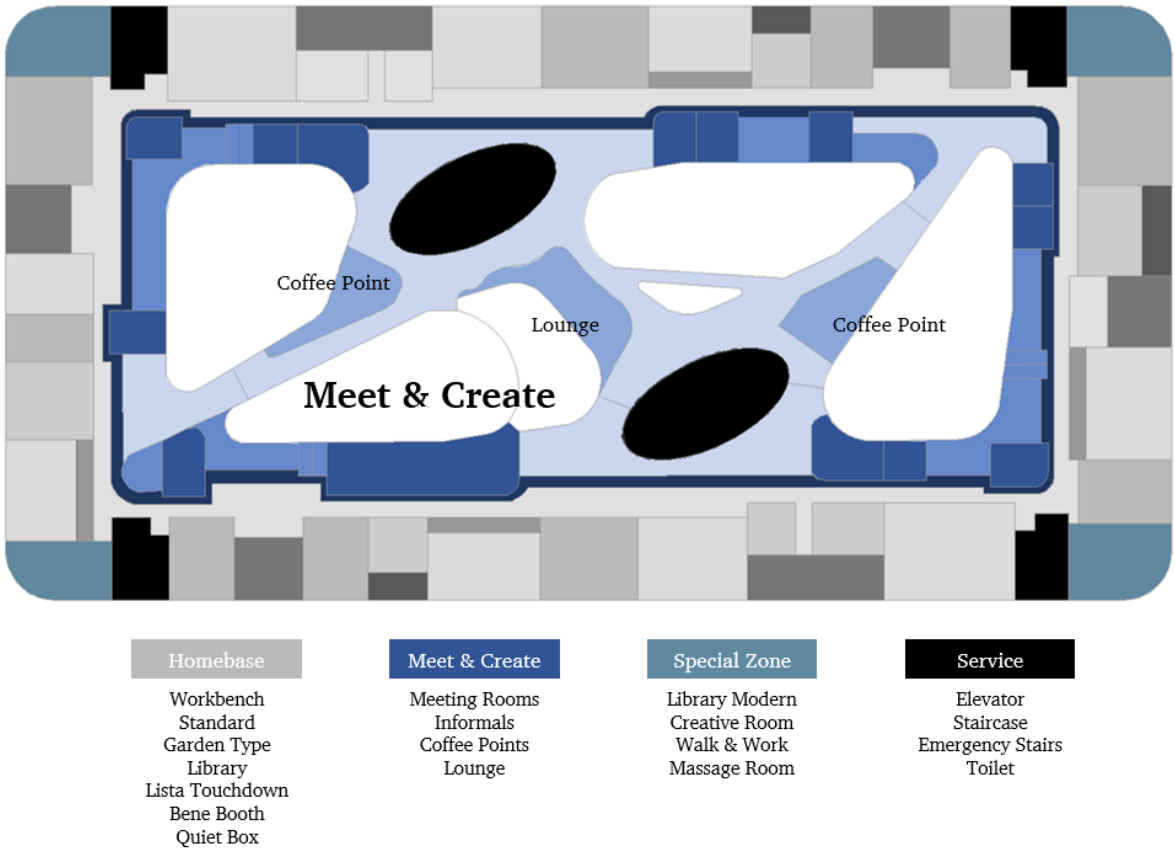


Figure 2.9: Office plan of easyCredit (Kohlert and Cooper, p. 143)

According to Nutt (2000, p. 11), the interface of facility design knowledge and facility management knowledge was at an older time the undeveloped area of FM, specifically on the strategic level, that is importantly to be identified in order to understand the impact of “management on design” and “design on management” that always overlap during life cycle briefing, design and management. The knowledge base is needed to ensure that the facility provisions are based on the end-user needs and the design concepts are suitable with property strategy.

Health, Safety, Security, and Environment

This has been years that office design prominently considers routine to produce the most efficient use of space and fulfil healthy and safety requirement at the same time (Bielefeld, 2018, p.9). To do so, it needs the assurance from an organisation to protect, promote, and support the complete physical, mental and social well-being through four approaches: “(1) physical work environment, (2) psychosocial work environment, (3) personal health resources in the workplace, and (4) enterprise community involvement” (WHO, 2010).

Vischer (2004), who studied the work environment design for worker healthy and productivity, suggested the concept of three comfort to measure user comfort in environmental and behavioural terms, as follows:

1. Physical comfort: the zone that related closely to the expertise of designer to ensure occupant healthy and safety requirement comply with the legal standards. It includes ventilation and indoor air quality, thermal comfort, ergonomic comfort, light levels, and sound absorption level.

2. Physiological comfort: sense of territory, both individual territory (office, workstation), and group (team workspace). It includes sense of privacy, sense of status and sense of control.

3. Functional comfort: effective workspace to help users finish their tasks. It includes air quality, thermal comfort, spatial comfort, privacy, lighting quality, office noise control, collaborative or team workspace, visual comfort, and security.

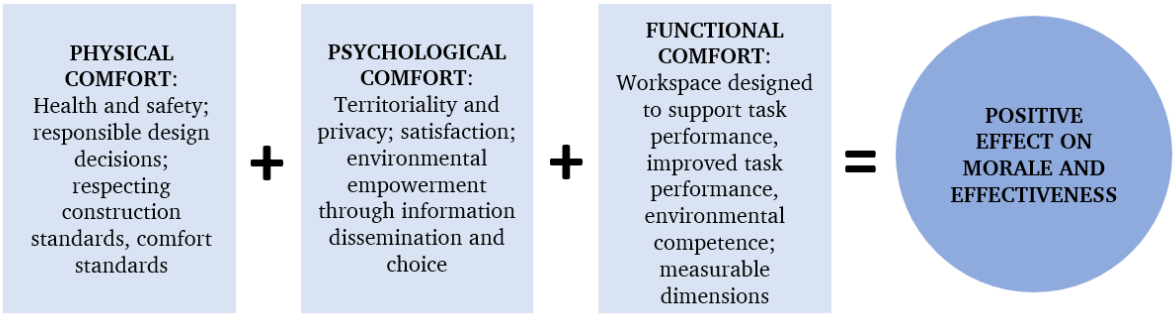


Figure 2.10: The concept of comfort (Vischer, 2004, p. 89)

Often, Facility Managers apply what the theories of efficient and effective office design have told to with barely considering the employees' satisfaction factors. The future office design that promotes a more open and flexible office layout offers a more collaborated and transparent office environment. Yet, at the same time, results the crisis of privacy and highly noise level. Many studies have shown the employees dissatisfaction when they have to move out from enclosed office to open workstation in terms of privacy, acoustic conditions and confidentiality issues (Vischer, 2003, p. 90). For example, a study of Kim and de Dear (2013) regarding workspace satisfaction proved that enclosed private office achieved the highest overall workspace satisfaction score compared to other office types (p.21). Visual privacy, amount of space, sound privacy, and noise level contribute the most significant satisfaction score of enclosed private office. While sound privacy was reported as the most dissatisfying factors of cubicles with high partitions (59%) and low partitions (58%), as well as open office layouts (49%). Their argued that the ease of communication offered by the cubicles and open office layouts failed to balance the negative impacts of noise and loss of privacy distraction occurred within these types of office (p. 25).

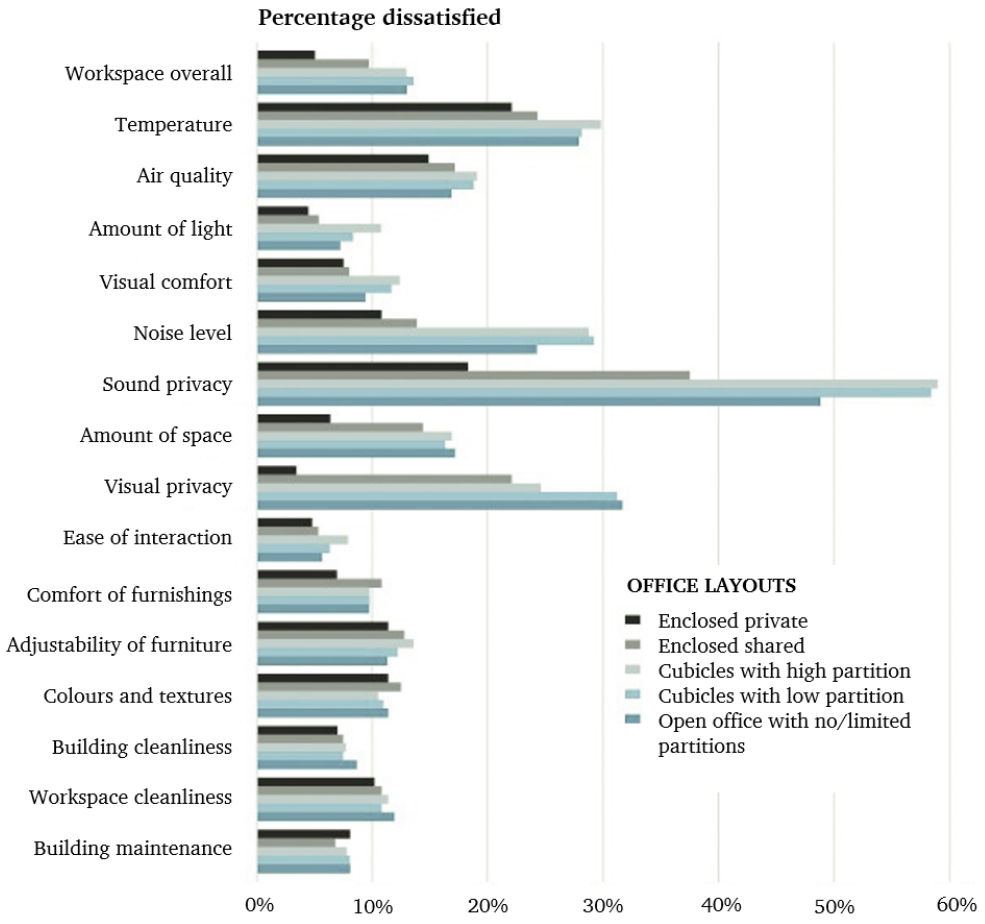


Figure 2.11: Employees office dissatisfaction based on office layout configurations (Kim and de Dear, 2013)

Besides, sickness report in Germany shows that headaches, pain in the back, neck and shoulders, inflammation of hand joints, physchological stress and eye strain are the most complaints healthy issues in office environment due to the massive usage of computer-aided information and communications technology (ENWHP, 2009, p. 3 - 12). It argued that providing ergonomic office chairs and good lighting are very often insufficient. Instead, to improve productivity needs a well-planned working environment to fulfil the employees' health requirement and encourage personal development for human well-being. It then suggested to:

- Work mix, e.g. workplace rotation, work expansion, combining tasks, and group work: encourages physical and mental activity, reduces sickness rates and stress, increases job satisfaction, and promotes well-being and health.

- Invest more space: research showed that work can be done more productively mobile compared to while sitting down.

- Avoid painful desk job: do a variation of movements e.g. walk, stand, and sit by taking break jobs through a non-computer related tasks, providing elevated desks next to workplace to take phone calls or a short meeting.

- Create awareness: promote exercise programs, courses to strengthen back, activities during breaks suggestions, as well as workplace health protection and promotion advice.

Kohlert and Cooper (2017, p. 62-67) argued space design must support four definite behaviours that related directly to well-being, which are communication, collaboration, concentration, and rejuvenation. Alongside with Steelcase research team, they agree that positive mood will support human well-being in office environment that may be obtained through six dimensions of wellbeing:

No.	Dimensions	Design considerations
1	Optimism: fostering creativity and innovation by allowing highly autonomy for employees.	Create spaces that allows employees to choose where and how the task can be done, flexibility for personalisation and individual customisation instead of standardised workplace, support their working needs, and transparent design to build trust.
2	Mindfulness: to manage the cognitive overload of their daily lives and be fully present in the moment	Create spaces that connect people physically without distractions or interference, control their sensory stimulation and set the intensity, and are calming through materials, textures, colours, lighting, and views.
3	Authenticity: to allow employees to feel a part of the organisation's culture and feel encouraged to express their own ideas and values	Create spaces that incorporate informal environment and connect their personal values to the organisation's values.

4	Belonging: to get connected to others	Create welcoming entrances, well-equipped spaces for mobile and full-time employees to work individually or in-group, provide videoconference configurations to work remotely, and informal areas for socialisation.
5	Meaning: to build harmony in context, based on trust and collaboration	Create representative spaces, use technology to show real-time information, and create ecosystem of spaces that energise the employees to work productively.
6	Vitality: to ensure positive sensory experiences	Design areas that allow employees to choose the level of sensory stimulation, provide adjustable furniture, healthy food, natural daylight, views, ventilation, healthy lifestyle.

Table 2.9: Six dimensions of wellbeing suggested by Steelcase research team (Kohlert and Cooper, 2017, p. 62-67).

Meanwhile, there are also opportunities to solve the environmental issues through office design. Energy saving in office building can be obtained through the optimisation of architectural design since it affects the heating, cooling and lighting energy demands of buildings (Nasrollahi, 2013, p. 24-25). A study in Iran claimed that the application of architectural energy efficiency saves the energy up to 50% without the need for additional materials or technologies. Yet, it considered the window-to-wall ratio and shading devices as the most importance factors affecting the energy demands of the building (p. 25).

In addition to the aspect of waste, attention must be paid in future to the aspect of urban mining in relation to facility management. Schebek, Linke and Motzko (2012), Schebek et al (2016) and Motzko et al (2017, p.9) encourage to develop the concept of urban mining that allows to save the primary raw material consumption for buildings. As quoted from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (2018), construction and demolition waste play a major role in contributing the waste generation in Germany during 2000-2015 by 58% - 64% (Federal Statistical Office, 2017). The solution that can be taken is by implementing

the waste hierarchy guidance that provides the best strategy of waste management options for the environment (the UK Government, 2011 and Scottish Government, 2017). According to this, the first priority in waste management hierarchy is to prevent waste in design and manufacture. However, since rapid changes in office workspace, urban mining concept offers to reduce the consumption of primary raw material by identifying and extracting materials of buildings, infrastructure, packaging, or process waste as sources for secondary raw materials (Motzko et al, 2017, p. 11).

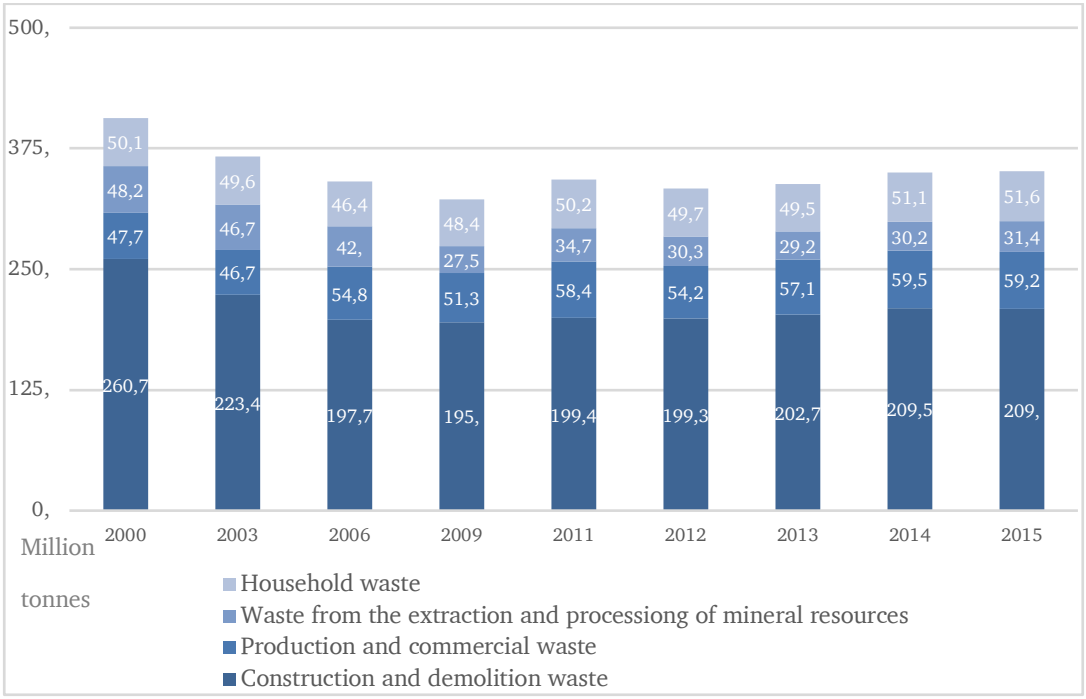


Figure 2.12: Waste generation in Germany 2000-2015 (Federal Statistical Office, 2017)

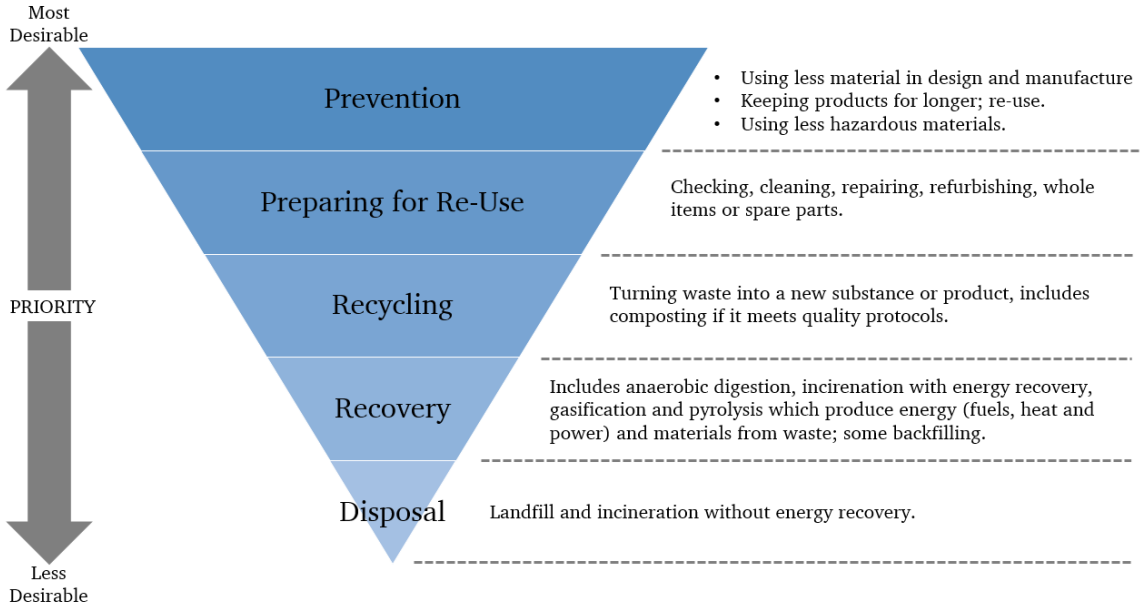


Figure 2.13: Waste hierarchy application guidance based on Article 4 of the Revised Waste Framework (Directive 2008/98/EC) (the UK Government, Department for Environment, Food and Rural Affairs, 2011 and the Scotland Government, 2017)

Flexible office design is also importantly advised to anticipate changes in organisation that at the same time leads to the changes of office space requirement, which then possible to prevent or at least minimise waste in office buildings. Jacobsen and Jenull (2010, p. 150) urged sophisticated room concepts as ecological solution that is not only improves work processes, but also increases space efficiency. They suggest “intelligent spaces” as multifunction area that can save costs, space and furniture resources. However, they argued almost on the opposite to Kim and de Dear (2013) regarding closed vs open plan office concept. Jacobsen and Jenull (2010), in contrast, promoted open space as sustainable solutions that offers zones for communication and retreat. Still, it requires undedicated closed office for employees who need to work in highly concentration (p. 151).

Evidence-based Design

In accordance to the performance and office design relationship, current theories fundamentally have to be rechecked to the actual practice to balance the contribution of facilities managers on asset and building management (Landorf and Harrison, 2000, p. 225). When we build buildings and environments, we expect the relation between

people and space rather than trust the level of the individual space (Hillier, 1996, p. 20). Hillier (1996, 2007) suggested that there are three filters of generic function when the buildings are designed. First, the fact of occupation and the fact of movement. Occupation can be defined as stationary activities that occur within the space, e.g. conversing, meeting, eating, or sleeping. Whereas movement means the relations between spaces of occupation. The second filter is the cultural or programmatic requirement, in which the aspects that need to be considered when different forms of occupation cannot be situated in the same place, e.g. intervention, spaces scale, or privacy needs. Third, individual properties of a building that make this differs from all others.

However, Sailer and Penn (2009, p. 6, 8-9) claimed that the relationship between space and organisation is unclear, i.e. substantially, employees may interact in two different ways: it is whether by spatial closeness (spatiality) or whether by conceptual closeness (transpatiality). Therefore, it is insufficient to easily implement the generic function concept to office building without having Evidence-based Design (EBD). To that, they suggested that anthropological behaviours could be used to explain spatial configuration-in-use as knowledge-intensive workplace environment through EBD i.e. the architects need to analyse potential movement flows based on spatial configuration and consider the organisation character through their usage patterns as well as work and programme structures.

EBD is a recently popular architectural approach to follow the successful recognition in design for health sector that is known as Evidence-based Medicine (EBM) (Sailer et al, 2008, p. 1-2). According to Hamilton and Watkins (2009, p. 9), EBD is formally defined as follows:

> *"A process for the conscientious, explicit, and judicious use of current best evidence from research and practice in making critical decisions, together with an informed client, about the design of each individual and unique project."*

However, it is often that practitioners refuse to implement EBD as they do not want to change their ways of working and are misunderstood that EBD will lead them to be rigid or standards in expressing themselves in a variety of forms (Hamilton and Watkins, 2009, p. 14). On the other hand, Sailer et al. (2008, p. 4) opposed the argument of designers that designing a building is not necessarily systematic. They argued, instead, that design process should be based on research to act in accordance with the Vitruvian principles of 'firmitas' (firmness) and 'utilitas' (commodity).

Nevertheless, Sailer et al. (2008) also admitted that the implementation of EBD is in fact rarely implemented compared to EBM. Based on office design cases, infrequently enforcement of EBD may be due to contradictory evidence in the field of office design since "office environments are strongly influenced by organisational structures, hierarchies, atmospheres, and an organisational identity and culture (p. 6). Unlike the health sector, design deals with unique cases because not all organisations are the same nor they use spaces in the same ways (p. 13-14). Thus, they suggest the new EBM practice that combines two fundamental aspects: (1) the need for systematic rigour, and (2) the uniqueness of cases (p. 14).

Aside from architecture and design, EBD is also adopted by other fields. The United Nations Inter-Agency Working Group (UN IAWG) on Disarmament, Demobilisation and Reintegration (DDR), for instance, develops an evidence-based approach for reintegration programming to help teams to achieve a more locally effective project and programme designs, as well as lead to improved local impact. They define EBD as follows:

> *"A process that can guide field teams (including international and national staff, as well as coordinating agencies as appropriate) in crafting new solutions to a wide range of context-specific challenges through the explicit and transparent use of information and evidence."*

With EBD, The UN changed the use of the "best practice approach" to project planning that depends on evidence of past performance to direct future action, towards the new concept of "best process approach" that supports teams in the design of context-specific propositions for present or future action with explicit and transparent use of information and knowledge. The goals are to be able to create strategically directed, rigorously (and locally) informed and pragmatically applies within organisational and administrative practice, as well as in operational implementation plans.

To implement EBD, practitioner needs to develop a consistent and reliable design process by selecting the design methods for research. Hamilton developed a model of EBD process for his design firm, as follows:

Step	Task	Activity
1	Identify the Client's Goals	Note most important and facility-related global and project-based goals
2	Identify the Firm's Goals	Understand the firm's strategic, project and evidence-based design objectives
3	Identify the Top 3-5 Key Design Issues	Narrow the possible choices; work on high impact decisions
4	Convert Design Issues to Research Questions	Reframe statement of design issues to become research topics
5	Gather Information (Benchmark Examples, Literature Sources, Internal Studies)	Infinite possibilities must be narrowed; limited perspectives must be expanded
6	Critical Interpretation of the Evidence	No direct answers; requires open-minded creativity, balance, and critical thinking
7	Create EBD Concepts	Based on creative interpretation of the implications of research findings
8	Develop Hypotheses	Predict the expected results of the implementation of your design
9	Select Measures	Determine whether your hypotheses is supported

Table 2.10: Nine-step EBD process of Hamilton and WHR Architects Inc. (Hamilton and Watkins, 2009, p. 210)

Since EBD requires fruitful tools, it is necessary to find out the methodologies that will be able to answer the research questions. Established in 1924 and headquartered in Darmstadt Germany, **REFA-**Verband für Arbeitsstudien und Betriebsorganisation e.V (REFA) is the country's oldest organisation for work organisation, business organisation and enterprise development REFA methodologies are cored on the optimisation of work processes, as well as operational data identification and analysis. Instead of only collecting statistical data for the computation of the time factor, REFA is able to estimate working methods and processes (REFA, 1932, p. 4,). Through work study, entire value creation and chain of the organisation must be gathered by using comprehensive tools and methods as well as experience for the investigation and design of work systems. It aims to improve work, consider the performance and requirements of people, and increase efficiency of a company (REFA, 1984, p.12).

REFA introduced ***Grundlagen der Datenermittlung*** (fundamentals data determination) that classifies process type by human-being as follows:

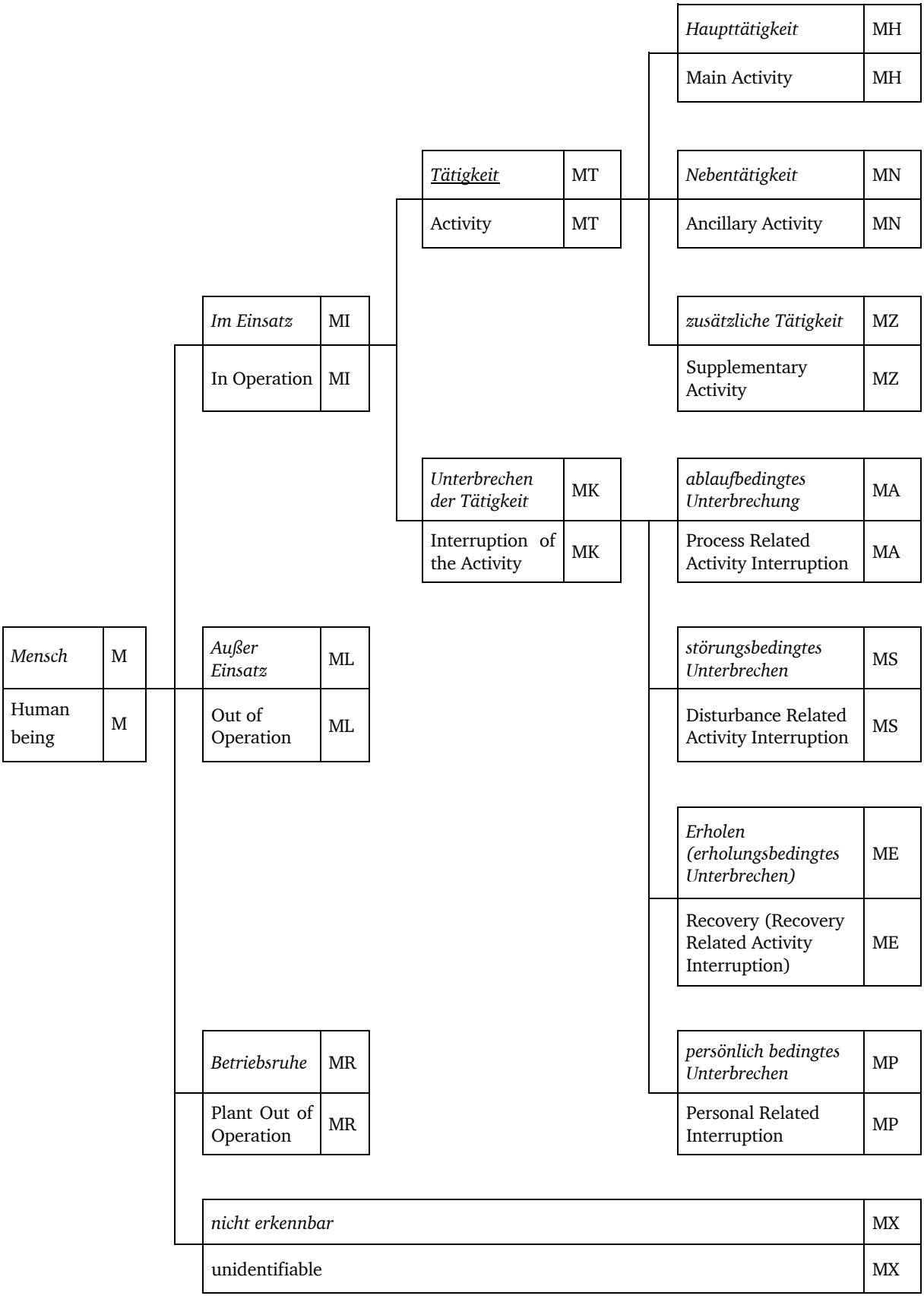


Figure 2.14: Process structure based on human-being (REFA, 1997)

Work task is a request to human activities that serves to achieve their goals. It identifies the purpose of the work-system. Using process structure, observer can investigate how a task is done by determining the process section code and implementing the methods defined by REFA (1984), as follows:

Time Recording (Zeitaufnahme)

Time recording is a method for systematic observation, recording and measuring of work processes. With the help of timing device, e.g. stopwatch, time recordings consist in the captivated of actual times as well as in the description of the work system, particularly the work procedure, method and conditions.

Technics of time recording are at least divided into two phases:

1. Preparation/ before time recording

- The application purpose of time recording must be defined, i.e. necessary accuracy, type of time measurement method, duration of the recording, etc.
- The observed operator has to be informed regarding the purpose of time recording and must be conducted with the knowledge of them.
- The work is articulated in process section in which the term (suboperation, operation step) depends on the application purpose. It is necessary to record the beginning and end of process section so that the process section is clearly described.

2. During time recording

- The observer should take position that distracts the observed operator as minimum as possible, yet still the work process can be surveyed well.
- Discussion with the observed person and third parties should be avoided.
- Company regulations must be considered.
- Safety regulations must be applied.

Single-Time Recording (Einzelzeitaufnahme)

Single-time recording is a proper methodology for individual work. It provides an image of the process examined with technical statistics procedure that can be stated by how the image deviates from reality and what can be done to correct and reduce discrepancies.

This methodology use time recording head sheet to note work procedure, work conditions and all other influencing parameters. Depending of the application purpose, detailment may be required. The observer writes down activities with important characteristics assessed with the help of stopwatch at the moment of changing from one process section to another process section.

TIME RECORDING NO:	Place : City A	Company : B	
9	Date : 20.07.2017	Building : C	
DESCRIPTION OF THE WORK TASK:			
Excavation with shovel loader and filling in pits and transfer silo			
FACTOR INFLUENCING WORKING TIME:			
Working System:			
Excavate with a shovel loader, transport to the installation sites			
Resources:			
Shovel loader with pneumatic tires, 96 hp, shovel capacity 1.2 m^3			
Workplace:			
Excavation height approximately 2m easily passable level path to the tipping points			
Work, building material:			
About 10 years ago heaped up and compacted soil; gravel-sand mixture			
Transport:			
Transport is carried out with a shovel loader; distance to the silo: 70m; to find: 160m			
Amount (amount/ observation):			
45m^3 solid -> 45.0 x 1.2 = 54 m^3 loose soil			
Weather:			
Dry			
Temperature during recording:			
18-25 degree C			
Other influences:			
In the overall system, the shovel loader is the time-determining subsystem			
Employee	**Frequency of Exercise**	**Age**	**Other Notes**
Driver of Loader	9	45	-

Figure 2.15: Example of REFA activity sampling recording sheet (adopted from REFA, 1984)

Activity Sampling (Multimomentaufnahme/ MM-Aufnahme)

Activity sampling is a counting operation that process sections or process types are randomly recorded, counted and statistically checked at specific time point. Unlike time recording that measures process, activity sampling needs number of observations for each process section or process type to find out the percentage frequency of occurrence of the respective process section or process type in the relation to the entie workflow. This methodology can be used for work design that the duration of process section and type can be calculated from the duration of the time recording.

Classical Activity Sampling (Klassische Multimomentaufnahme)

Classical activity sampling is the method for determining the frequency of interest occurrence, whereby predefined process type is recorded in activity sampling tally charts sheet. It is strictly complied with the basic principle of mathematical statistics randomness and used to determine the time point for observation. In this case, the observation times are not uniform and must be random so that each time point of event has the same chance of being noted by a random observation. The determination of observation times can be achieved with the help of random time tables.

The accuracy of the MM recording, however, depends on the number of data collected. MM method should be used for time fraction that is adequately representative of the total time. This can also be performed as (1) MM individual recording and (2) MM group recording, while the implementation consists of planning, executing and evaluation with the individual steps of: (1) set a goal, (2) determine and describe process types, (3) define tour plan, (4) determine required scope of observation, (5) determine tour times, (6) make observations, (7) interim evaluations, and (8) final scoring.

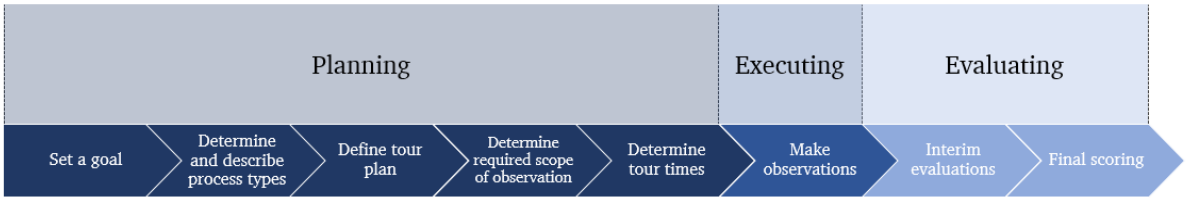


Figure 2.16: Implementation and individual steps of Classical Activity Sampling (adopted from REFA, 1984)

MM2	REFA-Activity Sampling Recording Sheet for summarised entries	Observer: AA Checked by: BB	Date 21.09	Filing No. Sheet		of		Sheets

Process Type		Day	Monday, 21.09																				Result			
	Tour	No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Amount	Transfer	Total	Portion
No.	Demonination	Hour	07.06	07.24	07.40	07.54	08.13	08.34	09.36	09.58	10.24	10.41	11.20	11.51	12.08	13.10	14.05	14.21	15.15	15.40	16.02	16.42	x_a	$x_ü$	x	Pin
B	101: BH, BN and BZ: Location 1		I		I	I	I		I	I		I	I			I	I	I		I		I	13			
B	201: BH, BN and BZ: Location 2					I	I	I	I					I	I			I	I	I		I	10			
B	301: BH, BN and BZ: Location 3				I				I			I	I	I	I	I	I						8			
B	102: BA: Location 1										I												1			
B	202: BA: Location 2									I													1			
B	302: BA: Location 3						I																1			
B	103: BS: Location 1																						-			
B	203: BS: Location 2																						-			
B	303: BS: Location 3																		I				1			
B	104: BP + BE: Location 1							I															1			
B	204: BP + BE: Location 2																						-			
B	304: BP + BE: Location 3																	I					1			
B	105: BL: Location 1			I										I	I				I		I		5			
B	205: BL: Location 2		I	I	I						I	I	I			I	I				I		9			
B	305: BL: Location 3		I	I		I		I		I	I									I	I	I	9			
	Σ Observations		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	60			
M	101: MH, M, MZ, Location. 1-3		I		II	I	III	I		I	II	I	I			I	I			II						
M	102: MA, Location. 1-3				II	II	II		~~IIII~~			II	III	III	III	III	III	III	I	I		II				
M	103: MS, Location. 1					II	III					II	I													
M	203: MS, Location. 2							I																		
M	303: MS, Location. 3								II							I	I	I		II						
M	104: MZ, moving											II		I												
M	105: MI, outside office		~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~				
			~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~				
			~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~				
			~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~	~~IIII~~				
			III	IIII	III	IIII		II	II	~~IIII~~	~~IIII~~	I	II	~~IIII~~	I	II	III	~~IIII~~	II	IIII	II	II				
	Observations Tour		24	24	27	29	28	24	29	26	27	28	27	29	24	27	28	29	23	29	22	24				

Tour			Special Occurence
No.	Day	Hour	

Figure 2.17: Example of REFA activity sampling recording sheet (adopted from REFA, 1984)

While in 1970s at the University College London UK, Hillier et al. pioneered Space Syntax, which is *"a science-based, human-focused approach that investigates relationships between spatial layout and a range of social, economic and environmental phenomena"* (Space Syntax). It provides theories and methods for spatial configurations analysis of a range of types and scales, i.e urban to building. It uses graphical representations of configurational and quantitative properties through computer programmes to detect the hidden patterns in architecture that can be figured out by intuitive eye and analytic mind (Hillier and Hanson, 1997, p. 3). Space Syntax developed various techniques for applying interpretive model from syntactic theories, as follows:

- Representations of space: to provide an objective method for representing the relation of building spatial layout to the way people use it.
- Spatial form analysis: to measure interior layout of a building in the relation to spatial configuration.
- Spatial function analysis: to observe and measure the use of the buildings.

- Interpretive models: to explore building layout impacts on how the people use a building.

Since this research aims to find out "the relationship between organisation and workspace" and "where does the work take place", related Space Syntax methods to this research will be discussed specifically, which is the spatial function analysis that requires observation to describe and measure the building function through:

1. Movement Traces: follow and record the movement of people from specific location for a minimum five to ten minutes and at least two recordings per individual room. It takes place only in open space offices and corridors, whereas enclosed office spaces are usually ignored (Vaughan, 2001, p. 12-13).
2. Snapshots: categorise activities e.g. sitting, standing, walking, etc. and take a tour from space to space to capture the activities within the specific place at a precise moment. Normally the observation is placed on large-scale plans of the area (1:50 minimum) and use the plans to record activities with coding according to the activity categories (Vaughan, 2011, p. 7-8).
3. Other methods, e.g. ethnographic observation and analysis, interview, facility survey and analysis.

These methods have been a powerful research tool that can represent researcher's intuitions to serve objective evidence about the characteristic of the observed area (Vaughan, 2001, p. 2). This has fundamental theoretical implications in building design to achieve the aims of a building programme, e.g. interaction, occurrence between employees, social and economic impact such as profit margins of the business, innovation and effiency (p. 17).

Activities	Symbols
Sitting	
Standing	
Sitting-talking on the phone	
Sitting-talking with colleagues	
Standing-talking on the phone	
Standing-talking with colleagues	
Moving	

Figure 2.18: Sample of activities symbols for Space Syntax snapshots observation

Figure 2.19: sample of Space Syntax snapshots

Both methodologies of REFA and Space Syntax share common principles that offer science-based evidence through systematic observations with human-focused, economy, and environmental consideration as the prominent aspects of this research. However, they are still unique and different to one another. REFA's activity sampling and Space Syntax's snapshots for instance, require similar procedures in which these observe large-scale areas and capture activities appear during observation. Still, both categorise activities differently. Space Syntax, on the one hand, categorises activities based on static activities (sitting and standing), interactions (talking), and directions of movement (walking). It serves observation data on the actual plans with activities coding. However, Space Syntax's snapshots are not particularly designed to specify whether activities appeared in the observed area contribute optimally or whether disrupt in completing a task. REFA, on the other hand, identifies the working processes of organisation and categorises activities based on the importance level of process in supporting tasks to be done, i.e. main activity, ancillary activity, supplementary activity, process related activity interruption, disturbance related activity interruption, recovery related interruption, and personal interruption. Yet, the activity sampling does not identify where the work takes place precisely if the observer use tally charts to count activities occurred in the observed area during the observation tour as advised by REFA.

Therefore, REFA's activity sampling will be helpful to find out organisation's working culture and measure productivity, while Space Syntax's snapshots will be potentially complementing REFA's activity sampling to specify the location of work using plans and activities coding.

Another example of Space Syntax and REFA methodologies similarity comparison is between Space Syntax's movement traces and REFA's time recording. Both methodologies record activities of individual or small group in specific area during a short time, while the difference precisely lies in its purpose: Space Syntax's movement traces aims dominantly to record routes of movement, whereas REFA's time recording intends to measure the work processes.

Since this research aims to find out the working culture, the location of work, the relationship between spatial configuration and organisational behaviours, as well as the contribution of productivity to cost efficiency in UOG industry, this research requires tools that are able to help systematically answer the research questions. Therefore, it is fruitful for this research to mainly and simultaneously use Space Syntax and REFA methodologies since these complement each other to measure the work processes through static activities, interactions, and directions of movement.

3 Methodology

As discussed in Chapter 1, this dissertation attempts to find out the working culture of UOG industry that involves spatial and organisational aspects to fruitfully contribute to an optimal productivity and cost efficiency. Qualitatively, issues related social and humanbeings of individual or group, interview to experts, data collection regarding specific theme, and complex data interpretation are explored flexibly (Creswell, 2007). Inductive analysis is also demanded to understand program activities and outcomes from experience and setting (Patton, 1980). Still, quantitative approach is required to test specific hyphotheses through rigid structure of holistic research that can be analysed statistically. Assumptions are also prescribed to examine available theories deductively to avoid bias, control alternative explanation, generalise and reimplement existing hypotheses (Creswell, 2009). In short, this dissertation adopts mixed methodologies that associates qualitative and quantitative methods, as well as philosophical assumptions. The timing of this research was also specifically decided in which this research implement concurrent timing that both quantitative and qualitative methods are collected, analysed, and interpreted relatively at the same time (Cresswell and Clark, 2007). However, since this dissertation determined to cover the circumstances both before and during the Covid 19 pandemic, concurrent timings were once repeated: (1) before pandemic in 2017 and (2) during pandemic in 2020.

3.1. Research Design

Research Problem

To be able to answer the reseach questions, philosophical basis guides this research to select the suitable research methodology by firstly identifying this research limitation or problem, so that this research can determine which approach is needed to reach its objective. In this dissertation, researcher recognises that:

- Oil and gas industry several times deal with ups and downs phenomena driven by geopolitical issues that affect global oil prices, political issues and recently by novel Covid-19 pandemic.
- To be able to survive, each function within the industry is rapidly demanded to adapt to the changes of the industry, both culturewise and costwise.
- Office Facility Management is one of the biggest shareholders of internal operational expenditures that can be potential area to save the cost impactfully.
- There were limited empirical research, direct or indirect observation, reported regarding spatial and organisational relationship that may help the office facility management to apparently understand their actual working culture.

- There were insufficient previous studies that introduced well-established methods to help the research gather the empirical evidence.
- Standards or regulations regarding Office Facility Management of organisations is not yet established sectorwide and/ or within each organisation.
- Organisations are unique.

To that, this research has to:

- Find out the working culture of UOG sector before and during pandemic by identifying, explaining and discussing within-data and across-data patterns in several different organisations.
- Help the industry to adapt the rapid changes by understanding the actual need of the industry, gathering empirical evidence of each organisation through direct and indirect observations and recognising the singularity and speciality of each organisation.
- Construct the applicable and comprehensive process, methods and tools to become a standard based on best practice and evidence that will help the industry to be more anticipative to the future changes.

Therefore, it is clear that subjective views of the participants will help the researcher of this research to build patterns and to finally result a theory. Yet, it is barely sufficient for this research to achieve the aim unless researcher collects data objectively with rigid tools so that bias can be avoided and theory can be tested. The combination of both approaches has assured that researcher needs to apply mixed methodology in which at this stage of discussion, this research also becomes conscious of four worldviews used in research are needed here. Although mixed-methodology is commonly be associated to pragmatism worldview, researcher determines to use multiple worldviews, i.e. (1) postpositivism, (2) constructivism, (3) advocacy and participatory, and (4) pragmatism, as explained by Cresswell (2007), as follows:

- Postpositivism: associated to quantitative approach. It works top-down by determinising, narrowing variables, detailing observations, and testing theory.
- Constructivism: associated to qualitative approach. It works bottom-up by understanding phenomena defined by the participants subjectively.
- Advocacy and participatory: influenced by political issues, e.g. empowerment, marginalisation, hegemony, patriarchy, and associated more to qualitative rather than quantitative.
- Pragmatism: associated to mixed-methods research. It focuses on concequences of actions, problem centered, pluralistic and real-world practice oriented.

This research also notices that, aside from methodological assumption, the necessity of ontological and epistemological assumptions are also considered. Ontology is the study of being (Crottty, 1998). It provides different views on nature of reality which is imperatively required to help researcher in giving the basis on perceptual perspective. Further, epistemology, known the instrument of knowledge that possible and reasonable, is used to understand the relationship between the researcher and the participants.

To help the determination of methodological approach required, this chapter initially classify what data is relevant to the research questions:

1. Working culture: organisations' documents, semi structured expert interviews, structured-space observations, questionnaires
2. Place to work: structured-space observations
3. Office occupancy rate: structured-space observations
4. Office spatial planning and organisational behaviours relationship: organisations' documents, FM & HSE assessment, structured-space observations
5. The future of work: structured-space observations
6. Office productivity and cost efficiency: organisations' documents, structured space observations.

However, as earlier mentioned, researcher realised that organisations are unique and not all the procedures or tools can be applied to each organisation. In addition, consent of participants to be included or not within each research method is fully respected. For this research, 8 (eight) companies of oil and gas sector were chosen to represent the sector and 2 (two) FM consultant were expected to give their professional point of view in the relation of FM in general and in the oil and gas area. The names of organisation were anonymously changed to become alphabetical orders in which will be explained later in the next Chapter 4: Introductions to the Case Studies. Below, this dissertation lists which method is applied to which organisation, as follows:-

Methods	**Organisation**									
	UOG Industry								**FM Consultant**	
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Organisations' documents	✓	✓	✓	✓	✓	✓	✓	✓		
Semi-structured expert interviews		✓		✓	✓	✓	✓	✓	✓	✓
FM & HSE Assessments	✓	✓	✓	✓	✓	✓	✓	✓		
Questionnaires	✓									
Structured-Space Observations	✓	✓	✓	✓	✓	✓	✓	✓		

Table 3.1: Sample of Space Syntax snapshots

3.2. Qualitative

Qualitative research is the classification of research that delivers findings based on non-statistical procedures or other forms of quantification (Strauss and Corbin, 1998). Often associated to constructivism of worldviews used in research, qualitative approach works bottom-up and links to participant's views in order to construct wider themes and generate a theory interrelated themes (Creswell and Clark, 2007). In this dissertation, researcher used inductive approach to start with participant's views and develop to patterns, theories as well as generalisations (Crotty, 1998) to which expert interviews were conducted in this research. At this stage, multiple realities as ontological approach are offered to the participants to give the illustration about different perspective.

Known as the broadest philosophical stance in the research process, epistemology implements closeness between researcher and participants by visiting their sites to collect data. Therefore, visit to the case studies offices were scheduled to almost all of case studies listed (nine out of ten). Whereas as one of the case studies was not available to be visited, the researcher invited the observee to join the virtual meeting set by the researcher.

3.2.1. Analysis of Organisations' Documents

Organisations' documents were analysed to get the perspective of each organisation from their organisational profile, annual report and their future program in OFM. This helped the research to enrich the information related.

There are at least 2 (two) classification of organisations' documents: (1) published and (2) unpublished. Published documents were accessed directly by researcher through the organisations' official website, e.g. company profile and annual report. Whereas unpublished printed or electronic documents were obtained through formal request to the organisations of the case studies, e.g. presentation by observee regarding their company/FM profile and office layout.

3.2.2. Semi-Structured Expert Interviews

The research prepared 2 (two) types of expert interviews:

1. Semi-structured expert interviews to Facility Manager of the Organisations: were constructed to get the information regarding current condition and future plan of each organisation. This is also expected to share the OFM manager experience, obstacles, and awareness to the importance of OFM role within the organisation.
2. Semi-structured expert interviews to the FM Consultants: allowed this research to get to know FM and get the recommendation for future trends from professional point of view.

The questions for Facility Manager of the Organisations and the Consultants were distinctive yet relatively similar. The difference was more on the perspective points of view expected from (1) owner representative and (2) professional. Typical questions were about definition, positioning, objective of FM. Specific subjects were also included: office spatial planning, HSSE, Contract Management, Asset Management, Knowledge Management. In addition, Facility Managers were also specifically asked to describe their future plan for office facility standards in UOG sector.

At the beginning of the interview, expert was given participant information sheet that provide details regarding this research: title of project, researcher's name, purpose of research, the reason why they were chosen, participation procedure and confidentiality. They were also granted a chance to read the questions carefully before they agreed to parcipate on the interview. If they agreed, this researcher began the next procedure by starting a voice recorder to record the interview to be able to transcript it later.

Despite the questions that has been set, interview can be spontaneously evolved when there was interesting particular topic that can be digged in by researcher or be told by interviewee.

3.2.3. FM & HSE Assessments

FM OFM and HSE assessments were proposed to investigate current condition of OFM and HSE in upstream oil and gas sector. Researcher developed FM and HSE checklist sheets adopted from healthy and safety policy (University of Sheffield), guidelines in Workplace (OSHA), and implemented FM and HSE checklists (NHS, University of Reading). The subjects of FM and HSE included in the checklists were about

housekeeping, maintenance, fire safety, electrical safety, first-aid, welfare, outside areas, workstations, hazardous substances and machinery, manual handing, Personal Protective Equipment (PPE), as well as accident reporting.

The procedure of the assessment involved HSE team of the organisations in which both researcher and HSE team were given the same checklist sheets to be able to take notes during the assessment. HSE team led the tour to relevant area of the office to be assessed with the researcher.

3.3. Quantitative

It is common for organisations to set up standards and regulations in which not limited to the spatial planning of the office. However, the actual condition of organisations, at least within the industry, needs to be investigated. Potential questionable hypotheses between what is written in the organisation' documents and actual condition of organisations have triggered the research to crosscheck through mixed methodologies and several cases of organisations as case study.

3.3.1. Questionnaires

Questionnaire was distributed specifically to employees in Organisation A. It consists of 32 questions regarding:

- Employees background: position level, department, working duration within the organisation, and working experience from another sector.
- Working culture: (1) frequency, location, overtime, essential criterias of workplace, and workplace satisfaction of individual work and in group, (2) frequency, reason, and employees' opinion of mobile & flexible work.
- The impact of work location to the work activities: location of stakeholders, frequency of travel to stakeholders and airport, as well impact of traffic jam, demonstration, and flood.

Using digital survey platform of Organisation A, this research succeeded in distributing the questionnaire to 882 employees in which that amount represented the number of all of the employees listed in Organisation A and given back the result from 663

employees. That means 75% of the employees of Organisation A participated in the survey.

3.3.2. Structured-Space Observations

Structured-space observations had done using REFA methodologies in the collaboration to Space Syntax methodologies. REFA introduced work-system and process design to aim the possibility of collecting statistic data for the computation of the time factor in which leads to a critical estimate of working methods and processes (REFA, 1932).

Formed by REFA process structure, process section related to this research were determined as follows:

- **Main activity (*Haupttätigkeit*)**: individual task working, e.g. working with computer or paper work.
- **Ancillary activity *(Nebentätigkeit*)**: formal meeting, group discussion
- **Supplementary *(Zusätzliche Tätigkeit*)**: talk on the phone, working with other tools, help other people or groups.
- **Process related activity interruption *(Ablaufbedingtes Unterbrechung*)**: waiting for printing, uploading/downloading big size programs or documents, walking from desk to another desk/ office/ printing station/ stationeries station.
- **Disturbance related activity interruption (Störungsbedingtes Unterbrechen)**: working tools error, safety issues.
- **Recovery (Erholen)**: lunch/ coffee/ cigarettes break, rest during task.
- **Personal related interruption (Persönlich bedingtes Unterbrechen)**: go to the toilet, private conversations, and delayed start of work.

Traditionally, REFA uses tally chart to note activities sampling during observation. While this research integrated Space Syntax methodologies, particularly Snapshots methods, to complement REFA methodologies in capturing all activities occurred by directly taking notes on office layouts with defined symbols of REFA process section as follows:

Figure 3.1: Defined symbols of Process Section developed from REFA Activity Sampling and Space Syntax Snapshots.

Single-Time Recording (*Einzelzeitaufnahme*)

Single-time recording helped this research to understand how employees finish their task individually and therefore to crosscheck whether their activities match to the activity sampling. This research targeted various employees background of the sector by choosing employees of each Department representation, e.g. Planning, Operation, Supply Chain, Corporate Secretary, Business Support, Finance, and Internal Audit Department.

At first, researcher asked employees to get their permission to record their activities for 15 minutes each recording and repeated 3 (three) times a day of observation. After consent received, researcher recorded once in the morning, noon and close to after office hour to get the variation of activities that might be occurred differently between one to another. During the recording, employees were not notified that they were recorded with the hope that the acts being recorded were natural. Until the end of the observation, the research completed 104 single-time recordings of 40 employees.

Activity Sampling (*Multimomentaufnahme/MM*)

Activity Sampling was a chosen method in this research to count employees' activities within the office and during office hour. It proved the density of the office, the place where the employees work, and how do the employees work. Using determined activities, Activity Sampling had been conducted systematically in 8 offices:

- Representative case studies were chosen based on various company background: private vs public, company size, and local vs multinational.
- Office tour location were situated on office floors with minimum 50% total area of core and support function/ department within the company.
- Office tours at the same location were repeated hourly (9-10 times per day per location) during office-hour using random times chart from 7 to 17, with total 257 office tours.

4 Introduction to the Case Studies

Indonesian upstream oil and gas organisations determine their working program and budget based on their targets in giving the greatest contribution by producing oil and gas for the State. Consequently, organisation with denser activities demands larger capital and operational expenditure to support their program. In this stage, office facility management is obviously included within the working program and budget of the organisations since office facility management contributes to provide work facilities for the organisations.

To give the picture of current offices standards in oil and gas sector, the study attempted to compile the data of 36 office buildings of 36 organisations within the sector to recheck the actual condition of oil and gas standard and the result is as follows:

- 62% of office buildings were at CBD area and the rest 38% were at non-CBD area. According to FM Elites, their decision in choosing the location of their office buildings was based on (1) proximity from their employees' major domicile to the office location, and/ or (2) proximity to Organisation A's office location. They added that proximity to Organisation A's office location becomes important since PSCs often physically attend meetings with Organisation A for regular coordination.
- The size of the offices were varied from 375 m^2 to 31,500 m^2 with seat capacities from 27 m^2 to 1,600 m^2.
- The gap of offices ratio were vast, from 7.65 m^2 to 22.10 m^2 with the average of 12.6 m^2 per person.
- The gap of office rental prices were equally broad, from 12 USD per m^2 to 46 USD per m^2, with the average of 27 USD per m^2 and included service charge.

Based on the data compilation above, it is clear that oil and gas sector has vast ranging offices standards in terms of sizes, seat capacities, ratios and rental prices. Since the business process of UOG sector in determining the size and capacities of the offices ideally based on the activities and productivity of the organisations, therefore representative case studies were chosen based on the organisations' oil and gas productivity rankings and categorised based on the size of the offices, as follows:

- Large organisation with office size >10,000 m^2: top ten oil and gas producer or top oil or gas producer in Indonesia,
- Medium organisation with office size 3,000 – 10,000 m^2: top ten oil or gas producer in Indonesia,

- Small organisation with office size <3,000 m^2: other oil and gas producers in Indonesia.

Aside from that, origin countries of the case studies were also considered to prove if cultural background affects working culture of the organisations. For that reason, eight case studies were selected, as follows:

- **Organisation A**: regulator, governmental institution with office size >10,000 m^2
- **Organisation B**: top ten oil and gas producer in Indonesia, national company with office size >10,000 m^2
- **Organisation C**: top ten oil and gas producer in Indonesia, multinational company with office size >10,000 m^2
- **Organisation D**: top gas producer in Indonesia, multinational company with office size >10,000 m^2
- **Organisation E**: top ten gas producer in Indonesia, national company with office size 3,000 – 10,000 m^2
- **Organisation F**: top ten gas producer in Indonesia, multinational company with office size 3,000 – 10,000 m^2
- **Organisation G:** gas producer in Indonesia, national company with office size <3,000 m^2
- **Organisation H**: oil producer in Indonesia, multinational company with office size <3,000 m^2

To achieve the aims of this research by choosing the case studies mentioned previously and therefore interpret its findings correctly, this research decided to describe further elaborately the organisation background and structure, as well as the location, the building types, and the size of their offices.

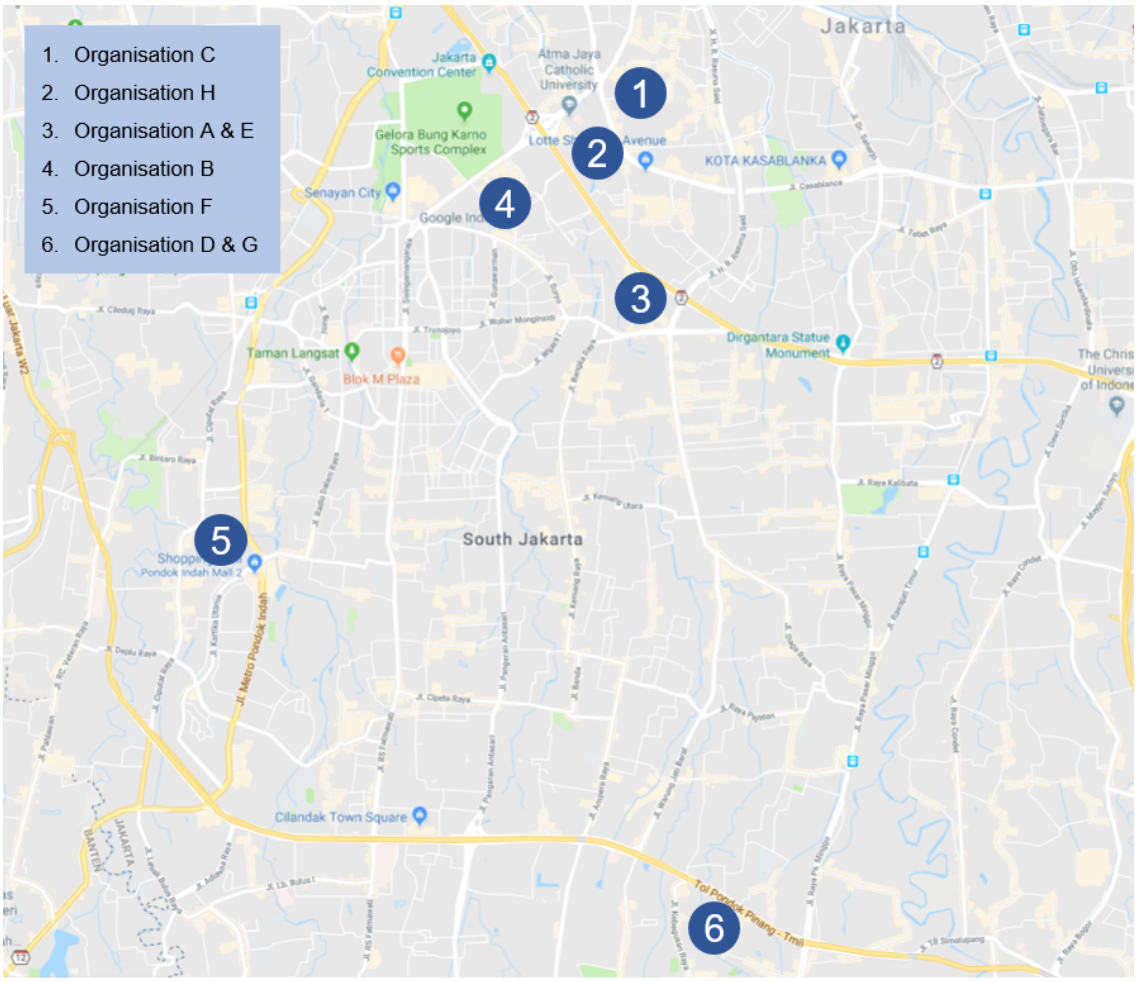


Figure 4.1: Case studies office location in the Mid-South and South Jakarta (accessed from Google Maps)

4.1 Organisation A

In the reference to the Minister Regulation of Energy and Mineral Resources Republic of Indonesia No. 17/ 2017 regarding Organisation and Working Procedure of Special Task Force for Oil and Gas Business Activities Republic of Indonesia, Organisation A is the state's special task force for performing the management of UOG business activities under instruction, coordination, and supervision of the Minister of Energy and Mineral Resources. The tasks of the organisation include, as follows:

- Provides advice to the Minister regarding arrangement and tender of Working Areas as well as Production Sharing Contracts.
- Signs the Production Sharing Contracts.
- Reviews and provides upstream oil and gas working areas development planning for production to the Minister.
- Provides approval of upstream oil and gas working areas development.

- Provides approval of Working Program and Budget for Production Sharing Contractors.
- Executes monitoring and reporting to the Minister regarding Production Sharing Contract execution.
- Appoints oil and gas seller for the State's sharing.

Based in the tasks above, it is clear that Organisation A acts as regulator and partner at the same time. It demands the employees to become a capable advisor for the government as well as a professional counterpart for the PSCs in determining productive oil and gas programs in which each program requires specific expertise. To be able to perform their functions, Organisation A is led by the Chairman and follows by the Vice Chairman with at least main seven Departments within the organisational structure, as follows:

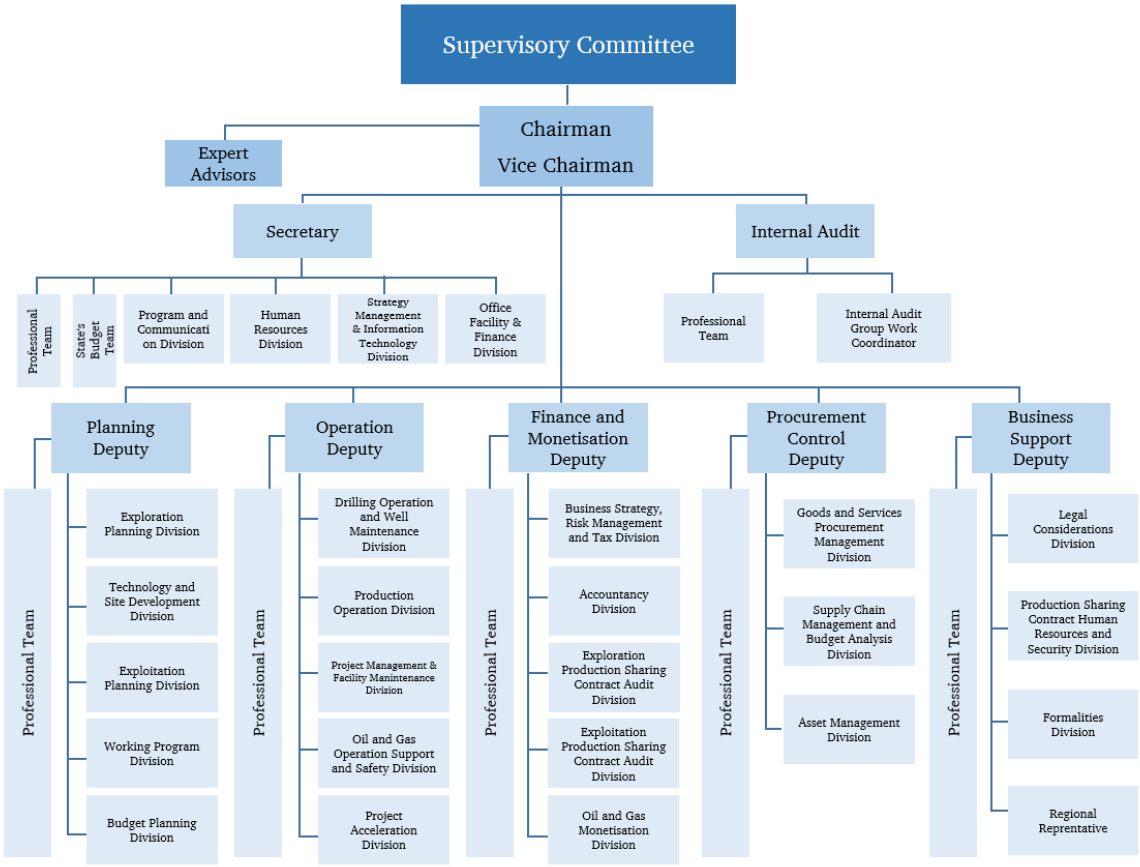


Figure 4.2: Organisational Structure of Organisation A (adopted from Organisation A organisational chart)

The Ministerial Regulation also elaborates the responsibilities that Organisation A holds, as follows:

- **Chairman**: to lead and represent the organisation in managing upstream oil and gas business in Indonesia according to Production Sharing Contract and so that oil and gas production in Indonesia can be optimal.

- **Vice Chairman**: to help the Chairman in managing upstream oil and gas business, as well as act as Chairman if the Chairman is permanently unable to fulfil the duty.

- **Secretary**: to coordinate in reporting the implementation of the Organisation's task, managing the working program, monitoring the performance of (1) business support, (2) communication and information, (3) organisation and human resources, (4) strategic management and information technology, as well as (5) office facility and internal finance of the Organisation.

- **Internal Audit**: to control compliance of the regulation, performance, and finance, as well as monitor the follow-up of audit finding by (1) planning, executing, analysing, and evaluating performance audit and finance audit, (2) executing compliance evaluation of the system and procedure, as well as regulations, (3) analysing and follow-up monitoring of audit findings, and (4) helping audit execution from Government and/ or external stakeholders.

- **Planning**: to plan the activities of upstream oil and gas business, includes (1) working program and budget evaluation as well as contract termination of exploration working area, (2) technology and development of oil and gas working areas evaluation, (3) working program and budget evaluation of exploitation working area, (4) working program controlling and realisation monitoring of working area development planning, as well as contract extension or termination in exploitation working area, and (5) Production Sharing Contract's budget controlling.

- **Operation**: to manage the operation of upstream oil and gas business according Production Sharing Contract, includes (1) controlling and monitoring of well operation and drilling activities, (2) controlling and monitoring of operation production activities, (3) controlling and monitoring of project management, as well as operation facility maintenance, and (4)

controlling health, safety, and environment protection activities, as well as operational support.

- **Finance and Monetisation**: to manage finance and monetisation of upstream oil and gas business according to Production Sharing Contract, by (1) controlling business strategy and investment, finance risk management as well as tax, (2) controlling and managing accountancy management of operational activities, (3) executing exploration cost audit and closed-out of Authorisation for Expenditure, (4) executing operational cost audit, as well as the calculation of the state income, and (5) executing the monetisation of oil and gas business.

- **Business Support**: to manage the business support of upstream oil and gas, includes (1) provide legal consideration to Organisation and Contractors, legal review and assessment, as well as regulations advice related to upstream oil and gas, (2) control and monitor human resources, as well as security activities of Contractors, (3) manage formality and land affairs, as well as governmental relation, and (4) manage upstream oil and gas activities in local community.

To be able to carry out their tasks just described previously, Organisation A currently leases space in commercial office buildings located in Mid-South Jakarta since 2010 with total area 31,398 sqm. This has been the second commercial office building that Organisation A has rented since the first commercial office building is no longer be able to accommodate the office growth requirement due to the organisation's expansion in which then forced Organisation A to move to the second commercial office building. It occupies two different buildings within the same complex: (1) 11 floors of working space and 2 floors of public area in main building, and (2) 1 floor of multi-function, 3 floor of support/ service area in annex building. The percentage of office function is as follows:

- **46.1% of workspaces**: cellular and open plan.
- **14% of meeting rooms**: (1) open discussion area, closed discussion rooms for 3-5 person, (2) small meeting rooms for 6-10 person, (3) medium meeting rooms for 11-20 person, (4) large meeting rooms for 21-35 person, (5) function hall for up to 1,000 person, and (6) training centre.
- **3.2% of support function related to working activities**: photocopy & printing centre, Emergency Response Centre (ERC), Procurement Certification Centre

(PCC), control room, mailing room, accommodation & transportation counter, library, business centre, and CCTV room.

- **10.6% of support function related to other activities**: receptionist, waiting room, lounge area, snack area, spiritual association, prayer room, fitness centre, pantry, breakout, security post, security check, driver post, canteen, cooperative, and toilet.
- **7.1% of service area**: file storage, furniture storage, stationaries storage, IT server, and IT hub.
- **19.0% of circulation**: main circulation, secondary circulation, stairs in premises.

Figure 4.3: Location of Organisation A (accessed from Google Maps)

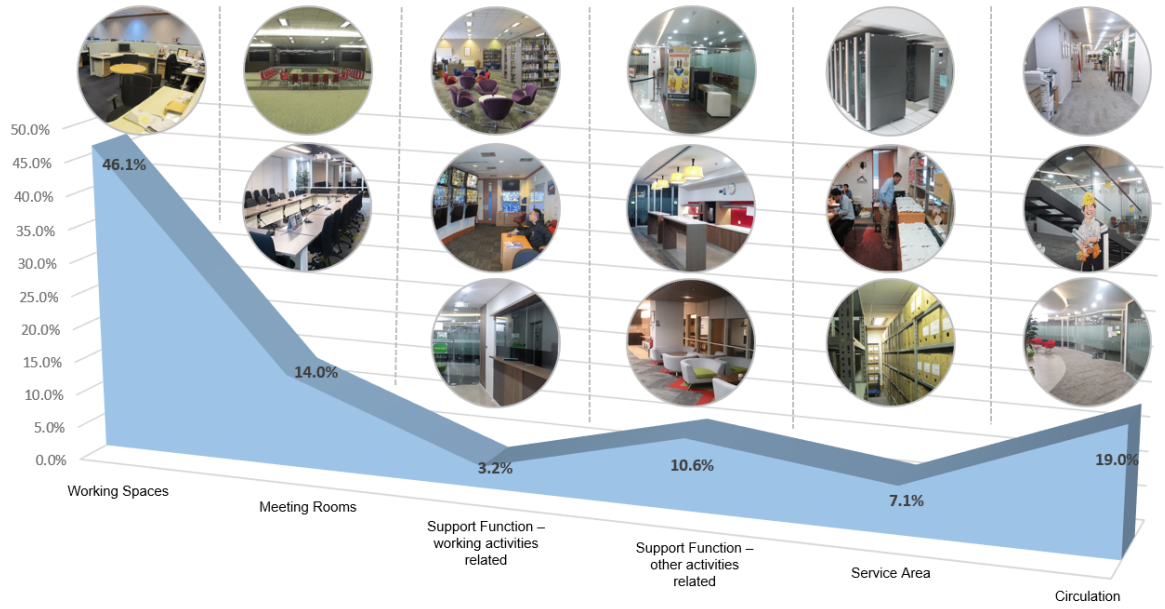
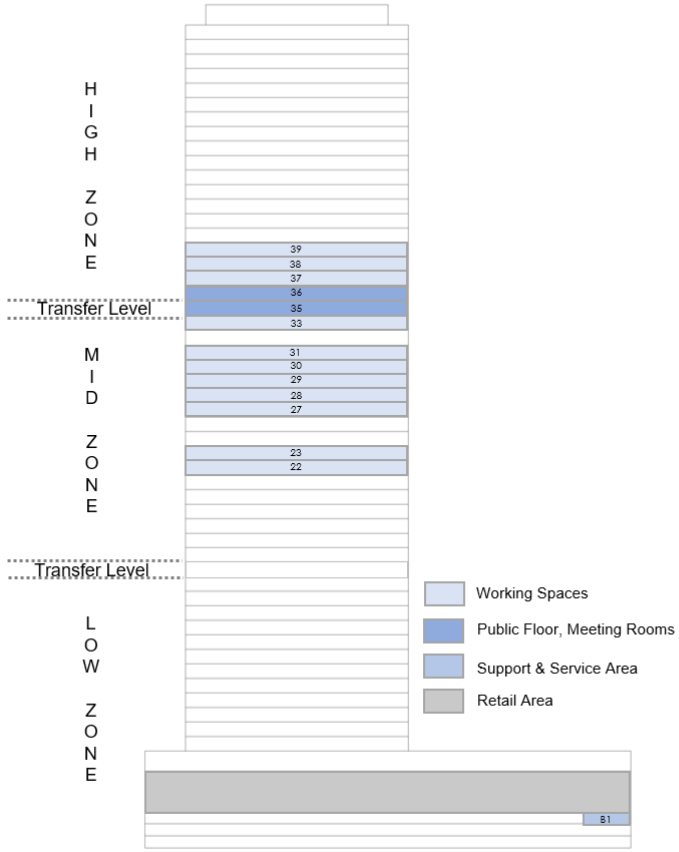


Figure 4.4: Office facility classification of Organisation A (own documentation)

Main Office

Organisation A main office building is one of the highest skyscrapers in the city; 54-storey with total 195 m high. Operated in 2003, the building is listed as grade A building. It lies in front of main road and highway in Jenderal Gatot Subroto Street. It is the area where odd-even traffic policy applied during 6 am – 8 pm every working day. The cars with odd licensed plate are allowed to pass certain area and time in odd-numbered dates, and vice versa for the even (Governor Regulation, 2018).

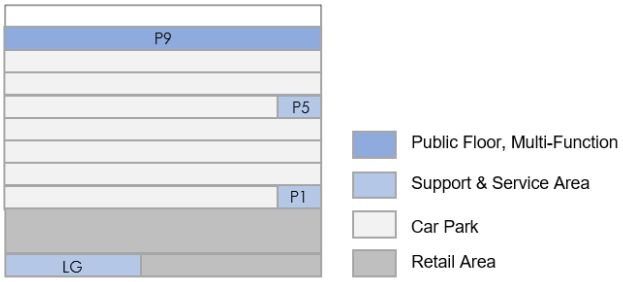


FLOOR	DEPARTMENT	AREA
39	Chairman, Business Support, Expert Advisors	2,191.5 m^2
38	Corporate Secretary	1,720.5 m^2
37	Vice Chairman, VP, Internal Audit	1,626.0 m^2
36	Public Fl., Meeting Rooms	2,123.5 m^2
35	Transfer Level, Public Fl., Meeting Rooms	2,191.5 m^2
33	Finance & Monetisation	2,126.5 m^2
31	Finance & Monetisation	2,119.0 m^2
30	Corporate Secretary	2,119.0 m^2
29	Business Support	2,119.0 m^2
28	Operation	2,119.0 m^2
27	Operation	2,119.0 m^2
23	Planning	2,161.5 m^2
22	Planning	2,161.5 m^2
B1	Driver Post	23.5 m^2
TOTAL		**26,921.0 m^2**

Figure 4.5: stacking plan of Organisation A main office

Annex Office

Although located within the same complex to main office building, annex office faces the secondary road of the location, which is functioned as alternative entrance and exit to avoid the odd-even traffic policy. It was surrounded by governmental institutions, commercial office buildings, street foods, and mid-low residential areas.



FLOOR	DEPARTMENT	AREA
P9	Multi Function Floor, Halls	3,535.0 m^2
P5	Security Post	49.0 m^2
P1	Storage	62.5 m^2
LG	Canteen, Cooperative	830.5 m^2
TOTAL		**4,477.0 m^2**

Figure 4.6: Stacking plan of Organisation A annex office

Sample Floors

Structured-space observations pick 7 out of 11 floors of workspaces and 1 of 2 public floors in Organisation A as samples. Beside the representative size of office area, the logic consideration of how these floors are picked as samples are based on the job background of the employees within the floors that may represent their Departments within Organisation A. The Functions in Organisation A are also classified to get a potential distinction of unique working culture between different Functions, as follows:

- Core Function: the Function that relates directly to core business of Organisation, which are exploration and production of oil and gas sectors.
- Support Function: the Function that supports the core business of the Organisation.
- Multifunction: the miscellaneous Function of the office to support the whole Organisation's activities.

The sample floors to be observed in Organisation A were a combination between (1) the workplace of Top Management, Core and Support functions of the organisation as well as (2) multifunction floor as public area of the office that can be accessed by visitors. Table below breaks down the floors based on the function of Organisation A and blue-highlights the chosen floors for the study's observation, as follows:

FLOOR	DEPARTMENT	FUNCTION	AREA
39	Chairman, Expert Advisor, Business Support, Corporate Secretary	Top Management, Support	2,191.5 m^2
38	Corporate Secretary	Support	1,720.5 m^2
37	Supervisory Committe, Vice Chairman, VPMR, Internal Audit	Top Management, Support	1,626.0 m^2
36	Public Floor	Multifunction	2,123.5 m^2
35	Public Floor	Multifunction	2,123.5 m^2
33	Finance and Monetisation	Support	2,126.5 m^2
31	Finance and Monetisation	Support	2,119.0 m^2
30	Corporate Secretary	Support	2,119.0 m^2
29	Business Support	Support	2,119.0 m2
28	Operation	Core	2,119.0 m^2

27	Operation	Core	2,119.0 m^2
23	Planning	Core	2,161.5 m^2
22	Planning	Core	2,161.5 m^2

Table 4.1: Office floors of Organisation A

As blue highlighted in the table of office floors in Organisation A, the sample floors represent all departments and all functions within the organisation, which are (1) 100% are of top management, (2) 50% are of core function, (3) 70% of support function, and (4) 50% of multifunction floors.

4.2 Organisation B

Organisation B was an Indonesia OG Company that operated in 5 different continents, including America, Africa, Asia, and Australia. The company expertise was in exploration, service contract, development, production, CBM, and economic participation. In Indonesia particularly, Organisation B handled 12 working areas, divided in 4 different islands: Sumatera, Java, Sulawesi, and Borneo.

Their Headquarters of the company was centred in Jakarta Central Business District (CBD) in Mid-South Jakarta. It was sited in the second dense CBD in the city in terms of occupation (82.1%) (Colliers, 2018).

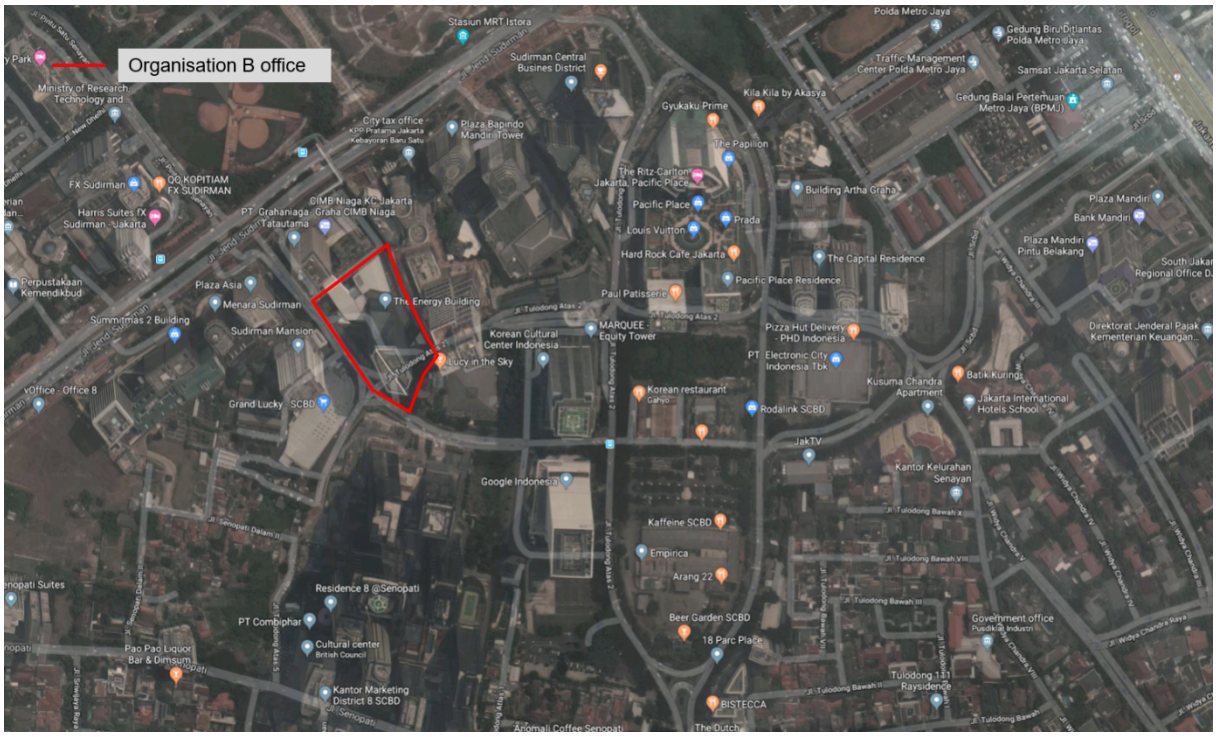


Figure 4.7: Location Map of Organisation B (accessed from Google Maps)

Further introduction to Organisation B was elaborated and integrated through interview to the company's expert, as follows:

I	**Regarding current office facility standards in oil and gas sector**	
1	How your organisation sees the importance of FM contribution?	FM is as important as other Departments since FM contribute to support office operational activities that potentially help the company to achieve their goals.
2	What is your organisation main objective that needs to be considered in FM?	Due to the drop of oil prices, top management demands FM to be effective and cost efficient. What FM has done is to rearrange the contract management through service contract, instead of labour contract.
3	What is FM role in your organisation?	To support and maintain the office service of the company, i.e. transportation, office maintenance (room temperature, electricity, lighting, and workspace) and travel agent.
4	How many FM employees in your organisation?	It is under Human Capital and Business Support Division, led by a Director, a VP and a Manager of FM. The Manager lead three group: (1) Office Services Maintenance (Internal Technician, Office Assistant, Mailing Service, Telephone Operator, and Receptionist, (2) Land Transportation, and (3) Travel.
5	How is your office:	

	Space planning	The idea is about integration, where all the visitor data is recorded within the organisation's system since the beginning the visitor arrives at the lobby. It continues to the elevator foyer where the visitor has to tap their temporary individual visitor card. Besides, the organisation promotes the concept of green building that optimise the use daylighting within the open plan area.
	Size, occupancy, ratio	The office size is 10,100 m2 with ratio 1:10.
	Management	FM team are mostly hired in-house, e.g. technician.
	Reference	The organisation's Holding Policy, SKK Migas, Presidential Regulation, Ministerial Regulation.
6	How is HSSE in your office:	
	Risk assessment	All FM tasks must pass through HSE induction and HSE team will issue HSE passport before the tasks can be carried out. The induction includes PPE requirement, daily safety meeting, and company's doctor clearance.
	Ergonomic	Office chairs are standard ergonomic.
	Disabled access	The office buildings are disabled access friendly, however special requirement within the organisation's premises is not yet applied.
	Building Inspection, fire drill	(1) Fire drills are carried out twice per year by the Landlords, whereas (2) internally the organisation performs medical evacuation drills once a year, sprinkler and APAR function check monthly.
	Security system	Barrier gate between lobby to elevator in ground floor, access door, and full coverage CCTV within the premises, particularly open plan area.
	Waste management	Separation between wet, dry and battery waste.
7	How is OFM Contract Management in your organisation:	
	Contract strategies	All of FM contracts are multi years based on effectiveness and cost efficiency consideration.
	Categories and products	Contracts: (1) Land transportation and driver, (2) office service and maintenance, (3) office rental, (4) indoor planting, and (5) mail service. MoU: (1) travel agent, (2) airways, and (3) corporate hotel rate.
	Tender	Based on SKK Migas Work Guidance No. 007, FM creates owner estimate and submit tender request to SCM. SCM will review and legal check the document before forward the request to the Bidding Committee Division.
	Contract usage control	Controlled by System and Admin Team of FM.
	Supplier performance evaluation	Evaluation is not performed specifically, but if there is discrepancy occurred FM will fix the issue quickly to prevent a worse condition of the issue.
8	How is Asset Management in your organisation:	

	Ownership status	Except car and office building, the organisation own the assets of FM related, e.g. furniture, home appliances.
	Utility management	Only on complain based or annually for audit purposes.
	Coding system	The data is integrated to the system of SKK Migas, but the asset tags are still manual. The organisation is on the way to improve the coding system in a collaboration with IT department of the organisation.
	Preventive maintenance	Daily after office, FM team will tour all of the office premises to check if there are inappropriate condition of the facility provided.
	Corrective maintenance	FM team is highly aware and initiative to share the information within the group if there are issues needs to be fixed.
	Condition assessment	Inspection is conducted in a collaboration with HSE team, e.g. air circulation.
	Replacement	For replacement, user will propose it to their superior before the request is sent to FM. FM will determine if the request is justified to be provided before FM approve it.
	Storage	FM has several types of storage within premises, i.e. chemical storage, stationaries storage, furniture storage, and crude oil sample storage (each approximately 20 m2) and outside premises, i.e. furniture storage (800 m2) and file storage (the volume is fluctuated based on actual number of boxes stored)
9	How is knowledge management in your organisation	
	IT/ data management	The organisation is normally scan documents within share folders of computer server and store the paper version within roll-o-pack system. However, there is no regular schedule for employees to destroy documents.
	Initiation for knowledge	There is no particular regulation of the organisation regarding knowledge or data management, employees are self initiative in documenting data from paper version to scan version and store it within the server.
	Process, procedures, and tools	FM team within the organisation shares their tasks internally and regularly within their server through weekly or monthly report, and so that all the FM persons are well informed about ongoing tasks. However, the organisation has not had yet integrated platform specifically to document their end-to-end projects.
	Performance measurement	FM of the organisation set Service Level Agreement (SLA) to set how and how long a task can be done.
II	**Regarding future plan for office facility standards in oil and gas sector**	
1	How does FM in your organisation adapt to the crisis of drop oil prices?	The organisation is aware about the drop of oil prices and their top management ask FM to be more efficient. To respond that, FM tries to campaign

		energy saving. However, there are no significantly standard changes within the organisation.
2	How important is knowledge management to adapt to the crisis of drop oil prices?	FM has coordinated with other fellow PSCs to create sector-wide joint contract to get the best offer from contractors and manage it through integrated digital platform, but this hopeful project needs to be approved by their regulator, i.e. SKK Migas.
3	Do you think that IT tools are fruitful to allow you to work more effectively?	FM is willing to migrate to a stronger integrated system throughout the sector.
4	What activity that consumes your working time the most as OFM Manager?	Office space relayout particularly the approval process and the procurement process.
5	In what area of OFM in your organisation that needs to be improved the most?	Asset management since the asset system of the organisation is still done manually. FM of the organisation has compared their asset management to multinational PSCs and they found out that their asset system is lagged behind.
6	How often in your organisation to have change managements?	It depends on situation, e.g. BODs of the organisation were just changed and they reshuffle people quite often lately. However in a normal situation, change management emerges not necessarily once a year.
7	How do you prepare change management?	FM take a look at the standard set to adjust to new requirement.
8	How do you implement change management?	FM persuasively approach users if change management happened. Often, change management drags time from three to six months due to leniency that top management decides to allow users to adapt to the changes.
9	What is the most common reaction of employee on a change management?	The employees care about the changes, sometimes they protest but at the end are supportive. They mostly dislike changes that affect their workspace, e.g. office renovation/ relayout since they feel discomfort with the process, e.g. dust, pack-unpack.
10	How do you manage and anticipate to employees' reaction on change management?	If FM in advance is informed, FM can be anticipative to arrange the strategy of changes. However, if the decision changes are issued without FM involvement, the implementation will just be done directly without having well preparation.

Table 4.2: Expert Interview with FM of Organisation B

4.3 Organisation C

Originally European OG Company, Organisation C established in 1924 and had been the fourth biggest OG Company in the world. The company operated in 130 countries throughout the world, including Indonesia particularly in Borneo Island since 1968. It was the largest gas producer in Indonesia since 2000. To focus on core activities,

Headquarters of the company was located within city radius to their working areas. On the other hand, the business unit was centred in Jakarta Business District in Mid-South Jakarta.

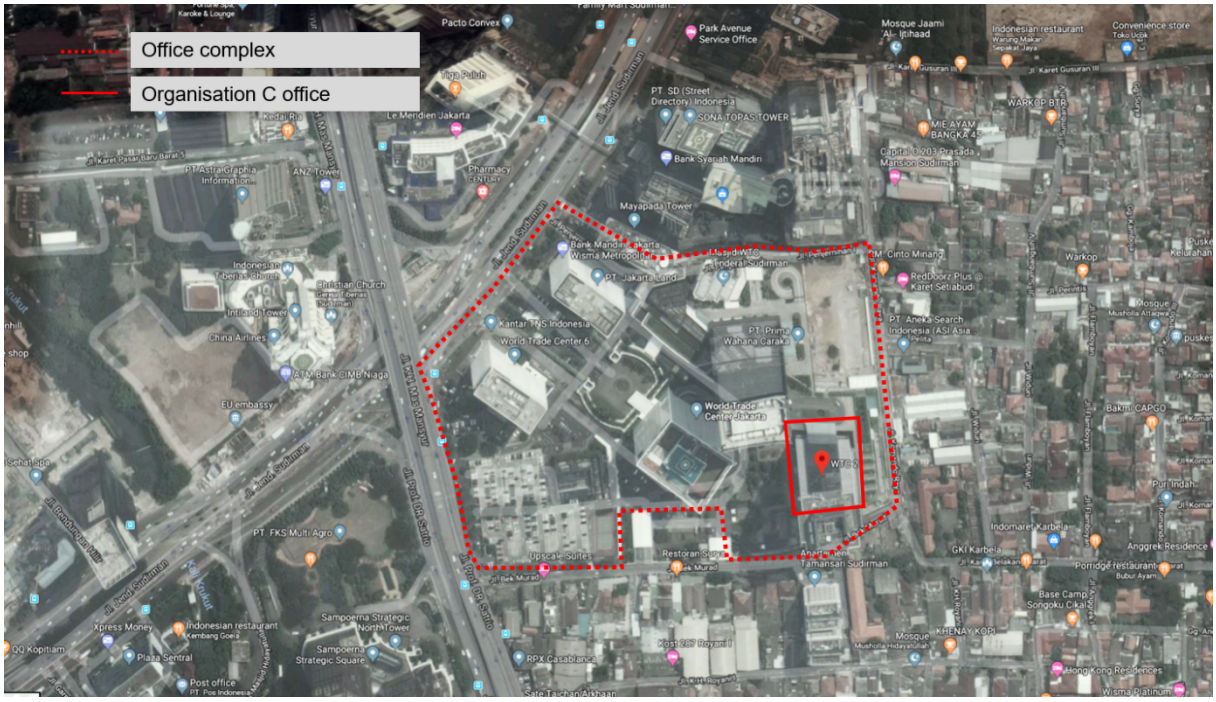


Figure 4.8: Location of Organisation C office (accessed from Google Maps)

Organisation C occupied a commercial A-quality office building with the size of 11,909 m^2 in 5 fl to be able to accommodate 325 employees. Expert of Organisation C explained the scope of Facility Management of Organisation C that was management by FM team:

- Office: rental and maintenance
- Facility services: cleaning service
- Housing: rental and maintenance
- Resort: maintenance
- Land transport: 9 carpools and 8 executive car for Top Management
- Air ticketing and lounge: third party services
- Mailing and courier service
- Hotel and event assistance
- Archive and warehouse
- 49 contracts related to the tasks above.

4.4 Organisation D

Established in 1908, Organisation D was a dynamic energy sources multinational company originally from Europe who had changed their business focus to follow the energy supply trends. Started with coal, the company focused in onshore oil business in earlier days and currently had moved to gas, deep water, and new mix of energy sources onwards. This has been the top gas producer in Indonesia.

The office was in Southern Jakarta, particularly area with the highest cumulative office supply by around 950,000 sqm out of 3,400,000 in outside CBD. The rent tariff, however, had been also the highest in the area; 225,000 IDR for asking base rent and 64,557 IDR for service charges (Colliers, 2018). However, with almost a thousand seats of office capacity, office ratio of Organisation D is at the minimum (10 m^2 per person). The efficient ratio of the office is claimed as a result of Activity Based Working concept of the office that has been partially applied. Facility Manager of Organisation D mentioned that it is challenging to promote this concept since employees of higher managerial level must give up their cellular office to become unassigned open plan office. However, this condition is anticipated with well communication and employees' involvement within the project in which therefore employees' refusal can be successfully minimised.

Figure 4.9: Location of Organisation D office (accessed from Google Maps)

FM Team of the organisation D also emphasizes that FM is responsible to provide facilities that potentially leads the Organisation to work productively. It has been also realised by the Management of Organisation D that the role of FM is strategical and therefore works intensively with the Management. As follows, details about FM of Organisation D is presented:

I	**Regarding current office facility standards in oil and gas sector**	
1	How your organisation sees the importance of FM contribution?	FM is crucial; FM reports directly to the Regional President. It is also considered strategical; FM is demanded to improve work productivity and save cost effectively.
2	What is your organisation main objective that needs to be considered in FM?	Organisation D is cost effective without giving up the safety requirement. FM Team is also expected to be creative and think out of the box, e.g. implementing ABW office concept.
3	What is FM role in your organisation?	(1) Workspace Management, (2) Office Support Services, (3) Office Safety, and (4) Transportation.
4	How many FM employees in your organisation?	1 VP, 1 Manager, 3 Coordinator, 5 Supervisor (TPC) and 325 Services Contract e.g. Helper and Operator.
5	How is your office:	
	Space planning	Partly assigned desk, hotdesking with ABW concept, and hybrid. The future office will implement fully ABW concept.
	Size, occupancy, ratio	12,640 m^2, 980 seats with 80-85% occupied.
	Management	inhouse for day-to-day basis task, e.g. office service maintenance and outsource for project.
	Reference	Global Safety Standard of Europe HQ, Ministerial Regulation of Health, Ministerial Regulation of Labour, and SKK Migas approval.
6	How is HSSE in your office:	
	Risk assessment	Firstly investigated by Security Team of the Organisation as the first filter. Afterwards FM and HSE Team will join the investigation.
	Ergonomic	Ergonomic workspace size based on consultation to Health Team, ongoing replacement for ergonomic chair, neck rest for employees with specific neck problem, and foot rest.
	Disabled access	Currently hire 4 employees with special needs. FM Team in cooperation with the Landlord make sure facilities are disabled friendly, i.e. rest room with bell and spacious maneuver as well as accesible ramp for wheel chair.

	Building Inspection, fire drill	(1) Regular basis: organised by third party Professional Building Management to check that the facility provided fullfil the safety standard based on Ministerial Regulation, (2) Monthly Self Verification Process: on site investigation and discuss special topic e.g. health, driving safety, and housekeeping, (3) hold quarterly drill for First Aid Emergency Response Team.
	Security system	Anti-pass back ID Card for internal premises, ID Card for assembly area in case of emergency, security gate with x-ray, CCTV in ground lobby and outdoor.
	Waste management	Ideally categorised into 4 types: battery, plastic, paper, and organic. However, the implementation of waste management still needs employee's behavioural commitment to support this program.
7	How is OFM Contract Management in your organisation:	
	Contract strategies	Usually multi years with possibility to extend contract as long as it still meets the standard with the same unit price.
	Categories and products	14 contracts and 9 agreements.
	Tender	Based on SKK Migas Work Guidance.
	Contract usage control	Controlled and reminded if the contract is nearly expired by Procurement Department.
	Supplier performance evaluation	Depends on the risk level. If high risk such as transportation facility will be reviewed quarterly. On the other hand, low risk contracts such as office service contract will be reviewed annually.
8	How is Asset Management in your organisation:	
	Ownership status	Majorly rental (office building, car, bus), and insignifant part of asset (infocus, office furniture). The future office expectedly will able to rent furniture to reduce costs of fitout, storage, and reinstatement.
	Utility management	Normally included within the contract.
	Condition assessment	FM will receive monthly reports from contractors.
	Replacement	Replacement will occur anytime the contract is terminated or the asset is completely broken.
	Storage	Approximately 200 m^2 available within the office premises (0.5% of total premises) and partly rent external storage for document archive (15,000 boxes) and furniture (600 m^2). The size of external storage can be adjusted based on actual requirement.
9	How is knowledge management in your organisation:	

	IT/ data management	Use share folder to share document within authorised function, e.g. contracts can be accessed by FM, Procurement and Finance, but have not had yet special tools e.g. BIM to manage this and is keen to have it in the future.
	Initiation for knowledge	It depends on the subjects; FM team shares general knowledge within the team or to the employees to succeed the FM program, whereas confidential subjects are normally shared only within the team meeting.
II	**Regarding future plan for office facility standards in oil and gas sector**	
1	How does FM in your organisation adapt to the crisis of drop oil prices?	(1) reduce office space from approximately 14,500 m^2 to 12,640 m^2 or more efficient for around 13%, (2) change assigned car for Managerial level to become transportation allowance or more efficient for aournd 40%, (3) future office relocation program by implementing ABW concept and choose a more efficient office typical floor.
2	What activity that consumes your working time the most as OFM Manager?	Workspace management and safety.
3	In what area of OFM in your organisation that needs to be improved the most?	IT tools, e.g. BIM to help FM work more efficiently.
4	How often in your organisation to have change managements?	The organisation is relatively stable, change management may occur only every 3 to 7 years. It also depends on the size of the Department; larger Department with more employees may have rotation more frequently compared to FM.
5	How do you prepare change management?	FM socialise change management to the employees at the early stage of the project.
6	How do you implement change management?	Employees are involved within the project, e.g. when FM wanted to implement ABW concept, FM told the employees at the early stage about the program and how is the change management going to be looked like. The employees were also involved during the design and construction stage.
7	What is the most common reaction of employee on a change management?	From previous case, reaction came up mostly from Managerial level that has to move out from cellular to open plan and from dedicated to shared workspace. But it only happens for the first 1 to 3 years after the change management is implemented.
8	How do you manage and anticipate to employees' reaction on change management?	FM communicates and studies the employees need before the change management is initiated.

Table 4.3: Expert Interview with FM of Organisation D

4.5 Organisation E

Organisation E was a moderately new joint local UOG Company that started their operations in East Java since 2007. The company had been a vital supplier of gas within their region, though they evolved their business in hydrocarbon resources. Despite of their emergence as UOG Company in Indonesia is relatively young, Organisation E have shown their commitment to the business by achieving at least 13 awards related to Financial Compliance, Using Alternative Fuel, Environmental Management, and most dominantly HSE Issues. To record another successful achievement, FM Team of Organisation E is triggered to synchronise their activities with the current mission of the Management by succeeding the efficiency program through operational transportation and office space optimisation.

Occupied the same building to Organisation A main office, Organisation E leases 2 Floors within the office building with the total area of 4,238 m^2 semi gross and 90% seats occupied.

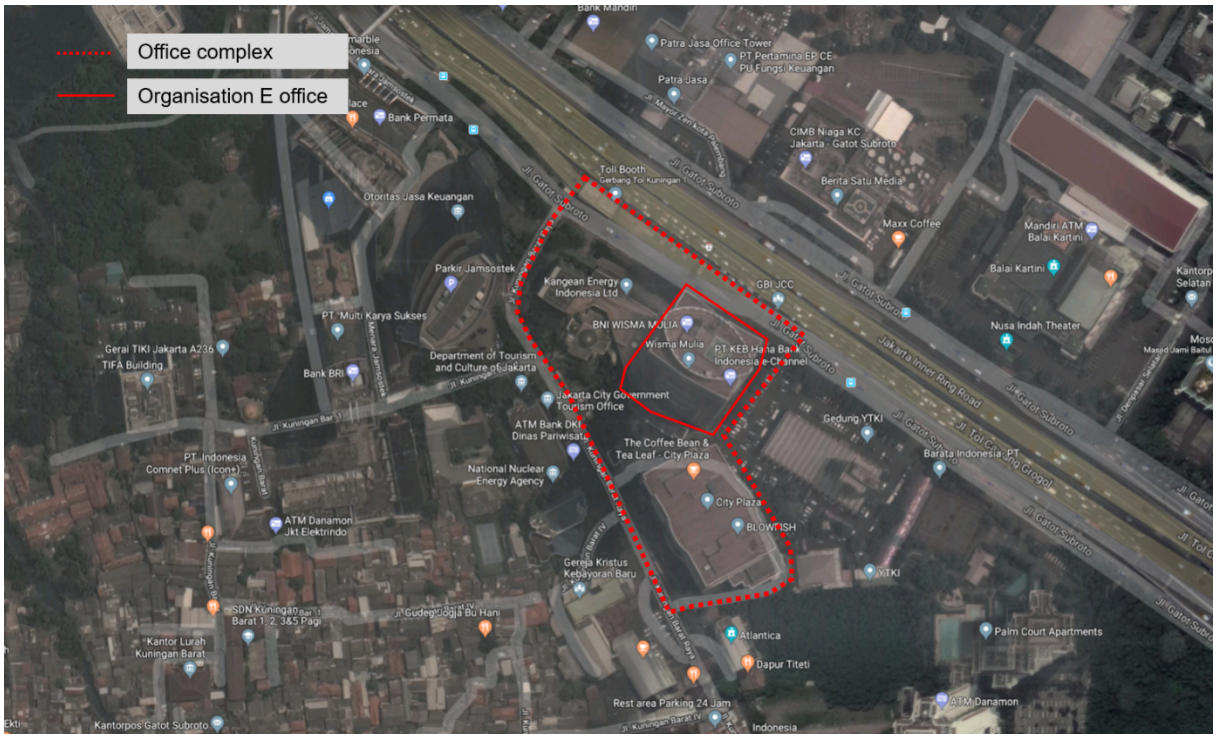


Figure 4.10: Location of Organisation E office (accessed from Google Maps)

However, FM Team of Organisation E struggled in dealing future office rent price with the Landlord and therefore they considered moving their office to another option of office buildings with a more competitive office rent price. They also benefited this situation to recalculate their minimum requirement of office size and the result is the

future office will reduce the size to become 3,000 m^2 with the office ratio of 10 m^2 per person. In terms of space planning concept, FM Team of the organisation proposes open plan with green interior concept. Their references to comply with are the Presidential Regulation of The State's Building Construction and Organisation A's Work Guidance regarding Work Plan & Budget as well as Procurement. Apparently, Organisation is finalising their Office Facility Management Work Guidance validation and other than that, their strategy is to study offices comparison of other PSCs and other sectors.

To support the office facility, FM Team of Organisation E places also HSE as priority aspect to be fulfilled through several programs, as follows:

- Environmentally friendly lighting system.
- Mechanical Electrical inspection, e.g. safety standard cabling system.
- Fire equipment inspection, e.g. APAR.
- Ergonomic interior, e.g. ergonomic office chairs, cubicle rearrangement, ergonomic desktop monitor height.
- Interior general inspection, e.g. housekeeping.
- Fire drill in the cooperation with Building Management of Landlord.
- Security system, e.g. access limitation based on ID Card and CCTV in oublic area.
- Safety system, e.g. fire alarm in emergency exit and smoke detector.
- Waste category: organic, non-organic and battery waste.

Further introduction in the relation to actual FM implementation in the company were elaborated by Expert of Organisation E, as follows:

I	**Regarding current office facility standards in oil and gas sector**	
1	How your organisation sees the importance of FM contribution?	It is strategical since FM manages impactful budget of the organisation.
2	What is your organisation main objective that needs to be considered in FM?	The focus is on cost efficiency that in short term can be achieved through: (1) transportation efficiency, (2) electricity consumption efficiency, (3) study comparison for office relocation due to inaffordable rent price of current office premises, and (4) recalculate office requirement due to reduced number of employees.
3	What is FM role in your organisation?	(1) building and office management and (2) land transportation.
4	How many FM employees in your organisation?	1 VP, 1 Manager, 1 Supervisor, 2 Officers and 24 Outsources.
5	How is your office:	

	Space planning	Plan to propose open plan with greenship concept with office ratio 10 m^2 per person.
	Size, occupancy, ratio	Currently 4,200 m^2 with approximately 280 seats provided (90% occupied) and office ratio 11 m^2 per person. The size of future office will be reduced to become 3,000 m^2 with office ratio 10 m^2 per person.
	Management	Currently in-house and in the future will implement Integrated FM.
	Reference	(1) Presidential Regulation, (2) SKK Migas Work Guidance, and will soon legitimate (3) Company Policy.
6	How is HSSE in your office:	
	Risk assessment	The implementation is currently in under proposal process.
	Ergonomic	Ergonomic office chairs replacement as well as cubicle and desktop rearrangement.
	Disabled access	Never experience it before.
	Building Inspection, fire drill	Hold general inspection for FM Scope (e.g. Housekeeping) quarterly and fire drill collaboration with the Landlord.
	Security system	ID Card, CCTV for public area, fire alarm in emergency exit, and smoke detector.
	Waste management	Organic, non-organic, and battery.
7	How is OFM Contract Management in your organisation:	
	Contract strategies	Propose by FM and reviewed by SCM Department.
	Categories and products	(1) main contracts: office and car rental, (2) support contracts: driver and office support.
	Tender	Based on SKK Migas Work Guidance.
	Contract usage control	Reminded by system (Oracle) if there is nearly expired contract or if the budget is running out.
	Supplier performance evaluation	Normally only in accidental case without regular review.
8	How is Asset Management in your organisation:	
	Ownership status	Four types of asset: (1) Capital Asset, (2) Inventory Asset, (3) non-Capital and non-Inventory Asset, (4) rental.
	Utility management	Asset is managed by PIC and the PIC will take care the Asset if the Asset needs reparation or maintenance.

	Coding system	Finance Department generates each Asset with specific code, but it is unintegrated with the system of SKK Migas and the location is recorded offline.
	Preventive maintenance	Have not done regularly, only if complain or report is received from the users.
	Corrective maintenance	FM acts based on the complain or feedback from the employees or Management. Corrective action is only done case by case.
	Condition assessment	Have not done regularly.
	Replacement	Replacement based on employees' complaints regarding broken asset/ facilities since there are no routine inspection.
9	How is knowledge management in your organisation:	
	IT/ data management	Have not had the Policy regarding record management, but currently manages 3,162 m3 printed data that is stored in third party storage.
	Initiation for knowledge	Have not had yet knowledge sharing system.
	Process, procedures, and tools	Have not built yet customised knowledge platform for FM and currently use open-source of FM Platform called FreshDesk to record complains from the employees.
	Performance measurement	Nearly in the future will implement it with FreshDesk. Currently the facility is reviewed by manual checklist without specific guideline.
II	**Regarding future plan for office facility standards in oil and gas sector**	
1	How does FM in your organisation adapt to the crisis of drop oil prices?	Negotiates the main component of budget, which is office rental. However, there are no change in culture since this organisation never implement premium culture before.
2	How important is knowledge management to adapt to the crisis of drop oil prices?	They admit that technology is helpful to support efficient and effective working.
3	Do you think that IT tools are fruitful to allow you to work more effectively?	FM Team expectation is to have well-identification and give control to users to self-helped.
4	What activity that consumes your working time the most as OFM Manager?	It is currently not statistically studied, but reporting work is demanding since they have not had yet IT collaborative system and the data is not well-synchronised.
5	In what area of OFM in your organisation that needs to be improved the most?	Integrated system to manage FM Tasks.
6	How often in your organisation to have change managements?	1 to 3 times annually.

7	How do you prepare change management?	FM Team gives employees notification if there is change management required. Persuasive in specific case is required to explain it to the employees.
8	How do you implement change management?	Based on practical and strategical review.
9	What is the most common reaction of employee on a change management?	Dominantly employees are supportive with change management.
10	How do you manage and anticipate to employees' reaction on change management?	FM Team expects Work Guidance within sectorwide and stable commitment from the Management.

Table 4.4: Expert Interview with FM of Organisation E

4.6 Organisation F

Focused on oil and gas exploration, production, refining and selling operations, electricity and chemistry business areas, Organisation F was a European Company that operated in 71 countries worldwide. In 1968, the company started their operations in Indonesia through Production Sharing Agreement (PSA) with the state oil company to explore the Eastern Indonesian Sea. Organisation F focused on exploration and production of onshore and offshore hydrocarbons activities in 14 blocks, located in Kalimantan, Sumatra, West Timor and West Papua. To support the core activities of UOG business, supporting facilities are required; office facility with furniture, office equipment and supply included, as well as transportation from office site to operation site and its accommodation. Therefore, the existence of FM Team within Organisation is expected by the hope of Management that exploration and operation employees of Organisation F may possibly focus on these core activities. Whereas supporting facilities to support their activities are handled by FM Team.

FM of Organisation F handles Shore-based Office, Representative Office and Headquarters Office for Organisation F. Aside from inanimate objects, such as office buildings that they manage, FM of Organisation F is also responsible to manage outsources, such as Helper, to make sure that the office facility fulfils the standard of cleanliness, tidiness, as well as food and beverage supply for employees.

Unlike Shore-based and Representative offices that located closely to exploration and operation site, the Headquarters sited in the South-Jakarta of Greater Capital City and bordered mostly by residential and retail areas. The office building is within the same complex to one of the most well-known shopping centres of the area. The rent premises

of Organisation F office building is about 6,700 m^2 and accommodate 400 direct-hired as well as third party employees included.

Figure 4.11: Location of Organisation F office (accessed from Google Maps)

Organisation F implements traditional assigned desk concept in which every employee is entitled full-dedicated office desk. With almost 90% of the total office capacity are occupied, the 10% are spared to accommodate the employees from Shore-based and Representative office during business trip to the Headquarters. The concept was chosen based on their European HQ Policy, Organisation A approval and benchmarking to the standard of other PSCs offices.

Since Organisation F is listed as one of the leading OG companies on the Climate A List, that is heading the decarbonisation of energy system and targeted declining greenhouse gases by -43% from 2014 to 2025, this organisation shows their commitment on HSE by implementing several programs, as follows:

- Provides ergonomic furniture, e.g. adjustable office desk and chair
- Reminds employees through HSE behaviours campaign that appears on employees' computers hourly, e.g. reminds employees to take a break in the middle of working or to litter waste correctly.

- Equips employees with “remind me” card and “intervention” card that can be used to stop or remind people within the Organisation F when potential dangerous activity occurs.
- Categorises waste into plastic, paper, food and battery waste.
- Guarantees first aid clinic in case of emergency.
- Holds building inspection together with Building Management annually.
- Constructs security system infrastructure: CCTV, security gate check with x-ray, alarm, and localise access for visitors.

In regards to the drop of oil prices, FM of Organisation F adapts by:

- Reducing cost of business trip to their European home country to hold meetings or trainings. Instead, as long as possible and fulfil the task substantially, they optimise the use technology for video conference meeting and e-learning.
- Change dedicated car for Expat to become pool car and shuttle bus system.
- Optimise food supply allowance for in-house meeting or training.

On the other hand, they have not yet considered to reduce the office space size since previously they have struggled with crowded office space in which currently have just improved. Further introduction to Organisation F are featured, as follows:

I	**Regarding current office facility standards in oil and gas sector**	
1	How your organisation sees the importance of FM contribution?	As the function that is able to well-manage the organisation's Headquarter Office, Representative Office, and Shore-based Office.
2	What is your organisation main objective that needs to be considered in FM?	To support the main activities of the business, which are exploration and production in oil and gas.
3	What is FM role in your organisation?	To manage animate (e.g. Helper) and inanimate (e.g. Furniture) assets of the office facilities.
4	How many FM employees in your organisation?	1 Manager, 3 Coordinators, 5 Administrators, 16 Helpers, 2 Messengers, 1 Receptionist, and 1 Mailing Room Handler.
5	How is your office:	
	Space planning	Dedicated office desk/room, open or cellular is depended not on the position but more on the function, e.g. Pay-Roll Staff occupies cellular office.
	Size, occupancy, ratio	6,700 m2, 400 seat capacity with 90% occupied.
	Management	Partly in-house and partly on-call basis.

	Reference	European HQ Policy, SKK Migas Work Guidance and benchmark to other PSC's offices.
6	How is HSSE in your office:	
	Risk assessment	Done by HSE Team, but FM Team is usually involved.
	Ergonomic	Adjustable furniture and break time reminder that pop-up in the computer hourly.
	Disabled access	First Aid Clinic and proper access to evacuate.
	Building Inspection, fire drill	Organised by HSE Team in the coorperation with the Landlord of office building.
	Security system	CCTV, security gate with X-Ray, alarm, and limited access for unauthorised person (e.g. Server Room and Storage) and visitors (i.e. access for Public Floor only).
	Waste management	Categorised into plastic, paper, battery and food waste.
7	How is OFM Contract Management in your organisation:	
	Contract strategies	Based on the needs, e.g. Annual or Multi-years contract.
	Categories and products	Office Building Lease, Travel, Outsources, and Maintenance contracts.
	Tender	According to SKK Migas Work Guidance.
	Contract usage control	Managed by Cost Controller and Users.
	Supplier performance evaluation	By the end of the contract, FM Team will release Performance Feedback and Closed-Out.
8	How is Asset Management in your organisation:	
	Ownership status	100% rental, i.e. Office buildings, cars, computers and printers.
	Utility management	In the future will soon have Maintenance contract to check the condition of assets periodically.
	Coding system	Checked by FM and HR Team of the organisation.
	Preventive maintenance	In the future will implement regular office tour to check the condition of assets that needs to be fixed or cleaned up.
	Corrective maintenance	Depends on employees' report or complaints to repair or replace assets.
	Replacement	Can be done flexibly, depends on the urgency level. Firstly FM Team will check if they have stock for substitution within their storage. If there is not, broken asset can be replaced with a brand new buy.

	Storage	Available within and outside of the office premises.
9	How is knowledge management in your organisation	
	IT/ data management	This organisation archives printed documents in storage and will keep it for 10 years before it is migrated to soft copy data.
	Process, procedures, and tools	Old documents are normally kept just in case needed for audit purposes.
II	**Regarding future plan for office facility standards in oil and gas sector**	
1	How does FM in your organisation adapt to the crisis of drop oil prices?	This organisation reduces business trip activities, specially travelling to Europe HQ, and optimises the use of technology for video conference meeting or e-learning.
2	How important is knowledge management to adapt to the crisis of drop oil prices?	Normatively to transfer the programs from FM predecessor to incumbent and afterwards to review it whether these are on the right track or need improvement.
3	Do you think that IT tools are fruitful to allow you to work more effectively?	It helps FM to inform and be informed regarding tasks that need to be done.
4	What activity that consumes your working time the most as OFM Manager?	Control FM contract as well as the payment.
5	In what area of OFM in your organisation that needs to be improved the most?	Mismatch system between Organisation F and Contractors is the area that needs to be improved with syncronised data and clear payment methods.
6	How often in your organisation to have change managements?	Normally organisational structure changes annually but depends on SKK Migas‘ approval. Reshuffle occurs twice a year, but an employee usually on the same job position for 5 years.
7	How do you prepare change management?	FM Team will rotate their workspace based on their new position within this organisation and provide new room name plates for new occupiers.
8	How do you implement change management?	It is relatively insignificant since change management in Organisation F occurs infrequently and the size of this organisation is sufficiently slim.
9	What is the most common reaction of employee on a change management?	FM Team persuasively communicate with impacted employees through program socialisation and listen to their feedback before it can be implemented.
10	How do you manage and anticipate to employees’ reaction on change management?	Organisation F always comply to SKK Migas Work Guidance and Europe HQ Policy in providing office facilities. As long as it is commited, conflict between employees could be avoided.

Table 4.5: Expert Interview with FM of Organisation F

4.7 Organisation G

Organisation G was responsible in managing the working areas in Northern Sumatera. It was a subsidiary of the biggest state UOG Company that conducted exploration, development, production, as well as business consultation and port-folio management. The holding converged all of the subsidiaries to occupy the same office complex in Southern Jakarta. It was also the same location to the Organisation D, as historically Organisation G took over the working areas of Organisation D partially in 2009.

Employees in support department of Organisation G were seated share-time by the holding and made the connection to employees in core department distanced in two different towers; tower D and tower F of the office complex.

Figure 4.11: Location of Organisation G office (accessed from Google Maps)

Occupied 695 m^2, Expert of this organisation apparently is responsible not only office space of Organisation G. Rather, FM team in Organsiation G shares their working times to other subsidiaries of main holding. Expert mentioned, FM function in Organisation D is more than just providing office space, but to provide a happy and comfortable environment for employees with organised procedure. All related to human resources must be considered by FM to provide facility that may support activities of work with

consideration to HSSE. Further introduction to Organisation G are served in table below:

I	**Regarding current office facility standards in oil and gas sector**	
1	How your organisation sees the importance of FM contribution?	FM function is more than just providing office space, but to provide a happy and comfortable environment for employees with organised procedure.
2	What is your organisation main objective that needs to be considered in FM?	safe and best place to work
3	What is FM role in your organisation?	Office facility, office supply, transportation, and travel management
4	How many FM employees in your organisation?	1 VP, 1 Manager, 2 Team Leader, 6 Staff, 10 Administrator, 120 Driver, 100 Helper and Technician
5	How is your office:	
	Space planning	Integrated concept: (1) provides space for relaxation and coordination , (2) relevant functions are allocated close to each other, (3) hotdesk for part time employee, intern, or visitor (4) assigned desk for full time employee
	Management	Managed in-house except Janitor
	Reference	QHSSE standard of the company, Occupational Health and Individual Health (OHIH), ISO 140001, OSAS, SKK Migas, Health Ministerial Regulation
6	How is HSSE in your office:	
	Risk assessment	Assessed by HSE Team and in the future will implement Control of Work (COW) regularly.
	Ergonomic	Consider on employees ergonomic seats, helper safety during manual handling.
	Disabled access	Partly implemented in main corridor, i.e. 1.2 m wide.
	Building Inspection, fire drill	Scheduled mainly by Building Management for fire drill and assigns floor warden, fire supressor, first aider together with Security Department.
	Security system	CCTV, security gate, alarm, emergency alarm/ panic button are provided.
	Waste management	Categorised into Battery, organic and non organic waste.
7	How is OFM Contract Management in your organisation:	
	Categories and products	Office Building Lease, Office Services, Travel Agent, Transportation, and Office Supply
	Tender	Multiyears, effectively 3 years with possibility for renewal 6 months prior contract expiry date.
	Supplier performance evaluation	FM team will control budget and spending directly

8	How is Asset Management in your organisation:	
	Ownership status	Assets that worth more than 5 million Rupiah are all rental.
	Coding system	Integrated asset numbering, electronic scan code.
	Preventive maintenance	Regular contract available with expert vendor
	Corrective maintenance	Provided on request basis.
	Condition assessment	Regular contract available with expert vendor
	Replacement	Assessment on complained basis.
	Storage	(1) in office premises: 70 m^2 and (2) hire professional storage management service outside office: 2,200 m^2
II	**Regarding future plan for office facility standards in oil and gas sector**	
1	What activity that consumes your working time the most as OFM Manager?	Socialisation on change management to users, e.g. new transportation facility, rotation of Helper
2	In what area of OFM in your organisation that needs to be improved the most?	(1) integrated system and (2) lack of manual and standardisation of FM
3	How often in your organisation to have change managements?	New form of organisation is rapidly changed at least one a year
4	How do you prepare change management?	(1) announcement of change management, (2) parralel work transition, and (3) change management implementation

Table 4.6: Expert Interview with FM of Organisation G

4.8 Organisation H

Organisation H was exploring oil working areas in Sumatera Island of West Indonesia. Typical to other case studies, Headquarters of Organisation H was located in the Capital City of Jakarta. Expert of Organisation H stated that they just moved their office effectively 3 (months) before observation to this case study was conducted. New spirit of new office was expected to collaborate people in organisation. Provided conventional closed room in their old office, new office was changed to become more open. Another reason was due to the development of organisation that was predicted to hire more employees in the upcoming future.

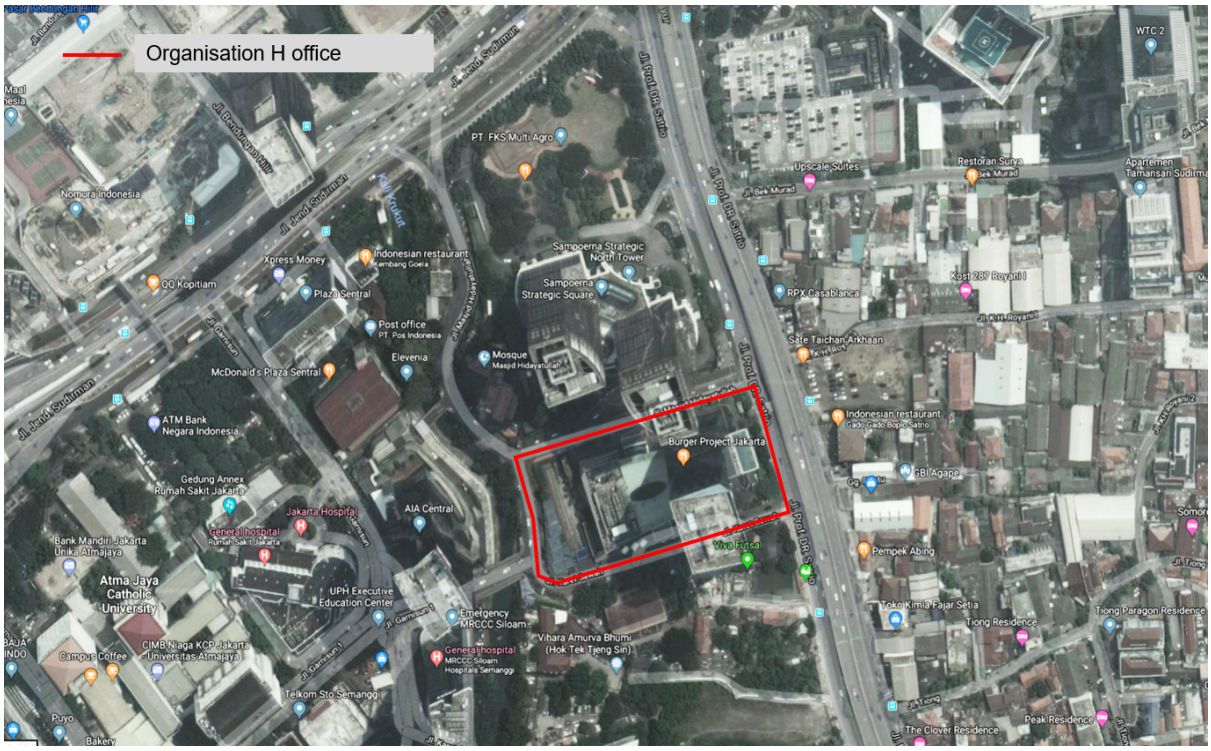


Figure 4.12: Location of Organisation H office (accessed from Google Maps)

Expert also shared their experience in finding office premises before their office movement. It took at least 10 office buildings to assess the physical condition of building candidates as well negotiate to Landlord regarding reasonable pricing of office basic rent and service charges. After the assessment, selected building was chosen as existing interior and furniture of previous tenant were relatively in a good condition and needed only minor renovation to suits better to Organisation H. Transferred assets from previous tenant were also done as the explanation by Expert as follows:

I	**Regarding current office facility standards in oil and gas sector**	
1	How is Asset Management in your organisation:	
	Ownership status	(1) transferred assets from another UOG company, (2) bought and own directly by the company, e.g. houseware, and (3) rental, e.g. building transportation, orinting facility
	Utility management	Scheduled regular general cleaning, however it is very rare that assets of the company are being damaged.
	Coding system	All reported assets are coded in the coorporation to Finance Department, however it is manual and not yet compurised, e.g. scan QR Code.

	Preventive maintenance	Regular check will always scheduled by building management.
	Corrective maintenance	Only minor of facilities were complained, e.g. problem with lighting
	Condition assessment	Regular assessment is not regularly secheduled
	Replacement	Based on request or complain for replacement
	Storage	Partially in office premises and partially in storage at working areas in Sumatera Island.

Table 4.7: Expert Interview with FM of Organisation H

4.9 Consultants

Since this study aims to construct office facility management standards both based on best practice and evidence-based, expert interviews with FM Professionals were recorded to give the input about:

- FM updated basic knowledge i.e. FM definition and current trend in Indonesia.
- FM experts' experience in handling clients, i.e. what are their clients' expectation and common goals, how have experts suggested their clients about FM scope of work and related subjects, as well as how to manage changes in FM program.

Expert – Consultant A

Company Profile

Expert A is a FM Professional from a Multinational Professional Services Company serves in (1) Leasing, (2) Capital Markets, (3) Property and Facility Management, (4) Project and Development Services, and (5) Advisory, Consulting, Valuation, and Energy Sustainability Services. According to the company's annual report, Property and Facility Management are their major revenue (54%) compared to their other services with 430 million m^2 managed worldwide.

This Company has particularly named their FM service line with "Integrated Facilities Management" (IFM) as they provide comprehensive portfolio and FM services to clients by outsourcing the management of clients' real estate. It claims that this company has helped to reduce cost of their clients' spending in FM by 20% through:

- Budget controlling: eliminate discretionary spending. Wealthy clients typically spend their costs more than just on primary needs, e.g. cleaning or mailing room services, yet abundantly on discretionary spending within their project. It is important to give clients a better understanding about the type of discretionary spending and offer selection of unnecessary spending type that could be potentially terminated, as well as establish quick guideline.
- Driving the efficiency across the business: identify clients' boundaries, headcounts, scope of work, and time analysis. Service Level Agreement (SLA) is the reference to evaluate if scope of work can be delivered with a smaller team in which can lead to a smaller cost.
- Virtual tools: develop added-value technology tools for FM. Different ways for efficiency should be dug up through emerging management, e.g. Six Sigma Tools that is currently developed in Expert A's Company.
- Ground right sizing the portfolio: review clients' occupancy rate. Based on Expert A's experience on reviewing clients' office size, oil and gas companies are significantly spacious (12 – 25 m^2 per person) compared to other sectors e.g. insurance, bank, and consultant are relatively compact (8 m^2 per person). Moreover, clients usually want at least 80% of occupancy rate, which is in reality it was only almost 70% of occupancy rate or lower in some cases. Therefore, if clients want to embrace the situation by going beyond 125% to 130% with a smaller ratio, there are a lot of costs that can be significantly saved.

Understanding FM, Current Issues and Future Trends

After presenting the background of Expert A's company experience and achievement, Expert A elaborated the definition of FM in which generally can be divided into two different topics: (1) hard and (2) soft services. Hard services are typically engineering services that require engineering skills to deliver services, e.g. mechanical engineering maintenance or critical environment. On the other hand, soft services give impact and are used by employees directly, e.g. cleaning, reception, and mail services.

Although general understanding of FM scope of work is defined, the development of FM is varied based on its emergence and trends in different region. To compare to Germany or even neighbour South-East Asian Country such as Singapore, the evolution of FM in Indonesia is at traditional phase. Traditional means Indonesian clients mostly

looks FM as technical expert on hard services or typical Building Management area of expertise in which to make sure the building operates normally. Whereas FM actually offers different area of services that Building Management offers, i.e. FM is responsible to manage inside of tenant's premises to support the work environment to be more collaborative and productive for a greater business. However, there are clients in Indonesia that has embraced the function of FM unconventionally, e.g. banking clients. In contrast, larger and older companies or domestic government institution dominantly are lacking the understanding of FM.

Furthermore, to responds to the future trends of FM, Expert A promotes a better technology that currently most of the industries are worried if in the future robot or information system may completely erase their business existence. Expert A, in contrast, is focused on change of the future work as well as being advanced in technology trends. Accordingly, Expert A develops new technology platform within the company to provide a work core of asset management system. The aim of the application is to offer customers the easiest use and the efficiency as they usually ask expert to solve for.

Moreover, there are typical goals that clients usually want to achieve, i.e. cost reduction, users' satisfaction, and wise operational expense. Other than that, normally clients nowadays prefer to have a single source contract or it may be called Integrated Facility Management (IFM) rather than multiple contracts. Mostly the main reason is FM is considered as a support function within an organisation. For instance, banking clients are at banking business instead of real estate expert. At first, they may try to serve FM and eventually they reach the point where they think FM expert can provide services with experiences and best practices that may benefit to a greater cost efficiency at the same time.

In the relation to the oil and gas sector, Expert A states that he is aware to the drop oil prices issue since there are oil and gas clients expect to achieve cost reduction to keep the business stand up. Expert A's strategies were to bring the headcount down and efficiency within the cleaning services. Furthermore, when the cost reduction is achieved through its strategies, Expert A continuously advices UOG clients to consider collaborative and efficient office spaces. Next, Expert A suggestion on special topics will be elaborated as follows:

Office Planning

Expert A starts the discussion of office planning by giving the example of the most aspiring benchmark office, e.g. Facebook. Facebook, a technology services company with a half Trillion USD market cap, is concerned more on giving their employees the best experience of the office. Their goals are as productive, happy, and engaged as possible. They give dedicated spaces, they have surplus in workstations, and spacious workspace to their staff. Under different circumstances, an older company in Indonesia, which is traditional and more concerned on the bottom line, is embracing the concept of Activity-Based Working concept in which eliminates fixed desk and would rather offer neighbourhood within the office. Expert A would suggest ABW concept if their clients are concerned about cost efficiencies. However, Expert A argues that transparency during the design process with employees is important. Usually clients will ask their employees as end-users of the offices about what they want and normally employees would say that they want to work collaboratively without actually knowing how they work. The issues about ABW concept without sufficient consideration then will lead clients to their employees' complaints about high noisy level that potentially occur and they do not want really use it because they want to be quiet.

The basic suggestion about office planning, therefore, is that clients need to define clear idea about the type of space and get in a more detail discussion about how design should best fit on operation and how they execute that. In the relation to the working culture, Expert A claims that there are similarities across office environment within particular industries. Instead, the difference rather appears across function. In oil and gas sector, for instance, the occupancy rate of Commercialisation Department offices is fluctuated as they work randomly in and out of the office. On the opposite, HR and Finance Department are typically working at their desks and provided with filing cabinet and enclosed space.

However, Expert A notices that the health and safety concern in oil and gas companies are commonly outstanding. The industry takes the issues seriously by setting a zero accident within their Key Performance Indicator. Another example is the robust security aspect in finance investment banking sector that is considered strongly than other sectors. Different operations across the sectors, consequently, affect the office size at the same time. Though the standard of office size based on the fire code is 10 m^2 per person, the variety is not driven by the cost of rental price but is determined by the type of company, e.g. law firms tends to have dominantly enclosed offices for their preferences while accounting firms prefers open plan for their auditors. In addition,

corporate standard is one of the reference for a company to define their preference of sizing.

In countries, across the culture is obviously impactful. For instance, Indonesian office is commonly talkative compared to Singapore office that is more quiet. Japan, else ways, considers their office as their second home and they want to have a fixed desk to feel like home. In this stage, Activity-Based Working concept is not in the accordance with Japan Culture. For that reason, it is fundamental to accommodate cultural aspect within the office planning process.

Change Management

Employees may react differently; partly easily accept the change and another part might be resistant to change. Based on Expert A experience, most cases of change rejection came from senior or executive employees who work for decades within an organisation. Expert A mentions that change management is oftentimes underappreciated and afterwards companies demand the helpof expert to handle change management. Aside from that, it is important to assign special person in charge for change management that would give optimal result of the change to operate in office environment. Person in charge also needs to perform the value of leadership as change management will work only if leader influents their employees through practice and promote the change. Furthermore, it needs to gather all the parties together, i.e. person in charge, project team and end-users to have a succesful change.

Measuring Impact of FM

Expert A convinces that it is critical to have a Key Performance Indicator with scoring system to measure the contribution of FM accountably. Scoring system can be set from zero (the lowest score) to five (the highest score). For example, if the KPI of HSSE is set with “zero health and safety accident” and then it is achieved, therefore the score that FM could get is safely three which means meet the expectation. Whereas, the score would be zero if there is an accident and on the other hand, the score would be five if FM practicably helps improve safety.

Frequently, clients also ask expert to distribute questionnaire of customer service satisfaction with scoring system to end users and Expert A thinks that it is challenging to interpret the result since cultural differences affect. For instance, The Philippines are very forgiving, whereas Japan is expecting higher performance. Expert A believes that understand end users' needs and experience within the office can be achieved through focus group approach where expert and FM of an organisation identify critical users and stakeholders on quarterly basis. This gives the opportunity to make a case and hear true feedback. Additional queries to expert of Consultant A were presented, as follows:

1	What is Facility Management?	Ultimately FM is the function that ensures hard and soft services are being delivered as clients' expectation. It is responsible to provide optimum satisfaction to the end-user with the most effective cost.
2	How has it developed in your country?	FM in Indonesia is currently in transitional phase from primarily hard services to something expansive to include soft and hard services within tenant space.
3	What are the objectives of Facility Management from Professional FM point of view?	The function is able to provide services based on human and workplace experiences in the best practices that impacts productivity and so that clients may focus on their core business.
4	What is the most common goals that clients have expected for Professional FM Consultant to achieve?	Clients expect mostly to reduce cost and to simplify procurement into a single source rather than multiple banders.
5	How do you differ to other professional FM?	Expert's employer focuses on corporate sollution that understands clients' needs, communicates effectively and benefits clients' operation.
6	Are you aware of the dramatic decline of oil prices?	Yes and have several clients in oil and gas.
7	Is there any client has been impacted by this?	Yes and they expect to reduce cost to keep the business stand up.
8	A look into the future: what are the current trends in FM, where do we move?	JLL focuses on change of the future work and stay headed on the technology trends.
9	How would you advise your clients about Office Space:	
	Space planning	The clients need to know first their actual working culture rather than following the future trends of office concept, e.g. ABW.
	Size, occupancy, ratio	The standard is usually based on the fire code, which is 10 m^2 per person. Other than that, the variety is determined by the company's requirement rather than the cost of rental price.
	Reference	Fire code and corporates' standard

10	How would you advise your clients about HSSE:	
	Government policy vs company policy	The expectation of company policy has to be complied with the government policy.
	Risk assessment	Risk assessment has to be performed to deliver FM services.
	Ergonomic	It is based on a corporate standard, but at least expert recommends to use ergonomicc furniture.
	Disabled access	Office design is always incorporated appropriate access for disabled people.
	Building Inspection, fire drill	These are fundamental and have to be complied with the regulation. Expert works with Building Management and Building Owner to participate fire drill at least once a year.
	Security system	CCTV coverage, at least to all access point to make sure clients can track anyone who comes and goes. Specifically Indonesia with a higher security risk should rhave appropriate security gates.
	Waste management	Should be categorised into at least two: (1) normal waste, e.g. office stuff, (2) hazardous waste, i.e. needs special treatment. Hazardous waste treatment should be appropriately documented to prove that it has been treated and removed properly.
11	How would you advise your clients about Contract Management:	
	Contract strategies	Can be: (1) clients add FM Consultant to be the principle contract holder, e.g. Cleaning services contract is between FM Consultant and Contractor or (2) agency model, i.e. The gates for the clients to hold their contract themselves and FM Consultant manages the contract.
	Tender and award	Make sure tendering process is transparent and comply to clients' internal compliance.
	Contract usage control	Should be centralised within Contract Management System whereby all contracts are assisted, managed and warned by system when the contract is expiring or the insurance is expiring.
	Supplier performance evaluation	Make sure all vendors performing to clients' expectation and have usually quarterly performance analysis.
12	How would you advise your clients about Asset Management:	
	Ownership status	It is easier, efficient, and more practical for clients to just rent furniture from Landlord, but problem lies on resources which are lacking, i.e. Landlord needs to spend Capex to buy furnitute. It is a new trend in Indonesia i.e. rental office spaces with furniture included for smaller companies that clients can rent, e.g. the largest rental office spaces with furniture in Indonesia is currently 750 m2. However, when we talk about the company with 20,000 m2, basically resources are currently unavailable.
	Utility management	

	Coding system	From asset life cycle and finance perspective, it is important to have system management technology that allows users to upload their asset information into a system. Tag system will track that data and later knows when the asset needs to be maintenanced or replaced. Better assets management system is potentially reduce cost into options of operation.
	Preventive maintenance	
	Corrective maintenance	
	Condition assessment	
	Replacement	
13	How would you advise your clients about Knowledge Management:	
	IT/ data management	It is important to have internal connection platform for one stop shop for all information, the process procedure tools, and performance management tools that is accesible as long as employees have username and password.
	Initiation for knowledge	Knowledge management should be believed as the form of co principle.
	Process, procedures, and tools	Normally SOP is constructed within a company yet forgotten after 3-4 years. To that, it is important for everyone to review and update regulation.
14	How do you encourage your clients to have a change management to reach their organisation goals?	To have a successful change, it is impactful to bring all the parties together, i.e. to have a person (in-charger) works with leadership, project team and end-user.
15	What mechanism or strategies do you employ for monitoring/ measuring the impact of your FM contribution to the client?	Key Performance Indicator should be agreed at first to meet clients expectation and to list the priorities based on the focus of a company, e.g. cost saving target.

Table 4.8: Expert Interview with Consultant A

Expert – Consultant B

Consultant B is a national property consultant in Indonesia that offers end-to-end property services, ranging from:

- Corporate Office Occupiers Services: to review customers' occupancy costs, tassist commercial lease terms negotiation and provide solution on real estate optimisation opportunities.
- Office Services: sole agent for office leasing properties, strata title office projects and open market transaction.
- Investment Services: buyer and seller representation on selling and purchasing of commercial land, bulk unit of high-rise living space, en-bloc property, and joint venture arrangement.
- Industrial Services: market finding on corporate occupiers for warehouse, logistic center and industrial lands.

- Retail and Residential Services: marketing concept and strategy preparation to optimise overall financial returns of retail an residential project.
- Portfolio Transaction Management Services: provides strategic planning and effective implementation for asset optimisation.
- Project Management Services: corporate occupiers representative in arranging, supervising and coordinating project parties to ensure on time project delivery within budget and expected quality.
- Property Management Services: assists property owners and corporate occupiers for operational cost efficienca and property value optimisation.
- Research and Consultancy Services: provides the latest trend of property market in regards to supply, demand, lease and sales take up, occupancy rate and price level.

Expert of Consultant B explained how FM in general and shared their experience in handling their clients cross sector in which concluded within this expert interview summary, as follows.

1	What is Facility Management?	FM is a working area that includes indoor facilities as part of tenant or occupiers. It relates to (1) hard service, i.e. involves technician, and (2) soft service, i.e. involves receptionist, cleaning, or housekeeping.
2	How has it developed in your country?	Companies hire outsource FM rather than inhouse to reduce cost and to be more focus on their core expertise.
3	What are the objectives of Facility Management from Professional FM point of view?	To fulfil the convexity of services with zero disruption by specifically measuring the delivery service.
4	What is the most common goals that clients have expected for Professional FM Consultant to achieve?	To focus more on the productivity and the cost efficiency.
5	How do you differ to other professional FM?	Expert prioritises (1) client's future business plan, e.g. project, property or asset requirement, (2) employees experience and future expectation, and (3) space programming to identify the actual client's requirement and find out specific facilities that can be optimised.
6	Are you aware of the dramatic decline of oil prices?	Yes.
7	Is there any client has been impacted by this?	Yes, oil and gas clients ask us to audit their space to reduce their office size due to the drop oil prices.
8	A look into the future: what are the current trends in FM, where do we move?	Currently on the integrated service, i.e. FM gives technical feedback about how efficient is the workplace and its facility that is given by the feedback or audit summary from weekdays and weekend office utilisation as strategic input for the corporate or client.

9	How would you advise your clients about Office Space:	
	Space planning	It is essential to (1) gather information through interview to the top level management and representative employees, (2) get statistics from questionnaire, (3) give the input based on interview and questionnaire result summary, (4) discuss several times as space planning process, (5) space audit based on the headcount and office ratio.
	Size, occupancy, ratio	According to the Presidential Regulation, the office ratio has to be not less than 10 m^2 per person eventhough there are organisations that may require only smaller ratio, e.g. call centre need only 1:6. However, if tenant wish to have space less than 1:10, special agreement should be signed for audit purpose.
10	How would you advise your clients about HSSE:	
	Government policy vs company policy	Any person in charge in FM is essential to have HSE knowledge. HSE tools are very close related to fire safety. Weekly meeting is important to update persons or fire wardens in charge. It needs to involve vendor or external technician within maintenance works to comply with HSE regulation. Safety analysis needs also to be provided to support the continuity of space.
	Risk assessment	
	Ergonomic	
	Disabled access	It is the point that nowadays should be awared of, i.e. to accommodate and upgrade disabled access that is previously not provided yet. This is now included within the main concern on fire safety and HSE agenda.
	Building Inspection, fire drill	Regular simulation, e.g. fire drill, should be done with the involvement of HSE and FM. It is also important for new employees to get safety orientation, eg. information about escape route in case of emergency.
	Security system	At least a company has concierge or main reception within one floor as security screening and assistance for visitors. Other than that, access card can be used by employees to access typical office function.
	Waste management	Driven by budget concern, it is recommended to reuse, reduce and recycle since minimum waste will lead to minimum cost.
11	How would you advise your clients about Contract Management:	
	Contract strategies	Can be: (1) principle model: all sub-contracts are paid under FM Professional or (2) agency model: contract is set by the client and managed by FM Professional.
	Tender and award	It depends on the procurement procedure of an organisation. If vendors are selected by client as their procedure, usually FM Professional is involved during the process to give advices as second opinion party about vendor's reputation within the market, e.g. if vendors under-perform, FM Professional report to client.
12	How would you advise your clients about Asset Management:	

	Preventive maintenance	Log book system is important to record the condition of asset, i.e. to remind service schedule, to review the condition if replacement is needed.
	Corrective maintenance	
	Condition assessment	
	Replacement	
13	How would you advise your clients about Knowledge Management:	
	Initiation for knowledge	To give orientation for new employees and give playbook as standard procedure that should be taken within an organisation.
	Process, procedures, and tools	Since transparency in FM is important, employees are able to access playbook as their knowledge management, particularly for safety regulation. However, there are specific subjects that should be restricted and confidential, e.g. commercial.
14	How do you encourage your clients to have a change management to reach their organisation goals?	(1) communicate to clients regarding their change planning and set program management, (2) involve the key parties as stakeholders, (3) suggest when and how the changing plan can be implemented, as well as identify the impact in the future, and (4) create simulation through focus group for brainstorming.
15	What mechanism or strategies do you employ for monitoring/ measuring the impact of your FM contribution to the client?	Set Service Level Agreement (SLA) or Key Performance Indicator (KPI) to measure the performance based on the agreed criteria between parties and users.

Table 4.9: Expert Interview with Consultant B

5 Office Evaluation

The main aims of this research in which to find out the contribution of office facility in increasing productivity and saving cost attract this research to evaluate the actual indoor environmental conditions of the offices in UOG sector in Indonesia through their spatial planning, design, employees survey and occupancy rate. This study believes this is fruitful since indoor environmental conditions are crucial to support comfort, health and productivity (BCO, 2018). A study of Leaman and Boardass (1999) argue that dissatisfied employees with their environmental conditions work less productively.

BCO (2018), for instance, reports the UK's productivity problem that is less productive compared to almost all of G7 countries due to economic (low investment, wrong direction of productivity, companies' low growth and profitability rates, as well as unproductive process and workers) and individual factors (stress, workplace politics, management effectiveness, remuneration, health and comfort). It also mentions interestingly that German worker, in contrast, spend a third of their workdays off and still manage to produce more effectively compared to the UK. In addition, according to the Organisation for Economic Co-operation and Development (OECD), Germany is in fact the most productive among G7 countries.

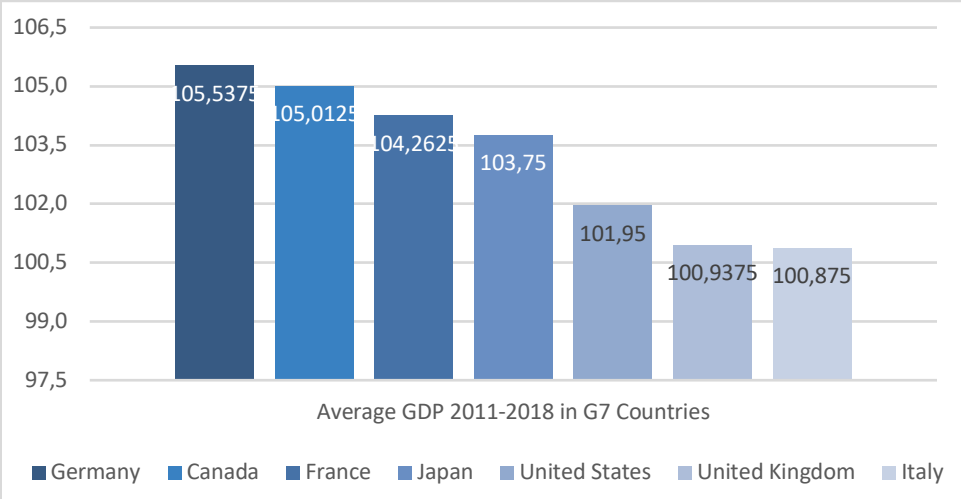


Figure 5.1: Productivity Statistics: average GDP per capita and productivity growth 2011-2018 in G7 Countries (OECD, 2018)

Furthermore, to have an in-depth analysis, the office of Organisation A is chosen to be evaluated to represent the offices of UOG sector in Indonesia since it has the biggest size and the most complex office among the other case studies as well as most importantly the role of Organisation A that determines the regulation for UOG Industry.

5.1 Office Spatial Planning and Design

Within this Sub Chapter, this research qualitatively examines the office spatial planning and design through direct space observation and the organisation A's related documents evaluation, i.e. Office Floor Plans, Office Facility Work Guidance, and Office Internal Studies. In the relation to productivity, this research also tries to see the competence of German's Workplace Regulation to be referred, as Germany is one of the highly productive countries in accordance GDP per capita and productivity growth (OECD, 2018). This hopefully will help UOG sector to find the right direction for fulfilling the office requirement that potentially increase productivity.

First, the number of offices provided in Organisation A is counted and classified based on the setting (cellular or open-plan) and the size of offices. According to the floor plans and Work Guidance of Organisation A, Organisation A has occupied current office building since 2010 with 1,464 workspaces, divided by 9 different office types:

- Type 1: cellular office of Committee,
- Type 2: cellular office of Management (Chairman, Vice Chairman, and Deputy),
- Type 3: cellular office of Expert Advisor,
- Type 4: cellular office of VPMR and Specialist,
- Type 5: cellular office of Division Head,
- Type 6: cellular office of Senior Manager,
- Type 7: cellular office of Manager,
- Type 8: open-plan office of Staff and Secretary,
- Type 9: open-plan office of Administrator.

Since Indonesian Government regulates the minimum office ratio, which is 10 m^2 per person, a more detail office requirement includes size and specification is determined by organisations internally. Therefore, to provide workspaces for employees, the standards of office types are set by Organisation A within the Office Facilities Work Guidance Book. It regulates the size, furniture (e.g. desk, chair), and other office equipment. (e.g. white board, computer, printer, scanner). The office interior of Organisation A, however, is a combination of newly fit-out workspaces, newly renovated workspaces and given workspaces from previous tenant of the office premises. It results that the actual conditions of offices in Organisation A partly comply with their Guidance Book, whereas the other parts, usually the given workspaces from previous tenant, are inconsistent in terms of size, functionality and appearance.

Office type 1 is the only type of office that is undefined in the Work Guidance Book of Organisation A. This makes offices for Committee are different between one another in terms of size, shape, and furniture provided.

Office type 2 is the most consistent type of office in all regulated elements since it is part of the newly office fit-out. This also is the largest size of office type in the Organisation A, with total area of 170 m^2 consists of secretariat office, workspace, napping room, and bathroom. Nevertheless, due to organisational restructure and expansion, in actual condition the size of office type 2 is reduced to become 50 to 100 m^2 depended on the density of each floor to be able to accommodate the needs of new offices for the new organisational structure.

Office type 3 for Expert Advisor and type 5 for Head of Division are newly fit-out workspaces that are fairly consistent to the guideline standard, except the office location within each floor that differs between one another due to the atypical floor plans that Organisation A has for the entire office. The size of these types are 21 m^2 and 35 m^2 for type 3 and type 5 respectively.

Office type 4, 6, 7, 8 and 9 are partly new renovated and partly given workspaces from previous tenant of the premises. Organisation A optimised what exist in the premises and adjusted only the unsuitable part to make it standard or closely as regulated in the Work Guidance. Office type 4 and type 7 are actually identical in terms of size (12 m^2), furniture, and other office equipment. The difference is on the location of the office that partly situated with and without window view. It is informal how FM of the Organisation A determines which user is entitled the room with or without window, which is usually based on the seniority or job grade level of the user.

Since the office design of Organisation A was incomprehensively tailor-made for this organisation, therefore, the uniformity on furnitures installed within the floor of this office is also lacking since this has been the combination of old furnitures from (1) office of previous tenant and (2) assets or inventories of Organisation A from previous office building.

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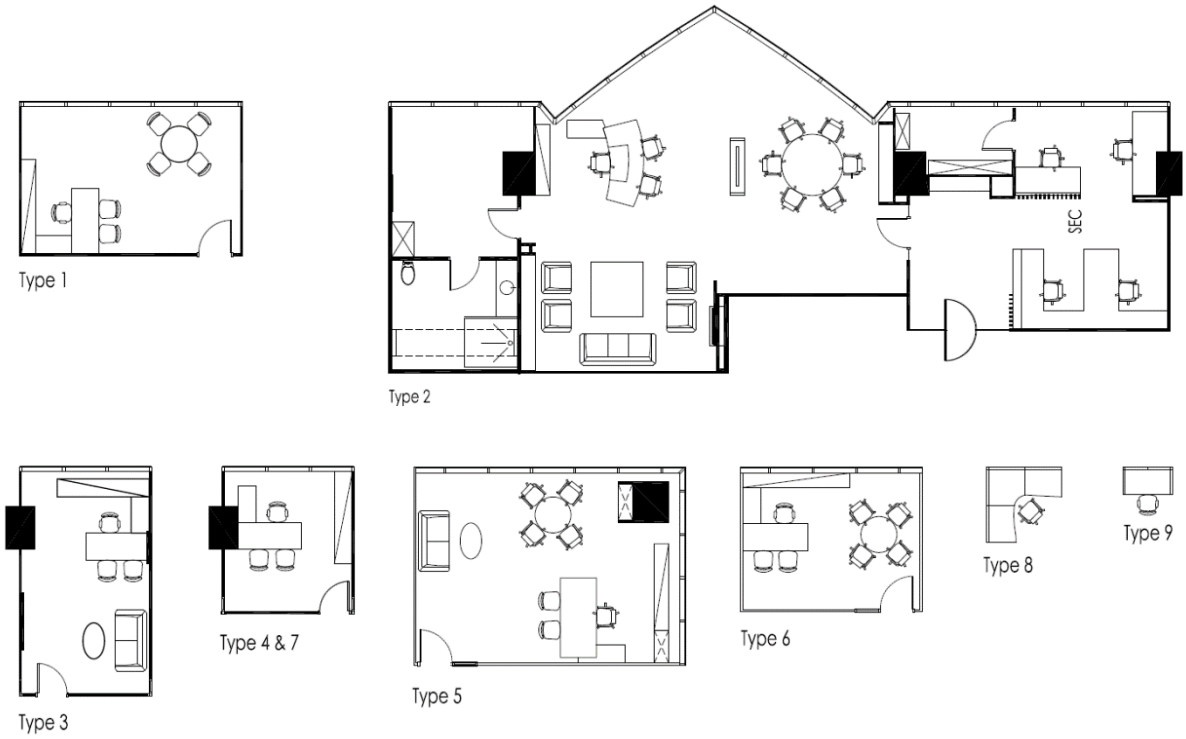


Figure 5.2: Ideal illustration of office types in Organisation A according to Organisation A's Office Facilities Working Guidance (SKK Migas, 2014)

This study next will discuss about the current office layouts to understand the function, classification and the portion of office facilities provided within observed floors, started from the lowest floor to the highest floor of this office.

The offices of Planning Department

The offices of Planning Department in 22nd floor conserved existing interior design of previous tenant from another company with minor renovation particularly for the office of Head of Division and breakout room. It has mostly built-in furniture, except chairs and roundtables for discussion. However, since the office design is mostly given, types and sizes of cellular office and open-plan office are inconsistent. For instance, there are at least two sizes of cubicles within the floor: (1) 4 m^2 and (2) 7.9 m^2. In average, this floor has the biggest average size of cubicles (6.8 m^2) compared to the size of cubicles within other floors (5.8 m^2). The type of cubicles in terms of panel height also varies: (1) high panel: 2.0 m^2 and (2) medium high panel: 1.25 m^2. The high panel cubicle is about the height of common door, while the medium high panel is the height of seated-man-eye-view. High panel cubicles in 22nd floor potentially complement the tasks of

Planning Department that mostly relate to program and budget affairs of its core business that might need segregated rather than integrated workspaces to handle sensitive subjects. This also allows employees to work more focus with minimum noise and visual distraction of surroundings. Yet, high panel cubicles possibly contribute disadvantages at the same time. Since employees' performance are affected by the workspaces proximity to window with view (Aries, et al, 2010), the case of high panel cubicles in 22nd floor which are isolated without window nor view, may result discomfort and leads to frustration. In addition, high-panel cubicles obstruct natural day lighting in which then demand a higher cost for electric lights compares open-plan office with low or medium panel cubicles.

Figure 5.3: 22nd office floor plan of Planning Department

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
22	**Planning Department**			
-	**Workspaces**			
	Cellular Office:			
	- Head of Division	4	33.8	135.2
	- Senior Manager	8	23.7	189.6
	- Manager	20	16.6	332
	Open Plan:			
	- Staff	66	6.8	448.8
	- TPC	23	3.3	75.9
-	**Meeting Rooms**			
	Medium meeting rooms 12 seats	3	27.8	83.4
	Medium meeting rooms 18 seats	1	66.8	66.8
-	**Support Function - working activities related**			
	Photocopy and Printing area	2	6.8	13.6
	Document Counter	1	15.1	15.1
-	**Support Function - other activities related**			
	Receptionist	1	13.4	13.4
	Waiting Room	1	19.9	19.9
	Pantry	1	8.4	8.4
	Breakout Room	1	15.4	15.4
	Executive Toilet	1	12.5	12.5
	Prayer Room	2	16.6	33.2
-	**Service Area**			
	IT Hub	1	9.5	9.5
	File Storage	2	35.9	71.8
-	**Circulation**			
	Primary and Secondary	1	470.5	470.5

Total Nett Area	**2015.0**
Total Semi Gross Area	**2161.5**
Total Gross Area	**2408.0**

Table 5.1: Office measurement of 22nd floor

The Offices of Operation Department

The offices of Operation Department in 27th floor was also majorly given from previous tenant of the premises, as well as built-in and loose furniture provided within the floor. Similar to the offices of Planning Department in 22nd floor, cubicles area for Staff are partly (1) open plan: medium-high panel cubicle and partly (2) semi-open plan: high panel cubicle. This also means that 27th floor has similar advantages and disadvantages in terms privacy and noisy level of open and semi-open cubicles that potentially occur. There are no specific design purposes of Organisation A to preserve these various cubicles arrangement of the floor except the aim of asset optimisation. Organisation A assigns Staff who occupies the open or semi-open cubicle normally based on the proximity to Staff's Manager, Senior Manager and Head of Division within the Operation Department. Affiliated to the offices of Staff, cellular offices of managerial levels are also designated, which then causes disparateness between actual and regulated size, particularly the cellular offices of Division Head (41 m^2 vs 35 m^2) and Senior Manager (32.6 m^2 vs 20 m^2).

Technically, the optimised assets in 27th floor are partly, but not least, outdated, e.g. Manager's office desk that are made from solid wood with paint-coated in which the practicality is questionably suitable for modern office that demands highly mobility and flexibility of the office furniture to support a highly dynamic of the organisation activities. On the other hand, office desk made from solid wood is arduous to remove nor reinstall from one room to another room. It lacks the potency of flexible function that system furniture, on the contrary, may offer. In addition, when it is no longer used, it also requires larger space to store since it cannot be folded or disparted in which then insists the Organisation to spend extra cost for furniture storage. In terms of appearance, painted solid wood may require repainting from obsolescence condition since obsolescence of the outdated assets is likely undermining the aesthetic of office interior as aesthetic beneficially allows primary sense's functioning, i.e. seeing, hearing, touching, smelling and thinking (Hekkert, 2006, p. 169).

Figure 5.4: 27th office floor plan of Operation Department

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
27	**Operation Department**			
-	**Workspaces**			
	Cellular Office:			
	- Head of Division	2	41.0	82.0
	- Senior Manager	7	32.6	228.2
	- Manager	18	14.3	257.4
	- Specialist	6	14.5	87.0
	Open Plan:			
	- Staff	80	5.6	448.0
	- TPC	27	3.1	83.7

-	**Meeting Rooms**			
	Medium meeting rooms 12 seats	1	28.8	28.8
	Medium meeting rooms 14 seats	1	37.5	37.5
-	**Support Function - working activities related**			
	Photocopy and Printing area	1	3.4	3.4
	CCTV Room	1	26.0	26.0
-	**Support Function - other activities related**			
	Receptionist	2	13.2	26.4
	Waiting Room	2	7.3	14.6
	Pantry	1	5.3	5.3
	Breakout Room	1	16.4	16.4
	Prayer Room	2	15.0	30.0
-	**Service Area**			
	IT Hub	1	12.1	12.1
	File Storage Small	1	5.4	5.4
	File Storage Large	1	52.0	52.0
-	**Circulation**			
	Primary and Secondary	1	522.4	522.4
Total Nett Area				**1966.6**
Total Semi Gross Area				**2119.0**
Total Gross Area				**2359.6**

Table 5.2: Office measurement of 27th floor

The offices of Supply Chain Department and Business Support Department

The 29th floor has been one of the workspace floors in Organisation A that is occupied by two Departments, which are Business Support Department and Supply Chain Department. Initially, both Departments were led by the same Deputy in which then later separated due to the organisation restructure of Organisation A. The size of Supply Chain Department Team is relatively compact; on the one hand, other Departments

occupy approximately one to two floors of the office while on the other hand, Supply Chain Department requires uniquely three quarter of the floor to accommodate all of their team.

In terms of spatial planning, workspaces in 29th floor are relatively organised; it has almost typical size of workspaces and proportionately in accordance to the standards regulated in the Organisation A's Office Facilities Working Guidance (SKK Migas, 2014). Open-plan workspaces are also optimum; the panel height of cubicles are wholly seated-man-eye-view high in which allows employees to work communicatively and collaboratively. Furthermore, it exploits natural day lighting more optimally within the floor. Still and all, the argument of researchers regarding the disadvantages of open-plan office, e.g. highly noisy and distraction, will be proven in Chapter 6 through REFA observation.

However, since Organisation A aimed to optimise their assets, although spatial arrangement of 29th floor is well-coordinated, massive threadbare carpet tile installed within the floor interferes the aesthetic and clean impression of the office at the same time that likely threat the pleasure of seeing sense and healthy condition of employees.

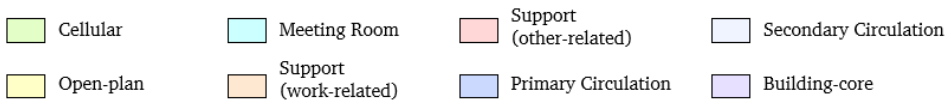


Figure 5.5: 29th office floor plan of Business Support and Supply Chain Department

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
29	**Business Support and Supply Chain Department**			
-	**Workspaces**			
	Cellular Office:			
	- Deputy	1	98.8	98.8
	- Head of Division	4	37.0	148.0
	- Senior Manager	9	23.6	212.4
	- Manager	19	13.9	264.1
	- Specialist	3	11.9	35.7
	Open Plan:			
	- Staff	64	5.1	326.4
	- TPC	34	2.6	88.4
-	**Meeting Rooms**			
	Discussion Rooms	1	12.5	12.5
	Medium Meeting Rooms 12 seats	1	31.6	31.6
-	**Support Function - working activities related**			
	Photocopy and Printing area	3	8.3	24.9
	Document Counter	1	10.5	10.5
-	**Support Function - other activities related**			
	Receptionist	1	13.6	13.6

	Waiting Room	2	10.6	21.2
	Pantry	1	10.5	10.5
	Breakout Room	1	14.2	14.2
	Prayer Room	1	24.7	24.7
	Executive Toilet	1	9.2	9.2
-	**Service Area**			
	IT Hub	1	11.1	11.1
	File Storage	5	16.0	80.0
-	**Circulation**			
	Primary and Secondary	1	528.8	528.8
Total Nett Area				**1966.6**
Total Semi Gross Area				**2119.0**
Total Gross Area				**2359.6**

Table 5.3: Office measurement of 29th floor

The offices of Secretary Department

Similar to 29th floor, 30th floor is well ordered in terms of spatial planning. The office layout of 30th floor has been rearranged two years after Organisation A moved in to the office building as the pilot project to ideally comply to the Organisation's Office Facilities Work Guidance (SKK Migas, 2014) post office relocation and afterwards due to the organisation restructure of Organisation A. This is the floor that the cubicles of Staff are dominated with new assets even though the rest parts of office furniture are optimised assets. Despite that, the optimised assets still existed in 30th floor fairly suits the size requirement. According to the office measurement of 30th floor, the actual size of all office types closely comply the Work Guidance except the office of Deputy that the actual size has been majorly optimised to become only 54.5 m^2 instead of 170m^2. In addition, the obsolescence of old assets is minimum in which the cost of office maintenance is also not urgently required.

Figure 5.6: 30th floor plan of Secretary

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
30	**Secretary**			
-	**Workspaces**			
	Cellular Office:			
	- Deputy	1	54.5	54.5
	- Expert Advisor	1	19.3	19.3
	- Head of Division	2	39.0	78.0
	- Senior Manager	6	21.5	129.0
	- Manager	22	13.6	299.2

	- Specialist	1	14.3	14.3
	Open Plan:			
	- Staff	68	5.3	360.4
	- TPC	44	2.0	88.0
-	**Meeting Rooms**			
	Small Meeting Rooms 10 seats	1	33.8	33.8
-	**Support Function - working activities related**			
	Photocopy and Printing area	5	4.0	20.0
	Payroll	2	7.1	14.2
	Business Trip Centre	1	12.0	12.0
	Document Counter	1	9.8	9.8
-	**Support Function - other activities related**			
	Receptionist	1	12.3	12.3
	Waiting Room	2	10.9	21.8
	Pantry	1	12.7	12.7
	Breakout Room	1	16.6	16.6
	Prayer Room	1	18.7	18.7
	Shower Room	2	33.9	67.8
-	**Service Area**			
	IT Hub	1	13.7	13.7
	File Storage	3	35.4	106.2
-	**Circulation**			
	Primary and Secondary	1	564.3	564.3
Total Nett Area				**1966.6**
Total Semi Gross Area				**2119.0**
Total Gross Area				**2359.6**

Table 5.4: Office measurement of 30th floor

The offices of Finance Department

The offices of Finance Department in 31st floor, on the contrary, has vast atypical office types. Particularly this can be obviously seen within the office floorplan that there are at least two types of cubicle that the size gap is vast-ranging between one another: (1) Staff cubicle type 1: 2.56 m^2 and (2) Staff cubicle type 2: 6.00 m^2. This condition leads to possible conflicts between employees to be preferably assigned in a larger cubicle in 31st floor, as well as the circulation's safety for a smaller cubicle is also questioned in this matter.

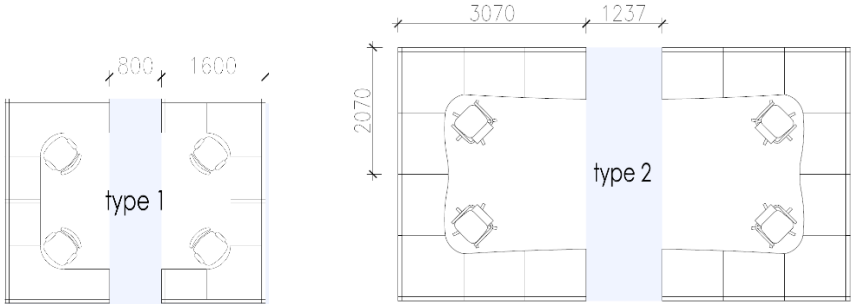


Figure 5.7: cubicle types comparison in 31st floor

This study checks the size and circulation of open plan area in 31st floor and tries to compare to the German standard. According to German's Technical Regulations for Workplaces No. A1.8 (ASR, 2012), the size of workplace in open plan area must be 12-15 m^2, included circulation area. On the other hand, if this study calculates the total area of cubicle, with the circulation included, the ratio of cubicles in open plan area is 6.1 m^2, which is only half of the German's regulated size. The same case to the size requirement, the circulation width within cubicles type 1 is also narrower compared to German standard; Germany obligates 0.875 m^2 as the minimum width of circulation within workspaces for 5 persons, whereas in fact the circulation width between cubicles type 1 in 31st floor is not wider than 0.80 m^2.

Figure 5.8: 31st floor plan of Finance Department

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
31	**Finance Department**			
-	**Workspaces**			
	Cellular Office:			
	- Deputy	1	95.7	95.7
	- Head of Division	3	41.0	123.0
	- Senior Manager	7	27.0	189.0
	- Manager	15	14.4	216.0
	- Specialist	2	11.2	22.4

	Open Plan:			
	- Staff	68	6.0	408.0
	- TPC	35	2.6	91.0
-	**Meeting Rooms**			
	Medium Meeting Rooms 12 seats	1	60.3	60.3
	Medium Meeting Rooms 16 seats	1	44.2	44.2
-	**Support Function - working activities related**			
	Photocopy and Printing area	2	7.5	15.0
-	**Support Function - other activities related**			
	Receptionist	1	10.3	10.3
	Waiting Room	2	10.3	20.6
	Pantry	1	9.2	9.2
	Breakout Room	1	12.7	12.7
	Prayer Room	2	13.0	26.0
-	**Service Area**			
	IT Hub	1	9.3	9.3
	File Storage	4	19.3	77.2
-	**Circulation**			
	Primary and Secondary	1	536.7	536.7
Total Nett Area				**1966.6**
Total Semi Gross Area				**2119.0**
Total Gross Area				**2359.6**

Table 5.5: Office measurement of 31st floor

Multifunction Floor

Organisation A apparently dedicates three floors within their office premises to anticipate various kind of Organisation A's group activities aside from the employees' office room or desk, which are 35th floor and 36th floor in the main office building, as well as 9th floor in the annex office building. The 35th and 36th floor are purposely designed mainly for meeting activities with the group size of 2 – 500 attendees, whereas the ninth floor accommodates larger events with the group size of up to 1,000 attendees. The ninth floor also uniquely provides supporting facilities aside from work-related activities, such as fitness room and medical clinic that is operated by third party.

The 35th floor has been the first multifunction floor of Organisation A that was built with completely new fit-out and furniture since Organisation A has moved in the premises in 2010. The floor initially aimed to eliminate the cost of external meeting expense that in previous years often be held in commercial meeting room, e.g. hotel. This was also the only floor where visitors are allowed to access Organisation A's premises by registering themselves with their valid ID. However, only by two years after Organisation A has moved in premises, Organisation A decided to provide a larger meeting room, such as hall, to be able to accommodate bigger events and therefore the ninth floor was built in 2013.

The 36th floor, on the other hand, was built in 2016. This has been the expansion of meeting rooms in 35th floor. As reported in Organisation A meeting activities studies (SKK Migas, 2016), this organisation averagely hold 45 meeting per day, whereas the meeting rooms provided in 35th floor are only approximately half (53%) from the meeting events held per day in Organisation A. According to the report, the size of group meeting occurred in Organisation A is categorised as follows: (1) 2 attendees: 0.07%, (2) 3 – 5 attendees: 1.48%, (3) 6 – 10 attendees: 29.54%, (4) 11 – 20 attendees: 45.06%, (5) 21 – 35 attendees: 18.24%, (6) 35 – 500 attendees: 5.49%, and (7) >500 attendees. This report is supposedly a potential reference for Organisation A to determine appropriate portion of meeting room types in 36th floor and calculated together with another multifunction floor in 35th floor, which then this study reviews its comparison, as follows:

Capacity	Meeting rooms in 35th fl.	Meeting rooms in 36th fl.	Total meeting rooms in 35th & 36th fl.	Total meeting events per day
2	0	0	0	0
3 - 5	2	9	11	1
6 - 10	6	21	27	13
11 - 20	11	10	21	20
21 - 35	4	2	6	8
36 - 500	1	0	1	2
>500	0	0	0	0
Total	**24**	**42**	**66**	**45**

Table 5.6: Types of meeting room in Public Floor of Organisation A

According to the comparison between the total number of meeting rooms in 35th and 36th floor and the total number of meeting events occurred per day, this is clear that Organisation A is able to provide sufficient meeting rooms to support group work activities within the organisation. It is even capable to accommodate peak season of group work activities up to 147% of the average requirement. However, the numbers of people participate within the group work mismatches to meeting rooms capacity provided in Organisation A, particularly the numbers of meeting rooms with 3 to 5 seats and 6 to 10 seats that are significantly oversupplied. In the opposite, it slightly lacks meeting rooms for 11 to 20 seats, 21 to 35 seats, and 36 to 500 seats. There are also insignificant numbers of meeting with 2 attendees and more than 500 attendees recorded by Organisation. Therefore, it is sensible that these types of meeting room is not necessarily provided within the office of Organisation A.

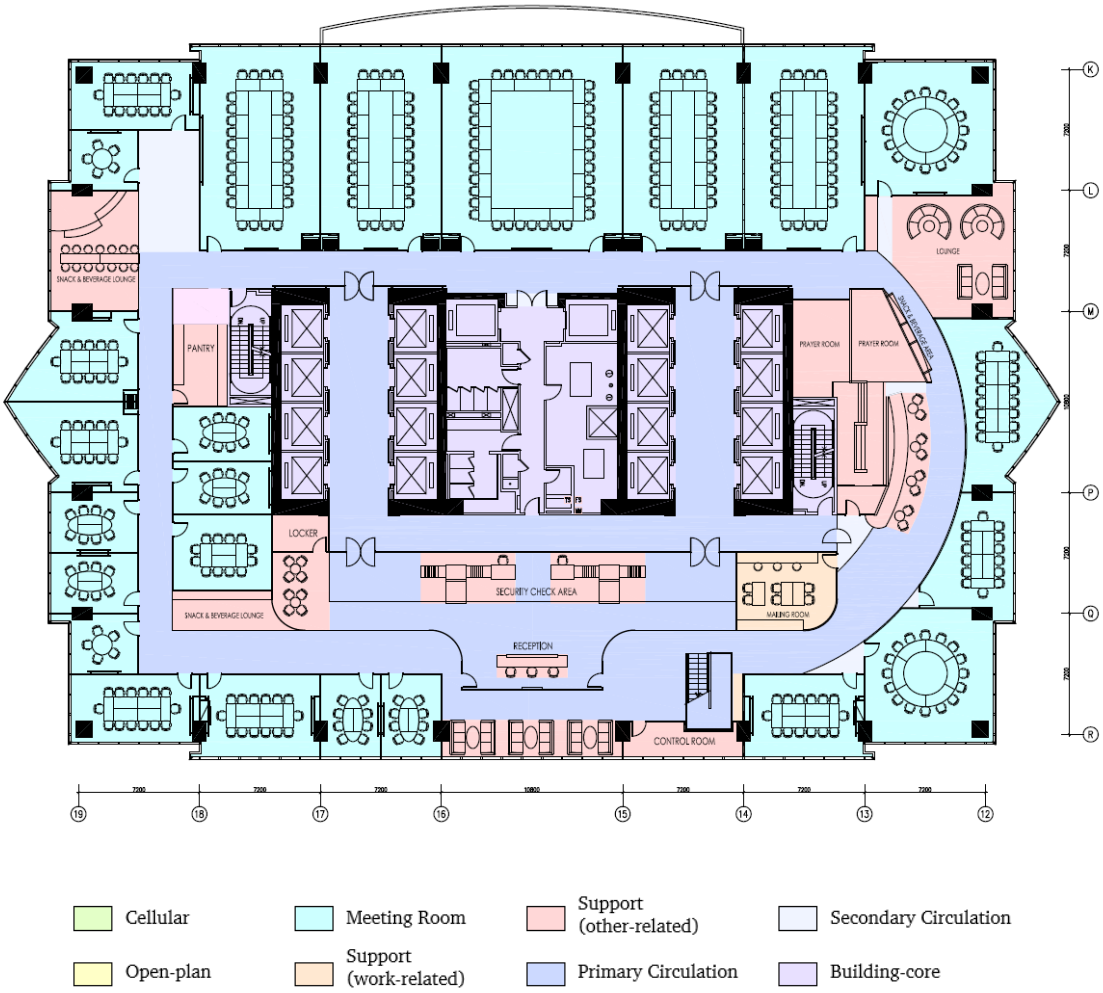


Figure 5.9: 35th floor zoning plans of Public Floor

Figure 5.10: 36th floor zoning plans of Public Floor

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
35	**Multifunction**			
-	**Meeting Rooms**			
	Closed Discussion Room (3-5 p)	2	15.2	30.4
	Small Meeting Room (6-10 p)	6	18.6	111.6
	Medium Meeting Room (11-20 p)	8	32.5	260.0
	Large Meeting Room (21-35 p)	8	80.9	647.2
-	**Support Function - working activities related**			
	Photocopy and Printing Area	1	2.7	2.7
	Mailing Room	1	27.9	27.9
	Control Room	1	16.2	16.2
-	**Support Function - other activities related**			
	Receptionist	1	27.1	27.1
	Security Check	1	45.2	45.2
	Lounge	4	35.9	143.6
	Pantry	1	16.0	16.0
	Breakout Room	1	40.8	40.8
	Snack Area	2	8.3	16.6
	Prayer Room	2	30.3	60.6
-	**Service Area**			
	IT Hub	1	6.9	6.9
-	**Circulation**			
	Primary and Secondary	1	463.8	463.8
Total Nett Area				**1916.6**
Total Semi Gross Area				**2126.5**
Total Gross Area				**2359.6**

Table 5.7: Office measurement of 35th floor

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
36	**Multifunction**			
-	**Meeting Rooms**			
	Open Discussion Room	4	16.5	66.0
	Closed Discussion Room (3-5 p)	4	10.6	42.4
	Small Meeting Room (6-10 p)	20	11.0	220.0
	Medium Meeting Room (11-20 p)	9	38.4	345.6
	Large Meeting Room (21-35 p)	2	32.7	65.4
	Collaboration Room	1	44.0	44.0
	Training Room	1	136.4	136.4
-	**Support Function - working activities related**			
	Quiet Room	1	10.5	10.5
	Business Centre	1	15.0	15.0
-	**Support Function - other activities related**			
	Receptionist	1	15.1	15.1
	Security Check	1	12.8	12.8
	Waiting Room	1	15.8	15.8
	Lounge	4	28.6	114.4
	Pantry	2	14.5	29.0
	Breakout Room	2	36.5	73.0
	Snack Area	2	14.9	29.8
	Prayer Room	2	9.7	19.4
-	**Service Area**			
	IT Hub	1	6.8	6.8
	File Storage	4	8.1	32.4
-	**Circulation**			
	Primary and Secondary	1	672.8	672.8

Total Nett Area	**1966.6**
Total Semi Gross Area	**2123.5**
Total Gross Area	**2359.6**

Table 5.8: Office measurement of 36th floor

The offices of Supervisory Committee, Vice Chairman, VPMR, and Internal Audit

The 37th floor of Organisation A that is populated by multi-department, i.e. Supervisory Committee, Vice Chairman, VPMR, and Internal Audit, is another pilot project for office size standardisation alongside to 29th and 30th floor. Refers to the office floor plans, actual size of offices relatively close to the regulated size.

It is the floor that the number of cellular offices is high (41%). It relates to the organisational structure of Organisation A in which the floor is occupied majorly by mid and top levels of management within this organisation that are entitled to occupy cellular offices.

However, in terms of usability, this floor is used questionably optimal. For example, the presence of Supervisory Committee is rarely daily basis; there are no specific working days that Supervisory Committee work within the office or mobile. Other than that, VPMR that stands for Vice President Management Representatives, is responsible to represent Organisation A within PSCs management, to communicate the PSCs operational condition to Organisation A and to pass Organisation A's policy to PSCs and other functions (SKK Migas, 2017). In this matter, VPMR shares their working times within Organisation A's office and PSCs office as their job role forces VPMR to work intensively with Organisation A and PSCs at the same time.

Although the appearance of Supervisory Committee and VPMR within Organisation A are not full time, Organisation A dedicates the offices for Supervisory Committee and VPMR individually, instead of implementing potential hot-desking concept that allows employees to use undedicated desk or office anytime they need to work within office. To be able to extend this finding, further investigation about occupancy rate and activities of Supervisory Committee and VPMR will be discussed in Sub Chapter 5.2 and Chapter 6 respectively.

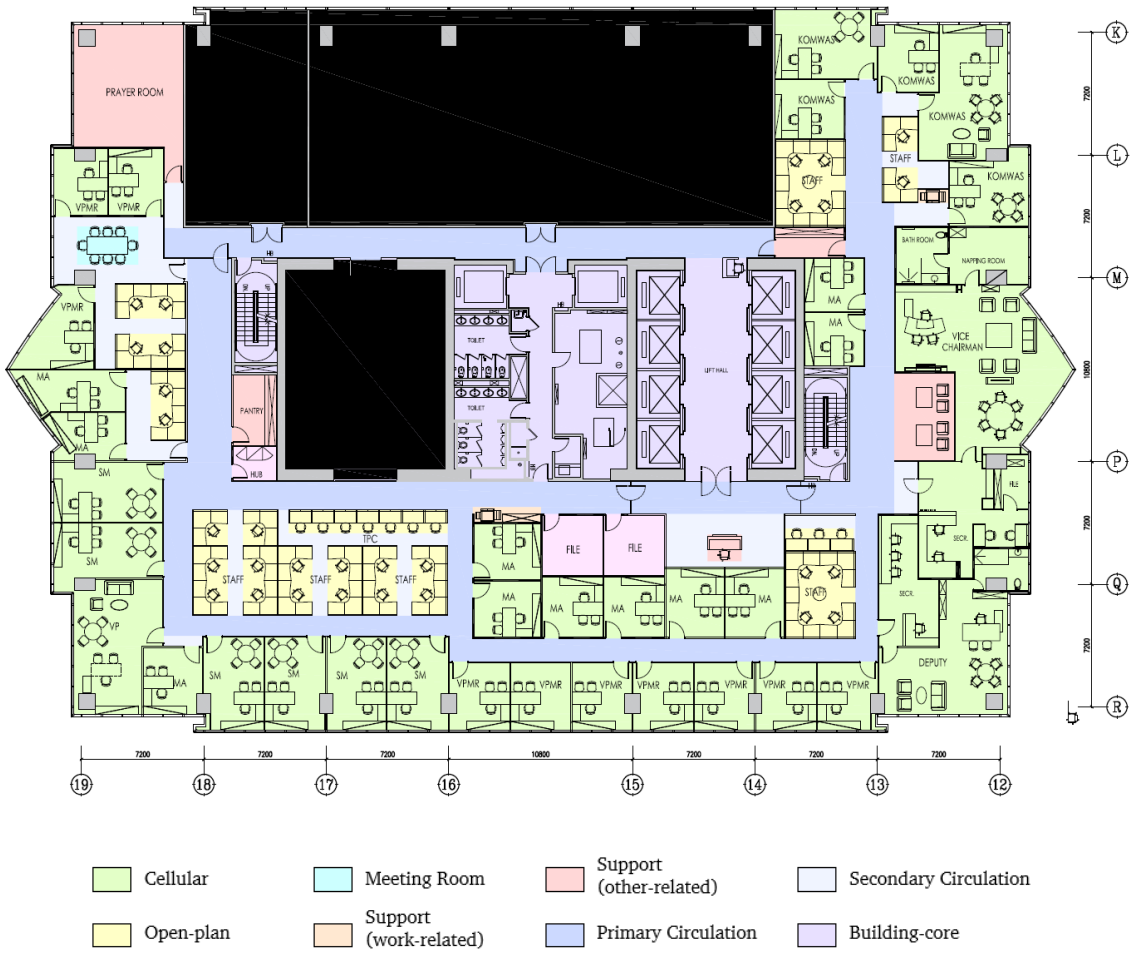


Figure 5.11: 37th floor plan of Internal Auditor, VPMR and Vice Chairman

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
37	**Internal Auditor, VPMR, Vice Chairman, Supervisory Committee**			
-	**Workspaces**			
	Cellular Office:			
	- Supervisory Committee	5	22.5	112.5
	- Vice Chairman	1	102.0	102.0
	- Deputy	1	57.6	57.6
	- Head of Division	1	37.3	37.3

	- Senior Manager	6	21.0	126.0
	- Manager	9	14.0	126.0
	- Specialist/ VPMR	10	14.0	140.0
	Open Plan:			
	- Staff	34	6.0	204.0
	- TPC	14	2.6	36.4
-	**Meeting Rooms**			
	Discussion Room	1	21.7	21.7
-	**Support Function - working activities related**			
	Photocopy and Printing area	1	3.5	3.5
-	**Support Function - other activities related**			
	Receptionist	1	16.0	16.0
	Waiting Room	2	12.5	25.0
	Pantry	2	9.2	18.4
	Prayer Room	1	49.0	49.0
-	**Service Area**			
	IT Hub	1	5.7	5.7
	File Storage	2	13.4	26.8
-	**Circulation**			
	Primary and Secondary	1	381.6	381.6
Total Nett Area				**1489.5**
Total Semi Gross Area				**1626.0**
Total Gross Area				**1932.5**

Table 5.9: Office measurement of 37th floor

The offices of Chairman, Expert Advisor, Business Support, and Corporate Secretary

The 39th floor which is occupied by the Chairman, Expert Advisor, Business Support and Secretary, is the highest floor of Organisation A‘s office premises that was chosen specifically for the Chairman with design philosophy that the Chairman as the main leader of this organisation sits on the highest position of the office premises. In addition, security concern is considered in this matter as the highest floor of the office premises is more potentially segregated with other parts of the office.

However, above consideration is possibly contradictive to the fact that the Chairman shares the floor with three different functions of this organisation that might disrupt the exclusivity requirement of the Chairman office. Evaluate from Organisation A’s internal studies, the reason of placing these functions close-by to each other in 39th floor is based on the intensity of Expert Advisor and Secretary in working to the Chairman. Expert Advisor, for instance, is responsible directly under the Chairman (SKK Migas, 2017, p. 27). Secretary in 39th floor, on the other hand, is actually a separate part from the other bigger parts of the Department in 30th and 38th floor. Nevertheless, it is justified that Secretary occupies the same floor to the Chairman as Secretary within the floor is liable to the Chairman’s secretarial, communication and protocol affairs (p. 9).

Business Support, in different circumstances, does not directly work to the Chairman. Instead, the reason of Business Support in this floor is considered suitable to share the floor with the Chairman is because of the tasks of Business Support in 39th floor that relates to legal affairs in which require concentrated work with low interaction (Duffy, 1997, p. 63).

Figure 5.12: 39th floor plan of Chairman, Expert Advisor, Business Support and Secretary

Floor	Function	Amount	Average Size (m^2)	Total Size (m^2)
39	**Internal Auditor, VPMR, Vice Chairman, Supervisory Committee**			
-	**Workspaces**			
	Cellular Office:			
	- Vice Chairman	1	102.0	102.0
	- Deputy	1	57.6	57.6
	- Expert Advisor	7	22.4	156.8
	- Head of Division	3	38.9	116.7
	- Senior Manager	8	25.0	200.0
	- Manager	21	12.2	256.2
	- Specialist/ VPMR	5	13.8	69.0

	Open Plan:			
	- Staff	60	3.7	222.0
	- TPC	32	2.0	64.0
-	**Meeting Rooms**			
	-	0	0.0	0.0
-	**Support Function - working activities related**			
	Photocopy and Printing area	2	3.3	6.6
-	**Support Function - other activities related**			
	Receptionist	2	11.7	23.4
	Waiting Room	3	7.4	22.2
	Pantry	1	7.2	7.2
	Breakout	2	16.7	33.4
	Executive Toilet	1	8.1	8.1
	Prayer Room	2	14.0	28.0
-	**Service Area**			
	IT Hub	1	9.2	9.2
	File Storage	4	19.8	79.2
-	**Circulation**			
	Primary and Secondary	1	538.9	538.9
Total Nett Area				**2000.5**
Total Semi Gross Area				**2191.5**
Total Gross Area				**2359.6**

Table 5.10: Office measurement of 39th floor

5.2 Office Occupancy Rate

To evaluate the effectiveness of office utilisation, it is important for this study to discover the actual occupancy rate of the office through structured-space observations. At this stage, this study separates the measurement of workspace floors and public floors. The reason is to get the pure number of employees that can only be found in workspace floors that are sterile from visitors. Still, public floor is observed to confirm that employees leave their office to work on different setting such as meeting room or collaboration room that are accommodated within public floor.

The number of employees in Organisation A that need office to finish their task is 1,135 employees, consists of: (1) 821 direct hired, and (2) 314 outsourcing. Administratively, the offices of Committee, Management, and Expert Advisor are fully occupied. On the other hand, the offices of Staff are massively vacant (32%); while Administrator, Manager, and VPMR/ Specialist have 16%, 12% and 12% of vacant offices respectively. On the other hand , there also spare offices of Division Head and Senior Manager though insignificant (7%). This results the administrative occupancy rate of Organisation A's office was 77% out of the total workspaces supplied. As shown in Sub Chapter 5.1 that the rest 23% of idle workspaces were whether completely unused and / or whether functioned for spontaneous activities such as group discussion or as storage for excessive printed-documents.

In terms of size, Organisation A has regulated its institutional policy regarding the office types based on the job level. Nonetheless, mismatch was found between regulation and actual size; the actual size averagely 14% larger than what was defined in the Work Guidance.

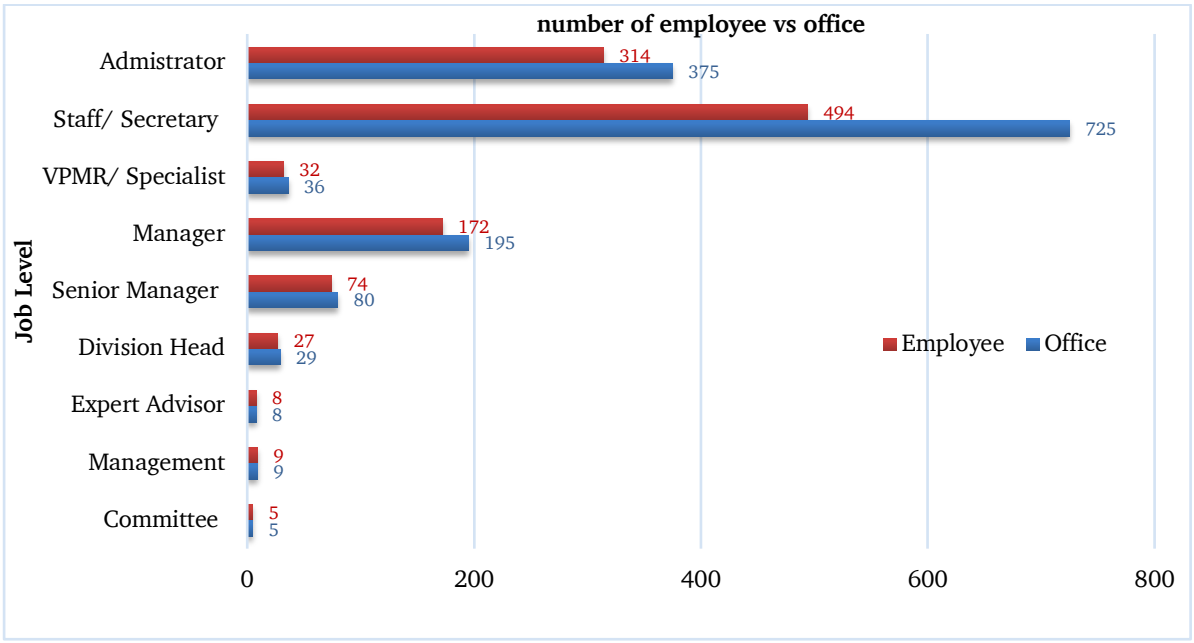


Figure 5.13: Comparison between office supply and employees in Organisation A

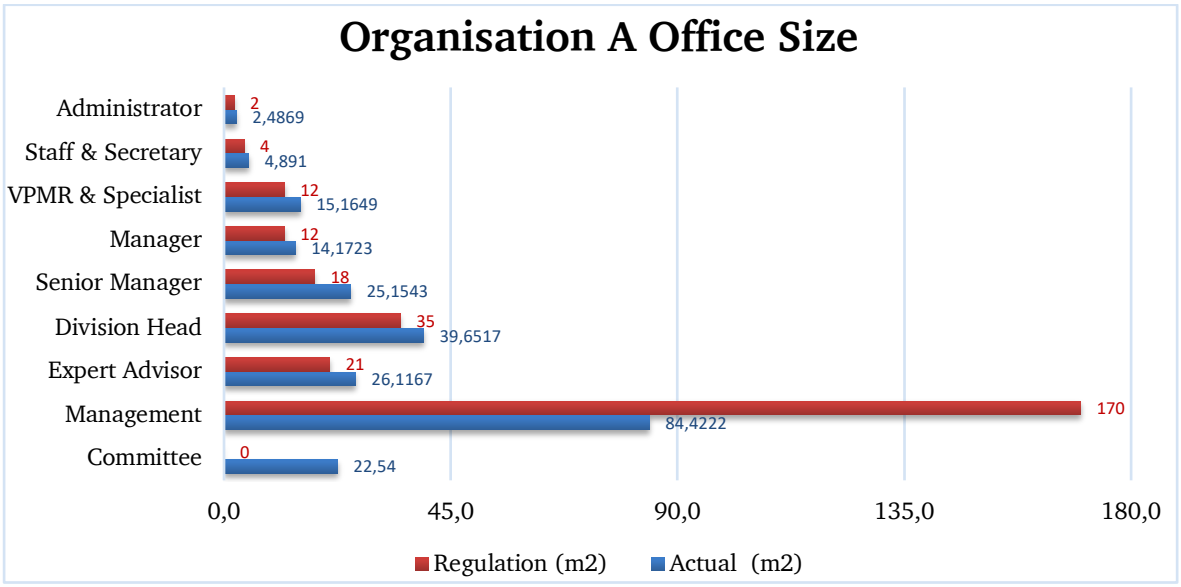


Figure 5.14: Office size comparison between regulation and actual in Organisation A

FLOOR	DEPARTMENT	FUNCTION	AREA
39	Chairman, Expert Advisors, Business Support, Secretary	Top Management, Support	2,191.5 m^2
38	Secretary	Support	1,720.5 m^2
37	Supervisory Committee, Vice Chairman, VPMR, Internal Audit	Top Management, Support	1,626.0 m^2
36	Public Floor	Multifunction	2,123.5 m^2
35	Public Floor	Multifunction	2,123.5 m^2
33	Finance and Monetisation	Support	2,126.5 m^2
31	Finance and Monetisation	Support	2,119.0 m^2
30	Secretary	Support	2,119.0 m^2
29	Business Support	Support	2,119.0 m2
28	Operation	Core	2,119.0 m^2
27	Operation	Core	2,119.0 m^2
23	Planning	Core	2,161.5 m^2
22	Planning	Core	2,161.5 m^2

Table 5.11: Office floors of Organisation A

In the same way that this study has mentioned earlier that the administrative occupancy rate in the office of Organisation A was 77%, the actual condition in sample floors was almost identic that apparently only 75% of offices were assigned to employees, whereas the rest 25% of these remained vacant.

During the office-hour of Organisation A (07.00 – 15.30), this study also identified the number of offices that were temporarily vacant. Temporarily vacant means the number of employees who were assigned to occupy the office yet they temporarily leave their office for doing other activities, e.g. business trip or attend meeting outside the office. The number of temporarily vacant offices can be measured through the number of employees listed in the office administratively minus the number of employees' activities appear in the office physically in which then represent the physical occupancy. Rather than just administratively, physical occupancy showed the number of employees who worked within the office space during office-hour.

According to the structured-space observations of this study, surprisingly in overall only 54% of the employees were at their office during office hour. Generally, the beginning (7), the break (11 - 12), and the finish (15) of office-hour were the times when the office had the least number of employees who stay within the office (34%, 46%, 40%, and 49% respectively). On the other hand, the density was higher in between at 8 to 10 (59%, 74%, and 65% respectively) and at 13 to 14 (63% and 58% respectively).

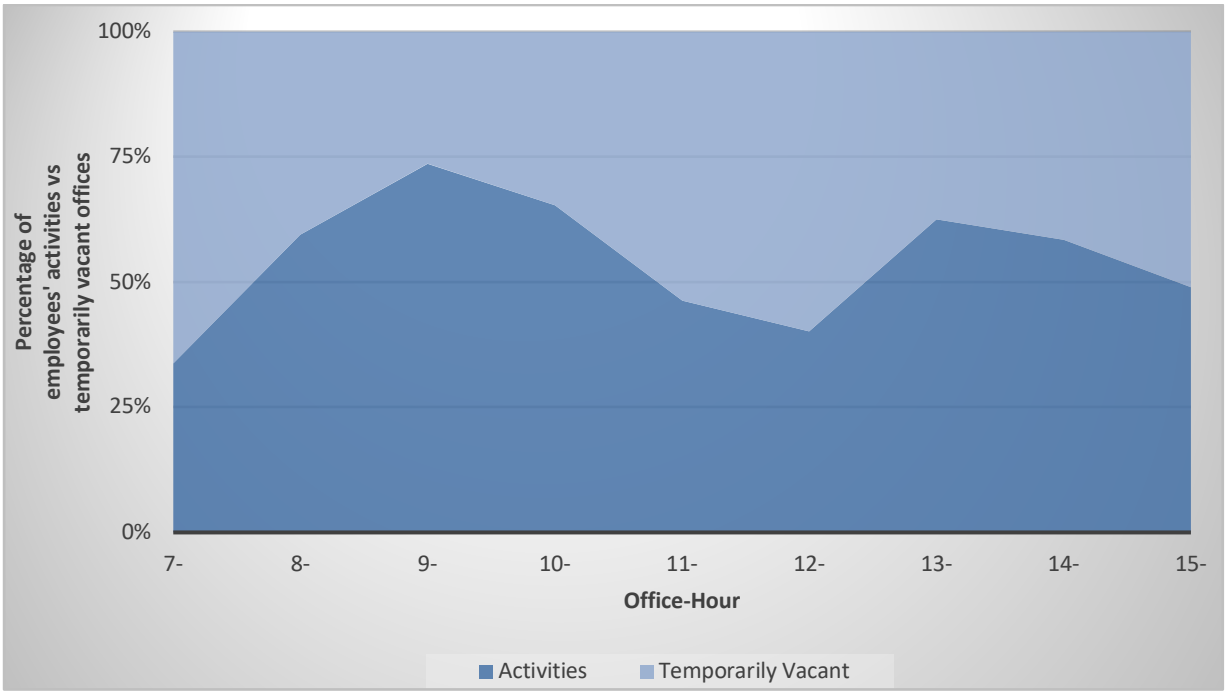


Figure 5.15: Workspace and public floors in Organisation A office

However, if the number of temporarily vacant and vacant offices were combined, occupancy rate of the office was apparently lower; employees productively used only 40% offices during the office-hour with the beginning at 7 was only 25%, break time at 11 to 12 are 35% and 30%, and the finish time of office hour was 37% offices utilised.

This study, therefore, checked the possibility of employees' activities in Public Floor as alternative location of work aside from workspace floors. However, the utilisation in Public Floor was not impressively satisfying; averagely employees and visitors used only 20% of total capacity available within the floor. Furthermore, discussion about type of activities that employees do to work on their task will be featured in Chapter 6.

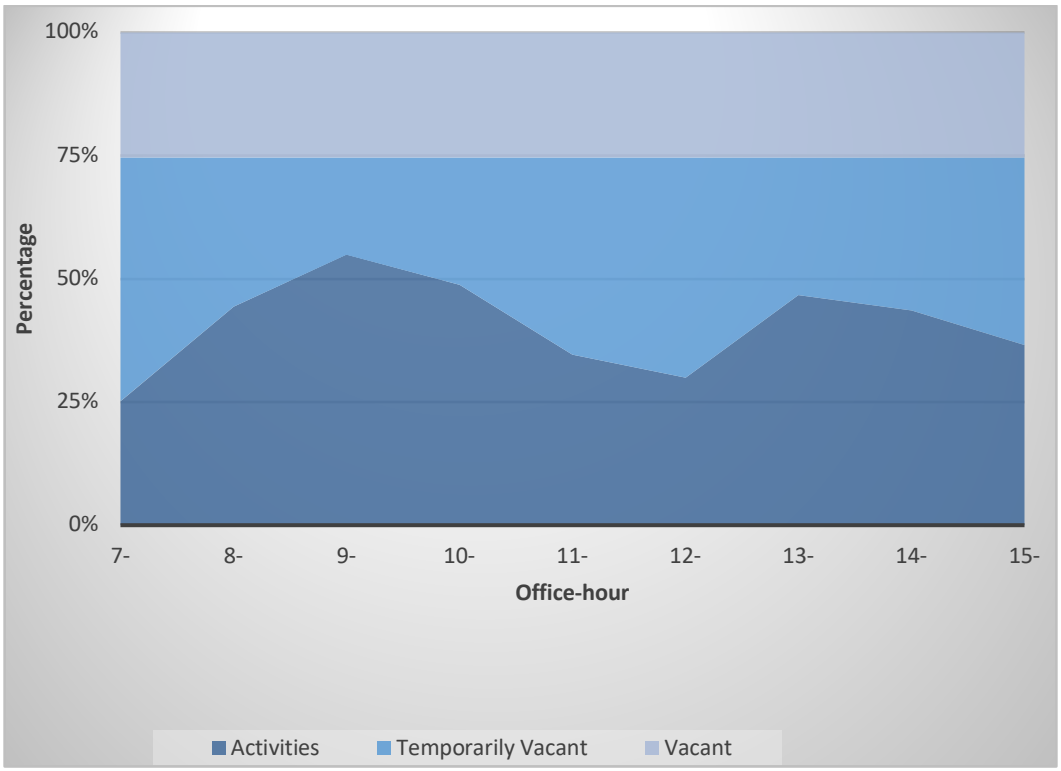


Figure 5.16: Utilisation in workspace floors of Organisation A

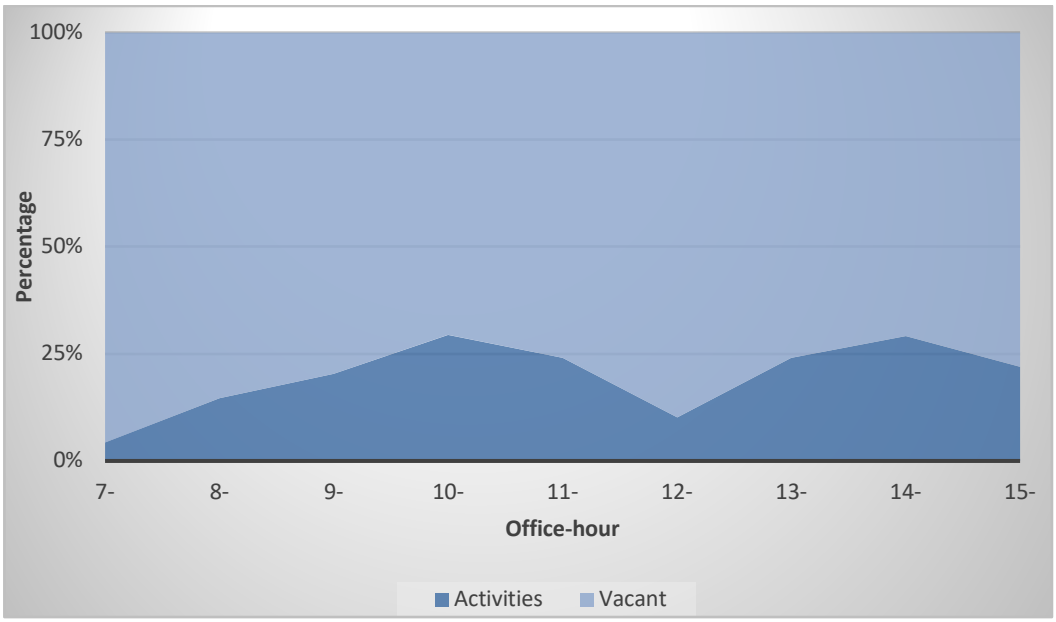


Figure 5.17: Utilisation in public floor in Organisation A office

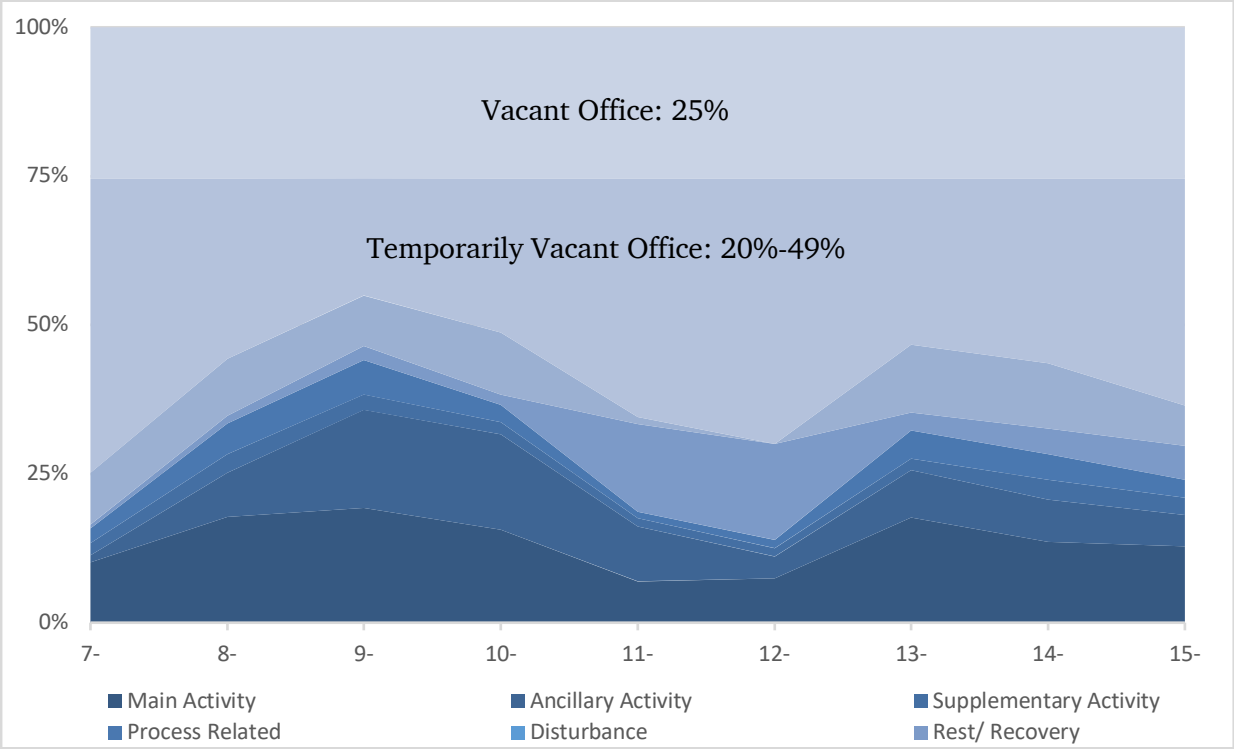


Figure 5.18: Office utilisation based on activities in workspace floors of Organisation A

Aside from that, space occupancy between departments and functions was also researched. As a continuation of vacant and temporarily vacant offices findings, therefore, space occupancy was interestingly compared to administrative occupancy and physical occupancy to get a comprehensive information of office occupancy rate. The terms of administrative occupancy and physical occupancy have been discussed earlier, yet it is crucial to once again define these alongside to space occupancy to get a clear comparison of office occupancy rate, as follows:

- Administrative occupancy: the percentage of offices that are administratively assigned to the employees as personal workspace.
- Physical occupancy: the percentage of offices that are used physically by the employees during office-hour.
- Space occupancy: the percentage of areas in square metre that are used by the employees during office hour.

According to the office occupancy rate, in terms of area, employees needed only 15% of the office area to carry out their task. This may due to these reasons: (1) impact of low administrative occupancy and/ or physical occupancy, and (2) employees mostly

used lower ratio of facilities, e.g. open plan office, meeting room or other types of sharing facilities. To confirm, the location of employees during their work will be shown in Chapter 6.

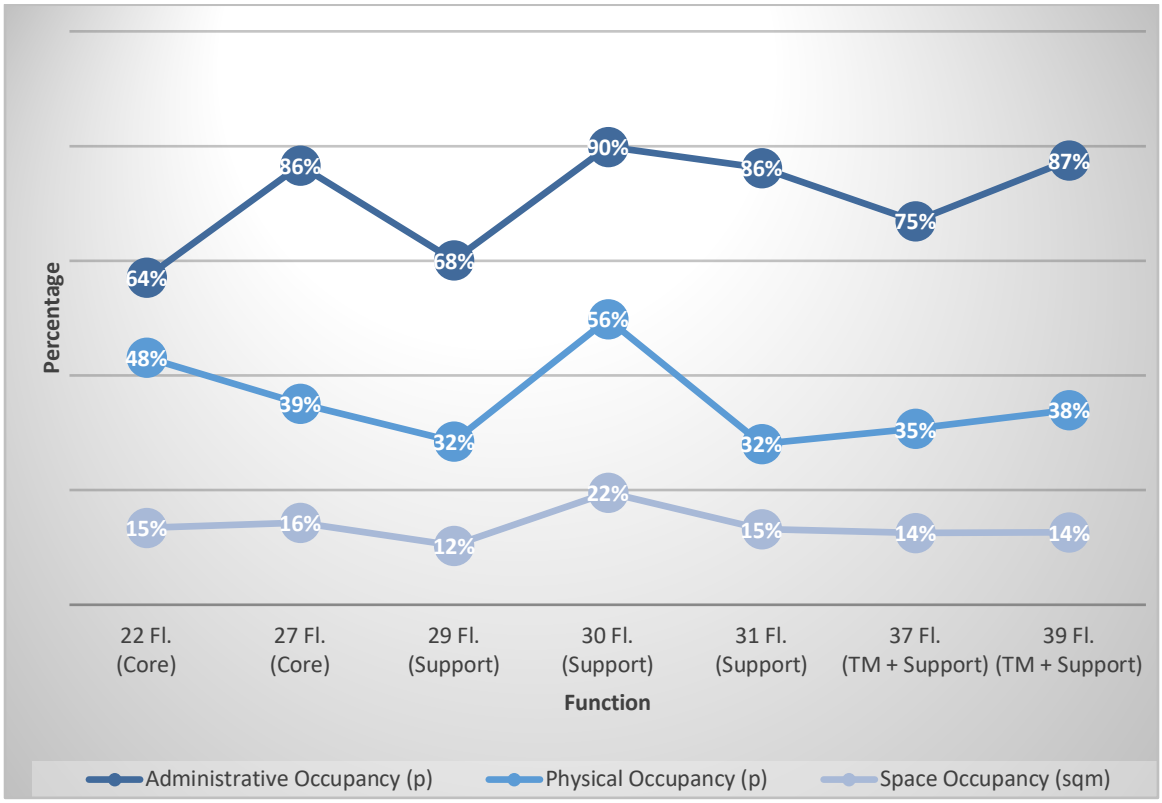


Figure 5.19: Office occupancy rate between administrative occupancy, physical occupancy, and space occupancy in Organisation A

Based on the function classification of Organisation A's office, averagely, Core Function floors in Organisation A occupied their office more productively (44%). Support Function floors had slightly less number (40%) while Top Management + Support Function floors were the less productive (36%) among other functions.

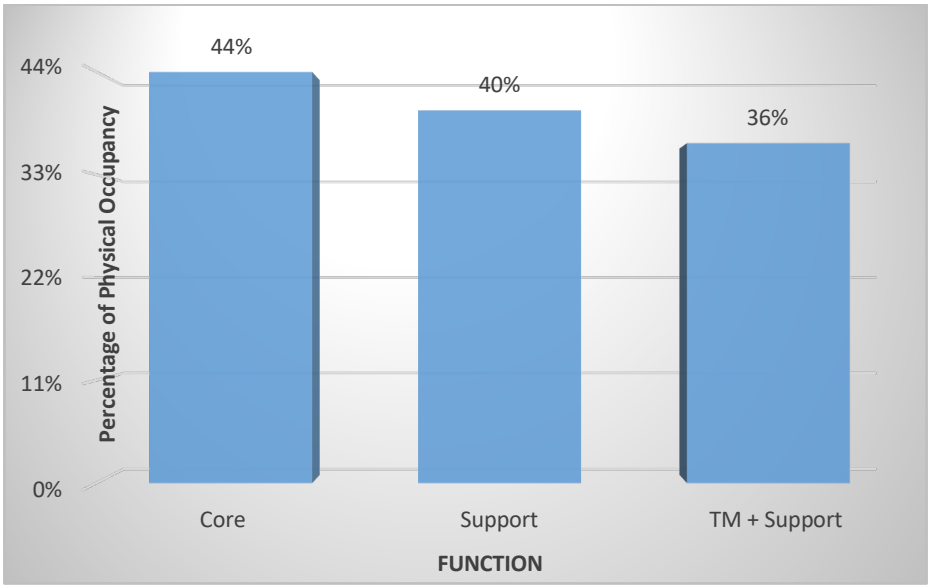


Figure 5.20: Physical occupancy comparison between Core, Support Function, and Top Management + Support Function Floors in Organisation A

However, if it is elaborated into a more detail graphic, 30th floor of Support Function were dense (56%) if it is compared to the average of physical occupancy in all sample floors (38%). Still, it is not surprising that this floor still had less busy times at 7, 11 to 12, and 15 as these hours had been the beginning, break, and the finishing times of office-hour. On the other hand, they used their office more productively at 8 to 10 (70%, 69%, 57%) and 13 to 14 (83%, 70%).

The second busy floor is the 22nd floor, which is the office of Core Function, with 48% of employees who worked within their office during office-hour. How they appear within their offices was unique; physical occupancy rate was only 33% and 44% at 7 to 8, but it sharply rises at 9 (80%) to 10 (81%). The appearance of people in 22nd floor at 9 to 10 was even exceeded the number of employees assigned within the floor (68%). It is obvious that visitors were within the floor during these peak hours since it decreased back also significantly to 39% during break time at 12. Unlike other floors that the number of employees after break time at 13 was similar to the number of employees at 8-9, 22nd floor had significant difference numbers in the comparison between these hours due to the temporary visits that only occurred before break time.

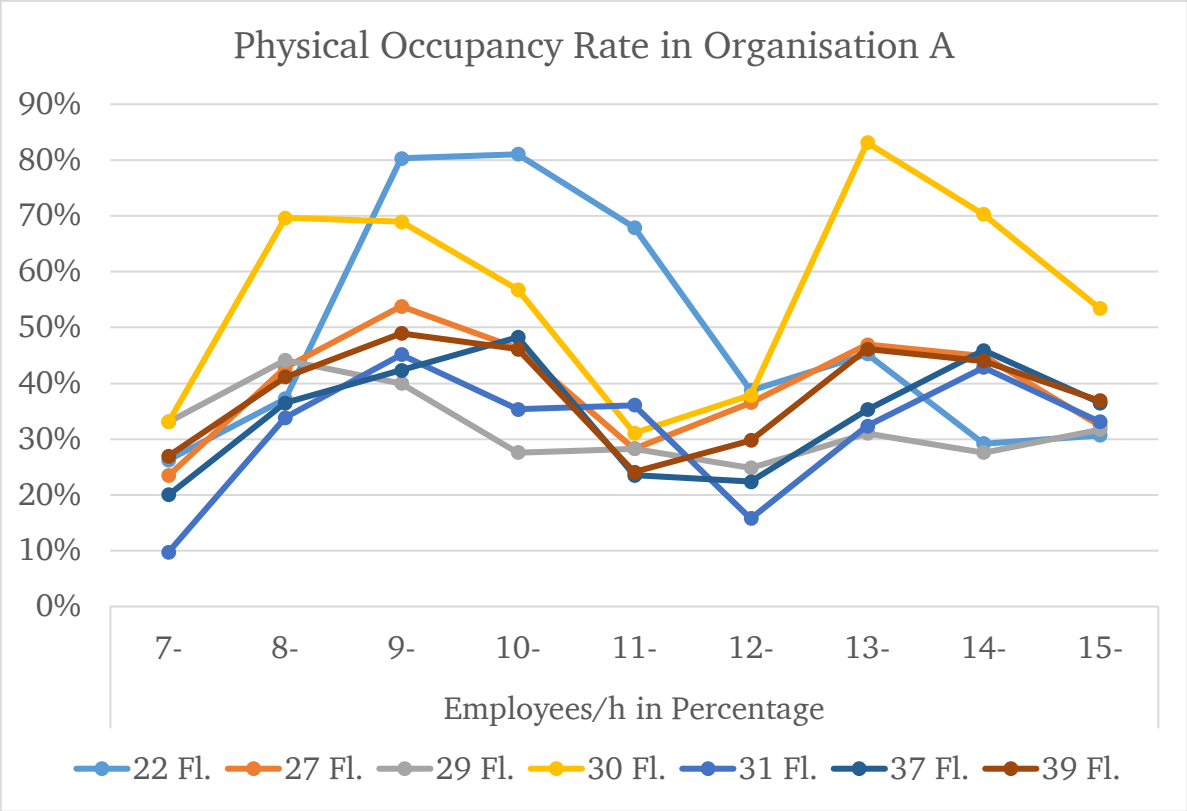


Figure 5.21: Physical Occupancy during Office-Hour in Organisation A

In the relation to physical occupancy, this research at the same time measured space occupancy, as well as its comparison between departments. Overall, space occupancy in Organisation A shows that each floor consumes space more differently compared to physical occupancy. The common sense of physical occupancy is that the numbers of employees decrease at the beginning, break time, and finish time of office-hour. On the other hand, space occupancy is more abstract since it depends on the type of activities that might appear variously, which then consume area in terms of size also differently depends on what type of facilities that they use. Space occupancy will increase when the employees utilise the individual workspace with higher ratio, while in contrast it will decline when they use sharing rooms with lower ratio more intensively, e.g. meeting rooms, discussion rooms.

Consistent to the finding of physical occupancy, 30th floor is in average the most utilised offices in terms of size in Organisation A as 22% of the offices are occupied by employees during the day while the average of the other floors is only 15%.

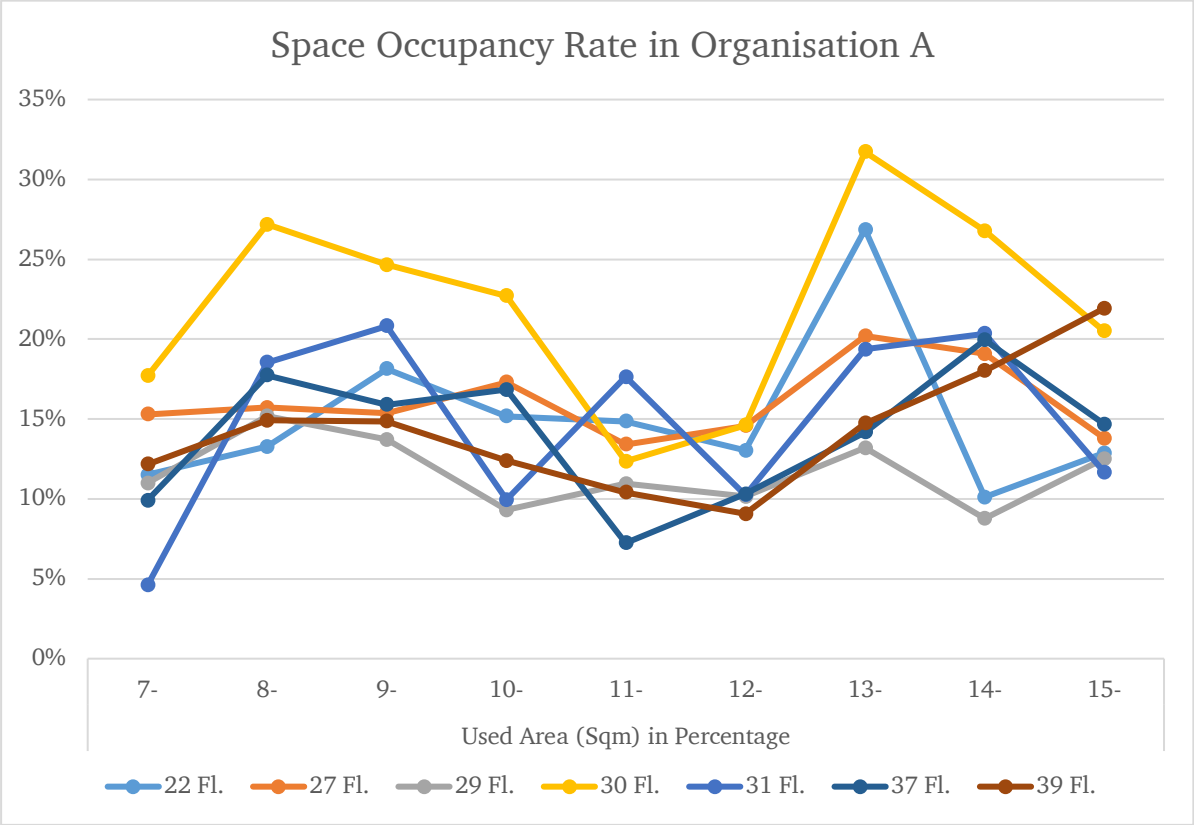


Figure 5.22: Space Occupancy during Office-Hour in Organisation A

The 22nd floor, on the other hand, showed another interesting finding in this case; with the average usage of size during the day was only 15% within this floor, it increased sharply after lunch time at 13 with 27% of utilised office area. This situation mismatched to the finding of physical occupancy in 22nd floor; physical occupancy increased sharply in the morning time while space occupancy inclined significantly after lunch time instead. The contradictive circumstance between physical and space occupancy in 22nd floor will be discussed in Chapter 6 to find out where exactly the location and what kind of facilities were used by employees during office hour.

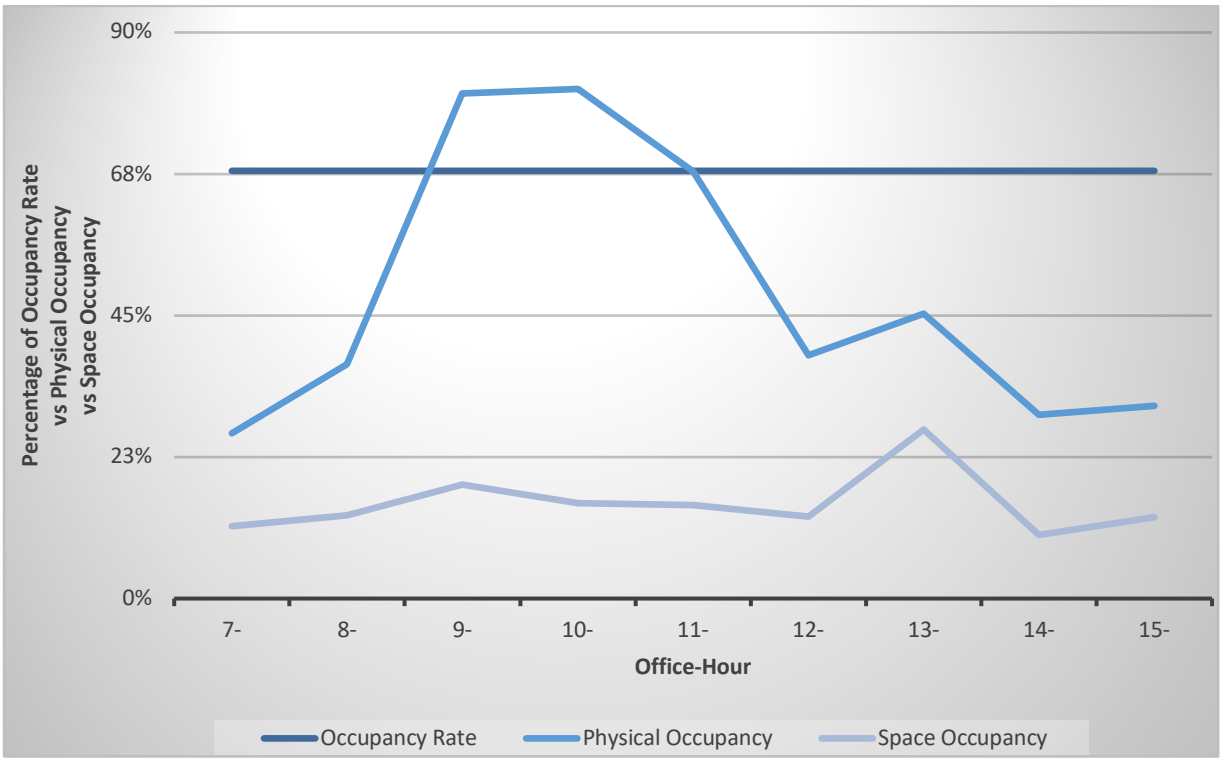


Figure 5.23: Occupancy Rate vs Physical Occupancy vs Space Occupancy in 22nd Floor

Differs to 22nd floor, space occupancy during office times of another Core Function floor, which is 27th floor, had almost stable profile with the least utilised area at 11 (13%) and highest utilised area at 13 (20%). According to the physical occupancy and space occupancy of 22nd and 27th floor that represent Core Function of Organisation A, there was no connection between 22nd and 27th floor as fellow Core Function with the number of employees work within the office and the size area that was consumed during office-hour: they work differently, as well as the size of area utilised.

The case of Core Function floors is similar to the case of Top Management and Support Function floors that the number of employees work within the office and the size used during office-hour are contrasting between one floor to another floor. The floor of the Chairman and Support Function in 39th floor, utilised larger space (22%) at the finish time (15) of office-hour. It was even larger to the other office-times within the floor and also to the other floors. In the comparison to the other floors, 31st floor, the office of Support Function, had the least size of area at the beginning (7) and the finish time (15) of office-hour with only 5% and 12% of area was utilised. In contrast, it also had the largest size of area (18%) utilised during break time (11) compared to the other floors.

Occupancy Rate in Upstream Oil and Gas Sector in Indonesia

To validify the in-depth result of occupancy rate in Organisation A, this research also attempted to find out how are the occupancy rates of other Organisations in Upstream Oil and Gas Sector. Based on the investigation, there are correlation between the occupancy rates and the office types, as follows:

- Small size offices had a lower administrative occupancy rate compared to large and medium size offices. It relates to the background of smaller organisations that are still developing and expecting grow number of employees in the near future.
- In contrast to small size offices, large and medium size offices were administratively high occupied 75-86%. Nonetheless, physical occupancy in large offices was lower (36-40%) compared to medium size (47-59%).
- Space occupancy in all offices were low (15-24%). This indicated that smaller workspaces with smaller ratios were favourable by employees of the sector to carry out their tasks (e.g. open plan office, meeting room), compared to larger workspaces with larger ratios (e.g. cellular office)

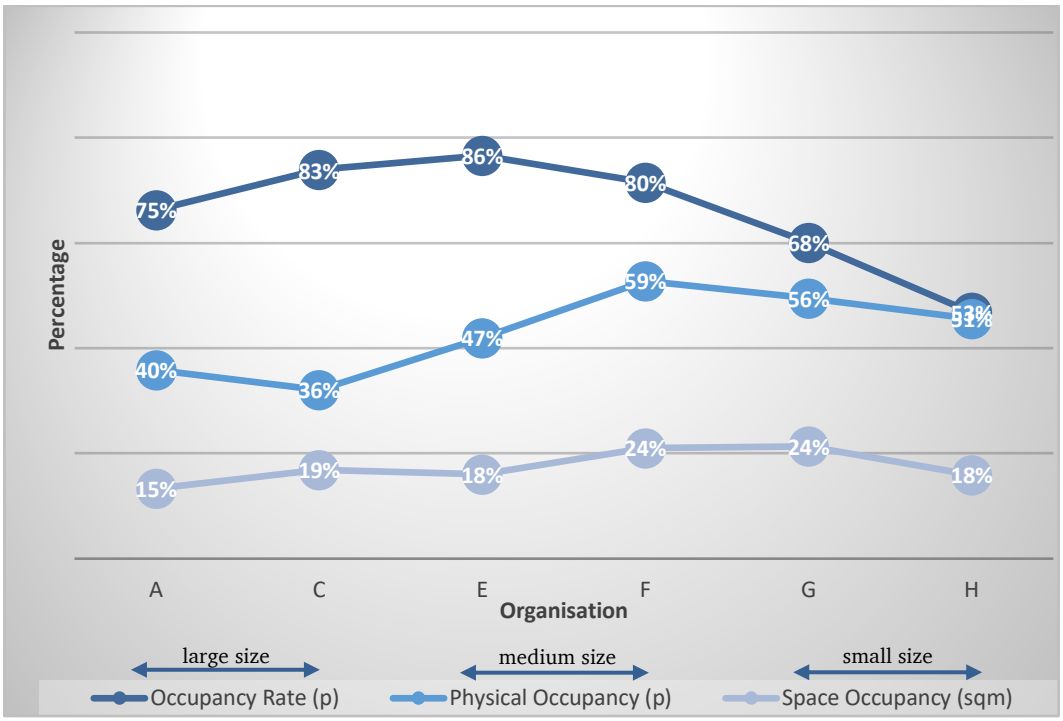


Figure 5.24: Office occupancy rate between administrative occupancy, physical occupancy, and space occupancy in Upstream Oil and Gas Sector

5.3 Office Survey

Based on employees' generation category, Generation-X dominated Organisation A by slightly more than half of total employees (52%), followed by Millennials (43%) and a narrow part for Baby-Boomers (6%). It is effortless to predict that the number of Generation-X employees will give up their dominancy to Millennials in the next 5 to 10 years (around year 2025 to 2030) when there will be no more Baby-Boomers left within Organisation A and reduced numbers of Generation-X due to the retirement.

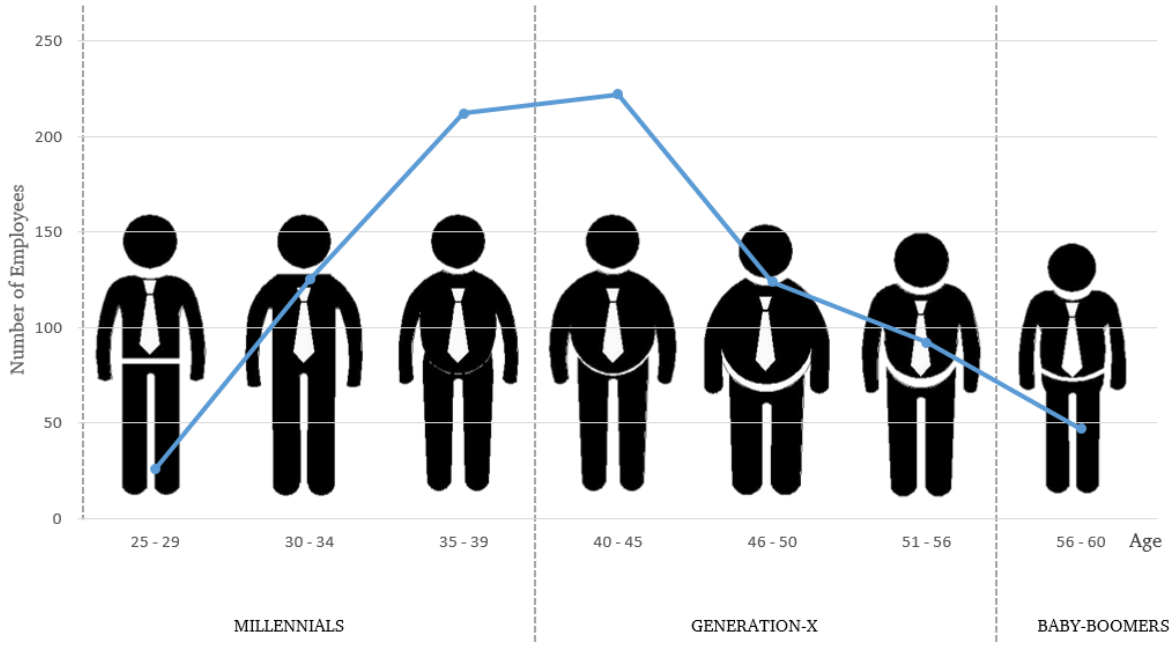


Figure 5.25: Employees generation in Organisation A

As discussed in the literature review of this dissertation regarding cross-generational background within organisations, Generation X and Generation Y share more similarities rather than differences in terms of characteristics and work value. Both generations work independently and capable to technology. However, Generation Y is remarkable as job-hopper (Adkins, 2016). A study claimed that 55% of Millennials are not engaged at work since they are idealist: they pursue their motivation over salary, self-development over satisfaction, coach over boss, discussions over annual review, strengths over weaknesses and life over job (Gallup, 2016, p. 15). It also shows the evidence that 21% of Millennials change their jobs within the last year. However, this argument is strongly mismatched to the fact of employees' length of time to stay in Organisation A. Survey in Organisation A has indicated that 94% of the employees in Organisation A have worked for the Organisation more than 3 years.

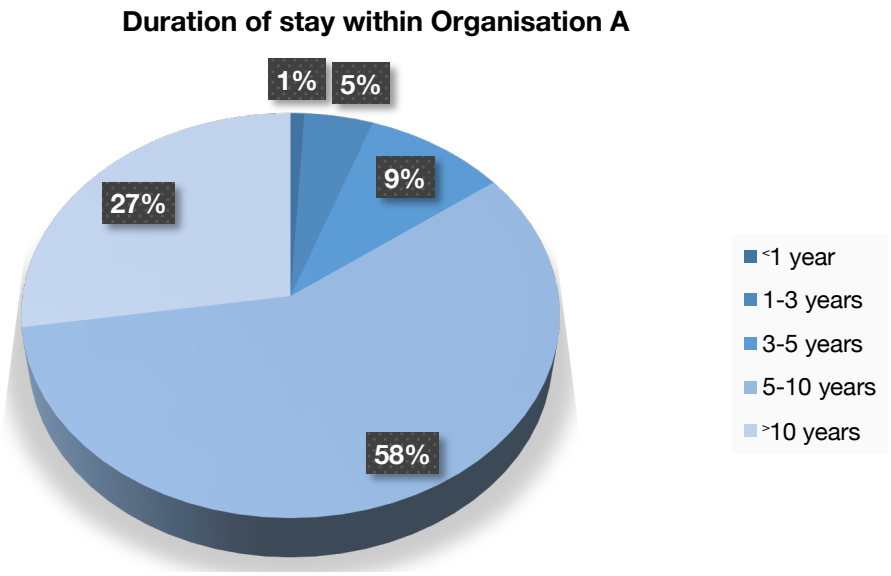


Figure 5.26: Employees' duration of stay within Organisation A

Regarding the frequency on working individually, employees in Organisation A stated that they work fairly individual (36%), similar number that often work individual (35%) and not a little number that rarely work individual (21%). They also consider that workspace is still the most appropriate place to work individually, rather than meeting room, breakout room, library, cafeteria or other types of room that new Activity-Based-Working Office Concept may offer.

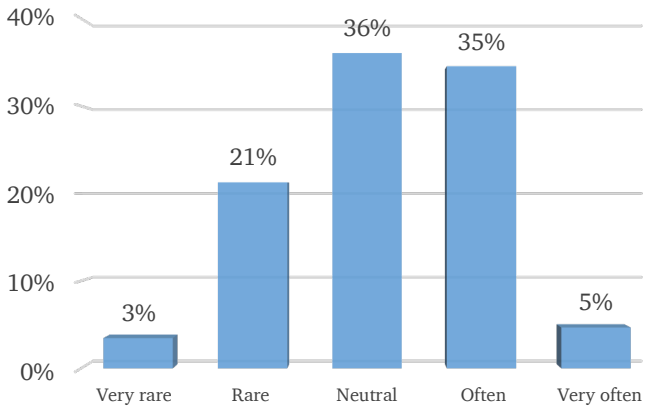


Figure 5.27: Employees' frequency of working individually

Ranking *	Location
1	Workspace
2	Meeting Room
3	Breakout Room
4	Library
5	Cafeteria

*1-5 = most proper – most improper

Table 5.12: Employees' place preference to work individually

Employees were asked to determine which criteria is important for their workspace to support work individually. They expressed that tidiness, security, desk position, technology and ergonomic are very important aspects to be considered. However, they relatively unconcern about noise, distance to other departments and distance to other facilities within workplace.

Criteria*	1	2	3	4	5
Location & position of office desk/ room	9%	3%	11%	21%	56%
Distance to other departments	6%	9%	28%	33%	24%
Distance to other facilities	4%	9%	28%	36%	23%
Office desk/ room size	6%	7%	17%	33%	37%
Office desk/ room equipment	6%	5%	10%	33%	46%
Privacy	6%	4%	17%	33%	40%
Silence	5%	8%	24%	35%	28%
Technology	7%	3%	8%	27%	55%
Ambience	6%	4%	11%	32%	47%
Lighting	7%	3%	7%	32%	51%
Tidiness	8%	2%	5%	21%	64%
Security	8%	3%	5%	23%	62%
Ergonomic	8%	2%	10%	28%	52%
Accesible	6%	4%	9%	34%	47%
Interactive & Collaborative	5%	4%	13%	38%	40%

*1-5 = very unimportant – very important

Table 5.13: Employees expectation on the workspace criteria to work individually

Unlike the frequency of working individually, more than half of the employees think that they work in-group often (52%). Although meeting room is without doubt considered as the most appropriate place to work in-group, employees choose their workspace as their alternative for group working instead of other typical communal facilities such as breakout room or cafeteria.

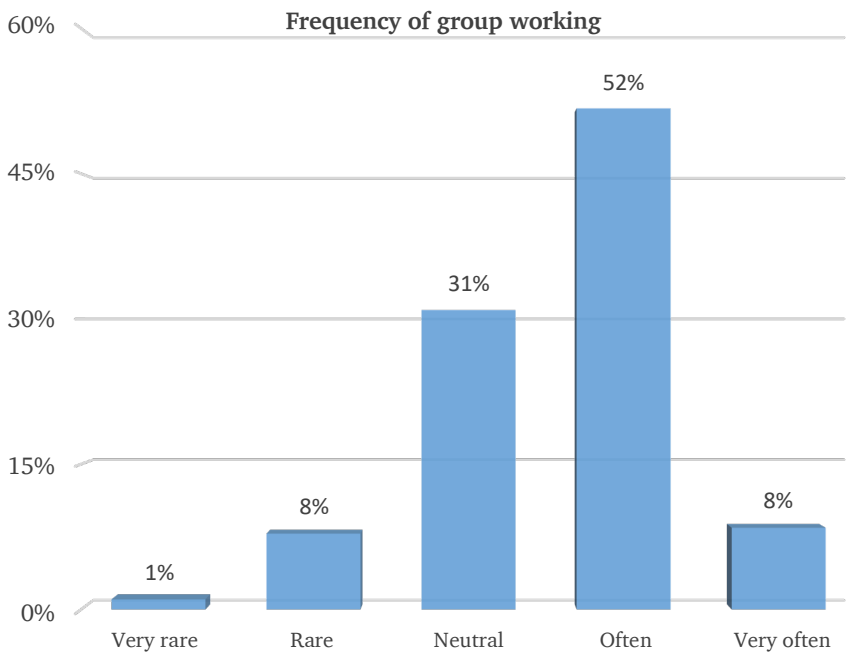


Figure 5.28: Employees' frequency of group working

Ranking*	Location
1	Meeting Room
2	Workspace
3	Breakout Room
4	Cafeteria
5	Library

*1-5 = most proper– most improper

Table 5.14: Employees' place preference for group working

In the relation to current trend of new office concept that promotes mobile and flexible working, this study also attempted to find out if the way of employees work in Organisation A match to the current trend of working. Dominantly employees thought that they often work mobile and flexible (39%), yet one third still realised they work in the middle between individual and mobile-flexible (35%), while only minority of them who rarely work mobile-flexible (16%). This tendency supports the argument about

current office trend that employees work mobile and flexible, rather than work at their desk 9-5. However, it is interesting that only 10% of employees admitted if they are driven by technology evolvement in working mobile and flexible. Instead, busy work schedule (37%), business trip (21%), and working culture (17%) force them to work mobile and flexible. The 35% of employees also claimed that they use their office hour mostly for working mobile and flexible.

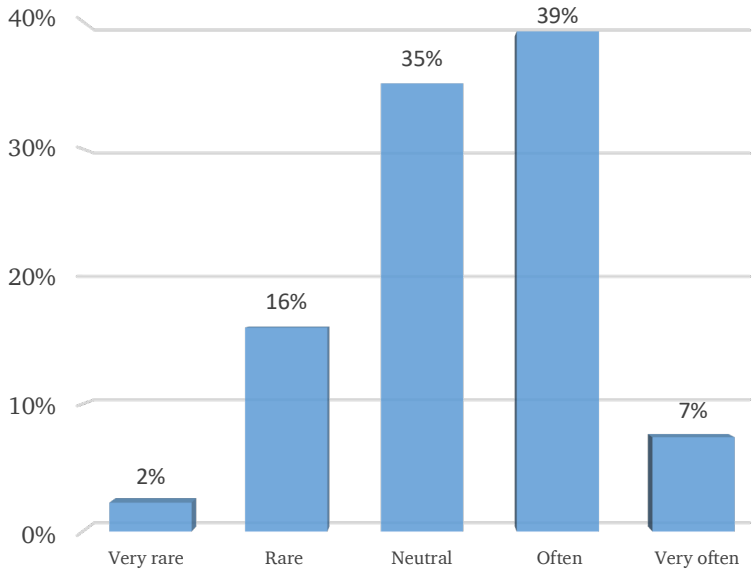


Figure 5.29: Employees' frequency on working mobile and flexible

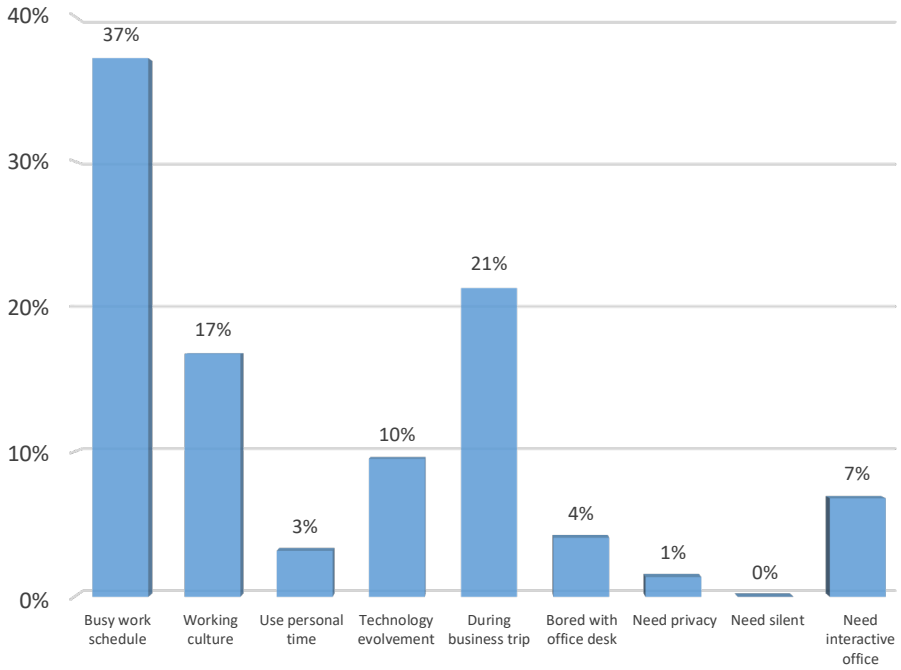


Figure 5.30: Reasons for working mobile and flexible

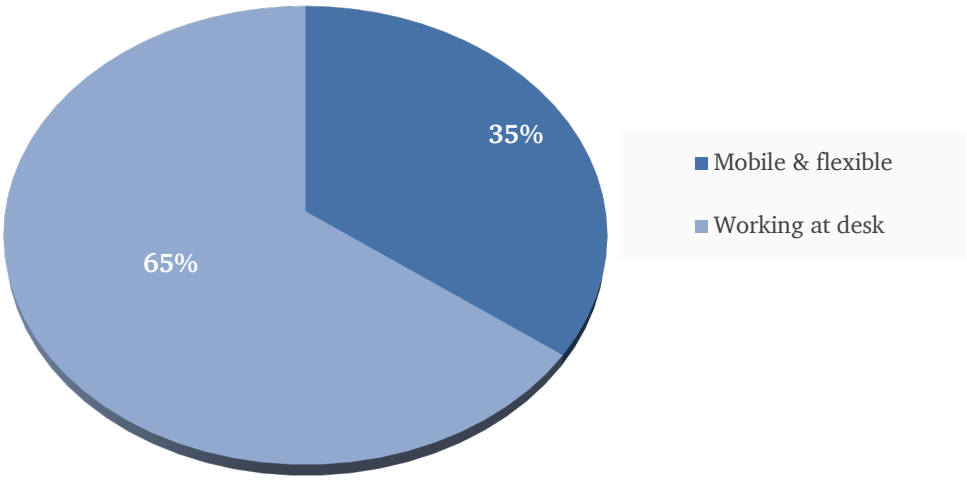


Figure 5.31: Employees' majority working time and place spent

This study also tried to find out if working mobile and flexible allows employees to work more effectively and 76% of the employees agreed to it. However, if they could choose, only half of the employees who are convinced to work mobile and flexible.

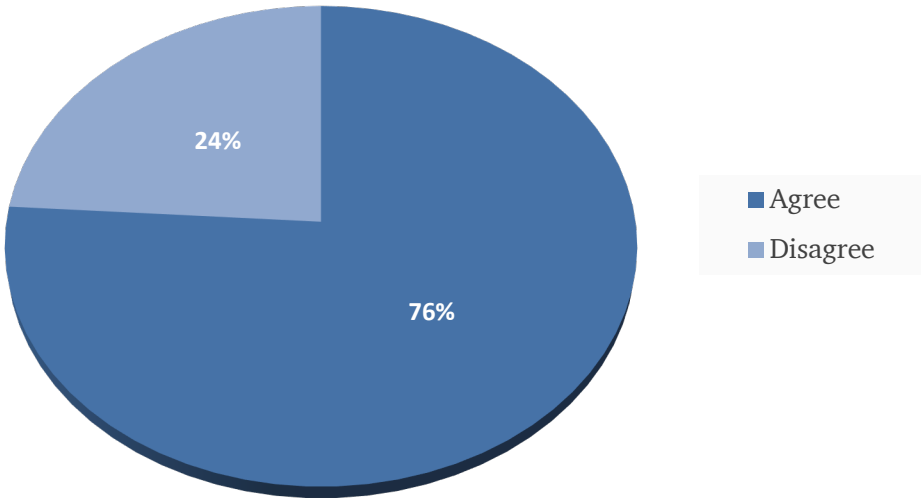


Figure 5.32: Employees thought if mobile and flexible working is more effective

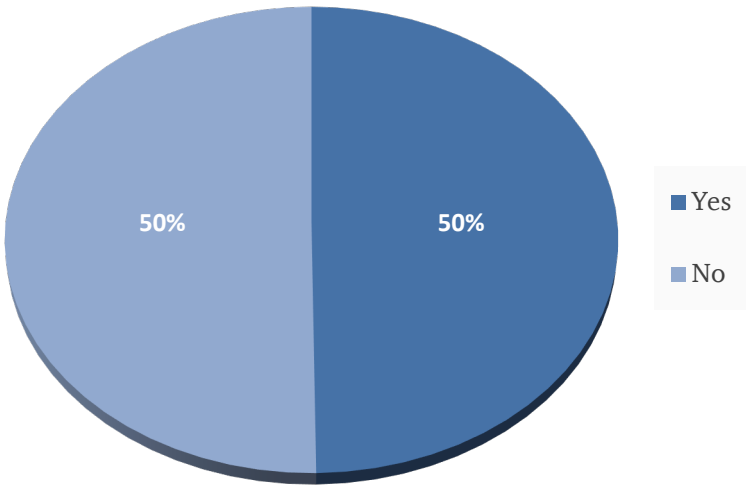


Figure 5.33: Employees' preference to work mobile and flexible

6 Work Process Analysis

Chapter 5 has discussed comprehensively about office design and spatial planning evaluation in the relation to the employees' satisfaction and office actual utilisation. It has partly answer the question of how is the working culture of the organisation. Nevertheless, the rest interpretation needs to be elaborated in this Chapter to specifically identify what type of activities occurred within the office and in which type of facilities that are utilised by the employees to finish their task.

As constructed in Chapter 3, this study has determined REFA process section in a collaboration to Space Syntax Snapshots as well as its description of structured-space observations. To note precisely the location of activities occurred within the office during observations, Space Syntax activities coding will be also generated in this case that also particularly records the movement and conversation appeared since movement and conversation are potentially related activities to the consideration of HSE requirement, e.g. ergonomic, privacy and noise level. Activities symbols were determined and used to show the observation results, as follows:

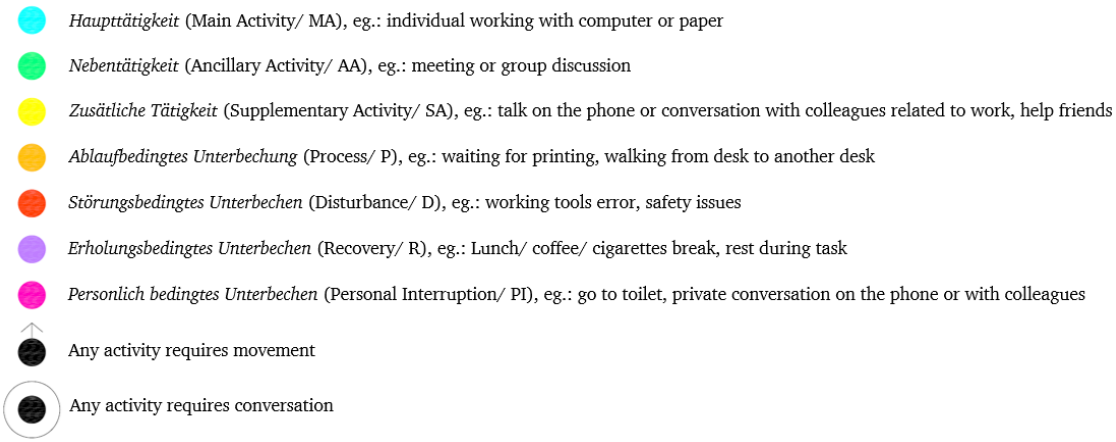


Figure 6.1: Symbols of Process Section

6.1 Working Process Analysis of Organisation A

According to the physical occupancy of Organisation A discussed in Chapter 5, averagely 48% of employees are at their offices during office-hour. Yet, the type of activities and facilities chosen by employees are not yet revealed through its statistic. This chapter will next present activity samplings taken in all sample floors from lower floors to upper floors of Organisation A to answer potentially the question of the organisation's working culture.

The Offices of Planning Department

Planning Department in 22nd floor was the second busy floor after 30th floor even though the intensity of work was not averagely distributed; at 9-11 o'clock the offices were productively used (80%, 81%, 68%), while the rest of office-hour was under-average (26% - 45%). In contrast, the space occupancy of 22nd floor showed dissimilarity findings to the physical occupancy; in terms of size, the peak of space utilisation was at 13 o'clock. REFA activity sampling observation serves the answer of this mismatch condition; the employees did an intensive work on Ancillary Activities (AA) (37%), which are meeting and group discussion, that require a smaller ratio of facilities to support the activities. Based on observation recorded in the office plan, the employees chose meeting room and closed office to hold these activities.

The second most often type of activities occurred in 22nd floor was the Main Activities (MA) (20%). Except at 9-11 o'clock when AA increased significantly during these office times within the floor, MA appeared almost steadily between 25% - 31% for the rest of hours. Unlike AA that took not only meeting room but also workspaces for meeting or discussion, MA in 22nd floor appeared conventionally within individual workspaces, both closed-office and open-plan, as its original design purposes.

Figure 6.2: Activity Samplings during office-hour of Planning Department (Core Function) in Organisation A (22nd Floor)

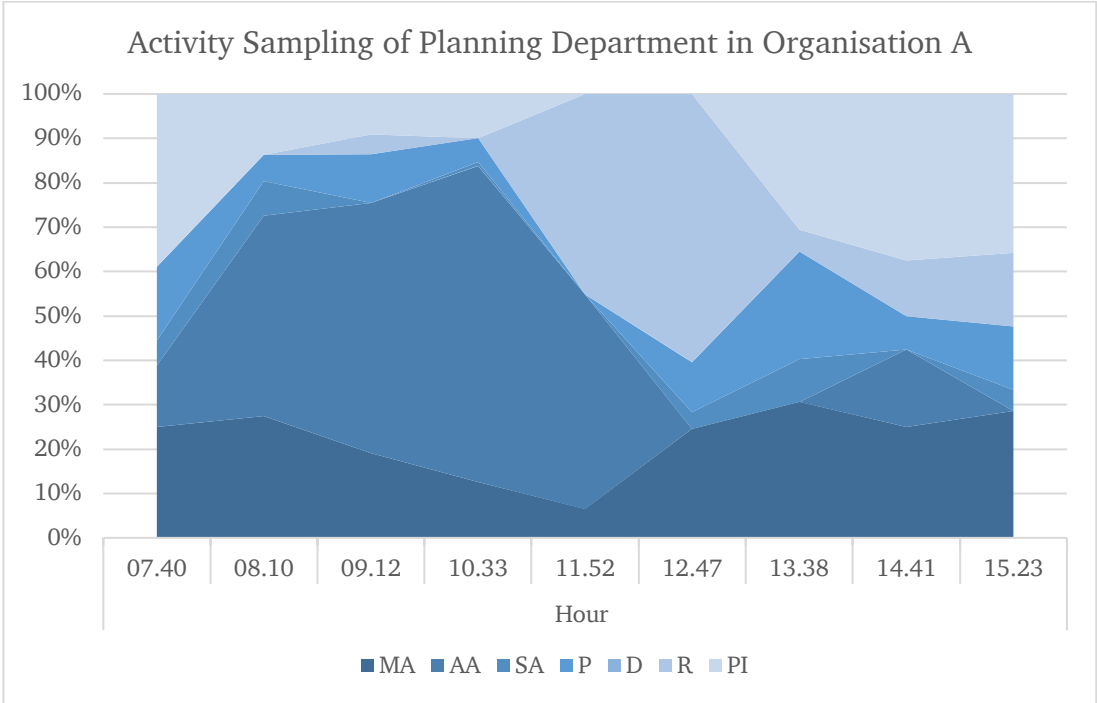


Figure 6.3: Activity Sampling statistic during office-hour of Planning Department (Core Function) in Organisation A (22nd Floor)

The offices of Operation Department

Similar to Planning Department in 22nd floor, Operation Department in 27th floor had a higher number of AA (32%) compared to MA (24%). The peak timing of AA was also at 9 to 10 o'clock (45% and 48%) and at 13 after lunchtime (38%) although not the least number of the employees continue the meetings and discussions in the middle of lunchtime at 11 to 12 o'clock (34% and 30%).

However, the size of the group differs to 22nd floor; 22nd floor had mostly large groups of meeting or discussion, while 27th had medium to small groups instead. This was obviously seen by the green dots of AA noted within the plan that scattered almost in every corner of the floor; there were 18 spots of the floor that used for AA: (1) two meeting rooms, (2) eight cellular-offices, and (3) eight open-plan offices. These group activities numbers and locations signify that instead of formal meeting setting (43%), informal discussion setting (57%) was more majorly occurred.

Meanwhile it is interesting to point out that almost half of employees in 27th floor started working individually (MA) early at 7 o'clock (44%) as this also had been a higher number of employees of MA compared to other office times within the floor. Process-related (P) was quite extensive (10%) confronted to Supplementary Activities (SA) (8%). Intensive P happened in this case was in the relation to the high mobility of employees within the floor to reach one point to another point within the floor or within the office building.

Figure 6.4: Activity Sampling during office-hour of Operation Department (Core Function) in Organisation A (27th Floor)

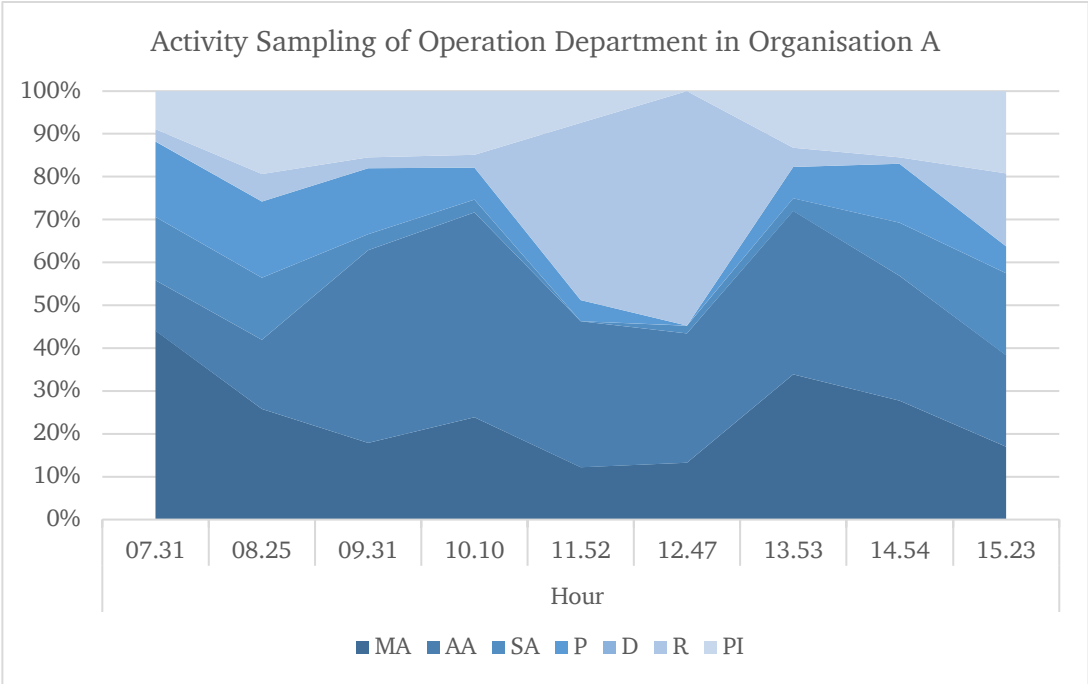


Figure 6.5: Statistic of Activity Sampling during office-hour of Operation Department (Core Function) in Organisation A (27th Floor)

The Offices of Business Support and Supply Chain Department

Unlike two previous floors, 29th floor of Business Support (BS) and Supply Chain Management (SCM) Department, worked more individually (37%) rather than in-group (18%). The place of individual work recorded by far dominantly in open plan offices of Staff. On the other hand, cellular offices of managerial level were utilised mostly for formal and spontaneous meeting.

According to the physical occupancy and space occupancy discussed in Chapter 5, 29th floor had the least number of employees who work within the floor (32%) and the least utilised area by employees (12%) confronted to other sample floors. This is basically caused by the low occupancy rate of 29th floor (68%), which means 46 offices in 29th floor were administratively unoccupied. This can be also noticeably seen through the activity sampling that 15 of 38 closed offices and 27 of 107 open-plan offices in 29th floor were completely vacant during the day.

Figure 6.6: Activity Sampling during office-hour of Business Support Department and Supply Chain Department (Support Function) in Organisation A (29th Floor)

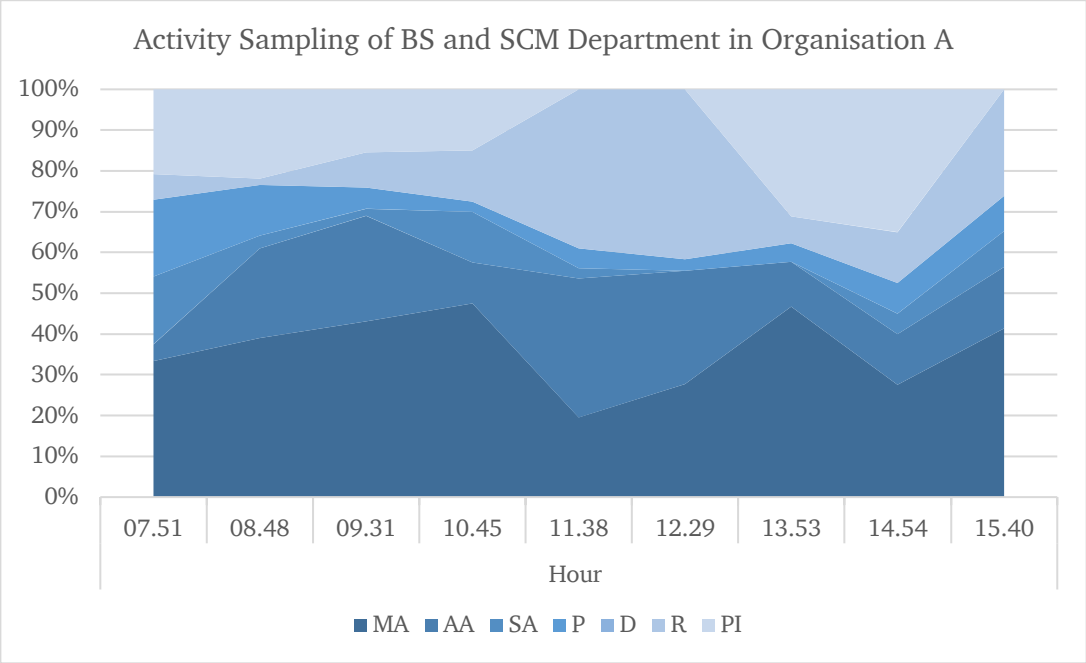


Figure 6.7: Activity Sampling statistic during office-hour of Business Support and SCM Department (Support Function) in Organisation A (29th Floor)

The offices of Secretary

As revealed in Chapter 5, 30th floor, the offices of Secretary, had been significantly the highest number of administrative occupancy, physical occupancy, and space occupancy rate of Organisation A. Activity Samplings prove that there were highly dense of activities occurred within the floor and had repetitively used the same location with different times of work during the day. Workspaces that completely unused the whole day of office hour was also minimum; it was only 6 (six) vacant closed offices recorded and 11 vacant open-plan offices.

Alongside to 29th floor as fellow Support Function, 30th floor showed more intensively work on MA (40%), while the rest activities were even low-lying (0% - 14%) except Personal Interruption (PI) that also was the highest number of PI (23%) compared to the average number of all sample floors (17%). PI recorded in 30st floor involve interaction mostly in the open plan area of offices.

Figure 6.8: Activity Sampling during office-hour of Secretary (Support Function) in Organisation A (30th Floor)

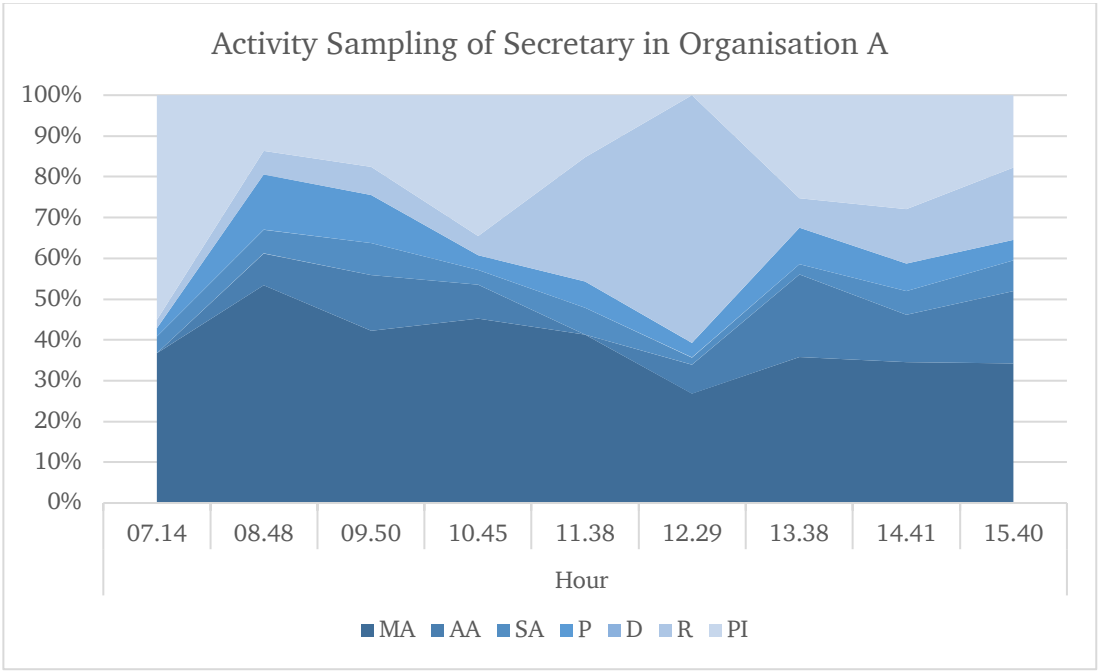


Figure 6.9: Activity Sampling statistic during office-hour of Management Secretary (Support Function) in Organisation A (30th Floor)

The Offices of Finance Department

The offices of Finance Department in 31st floor were as quiet as 29th floor, with only 32% of offices were used by employees during the day even though administrative occupancy rate was actually high (86%). This means that although only 14% of offices were vacant, 54% of offices were unused during the office-hour due to higher activities of employees aside from their offices, e.g. business trip, meeting at stakeholders' office. Recorded in the Activity Samplings, there were 14 of 28 closed-offices and 47 of 105 open-plan offices completely idle the whole day.

In terms of activities, the comparison between work individually and in-group was almost balance (30% and 21%). Similar to Planning Department, Finance Department hold their meeting or discussion in closed-room, whether in meeting room or cellular office. This resemblance between Planning and Finance Department in requiring closed-room during their meeting or discussion activities connects to the job descriptions of both function that deal mostly with financial affairs e.g. budget planning, monetisation, and accountancy (MEMR, 2017), in which potentially contain sensitive subjects or documents.

Figure 6.10: Activity Sampling during office-hour of Finance Department (Support Function) in Organisation A (31st Floor)

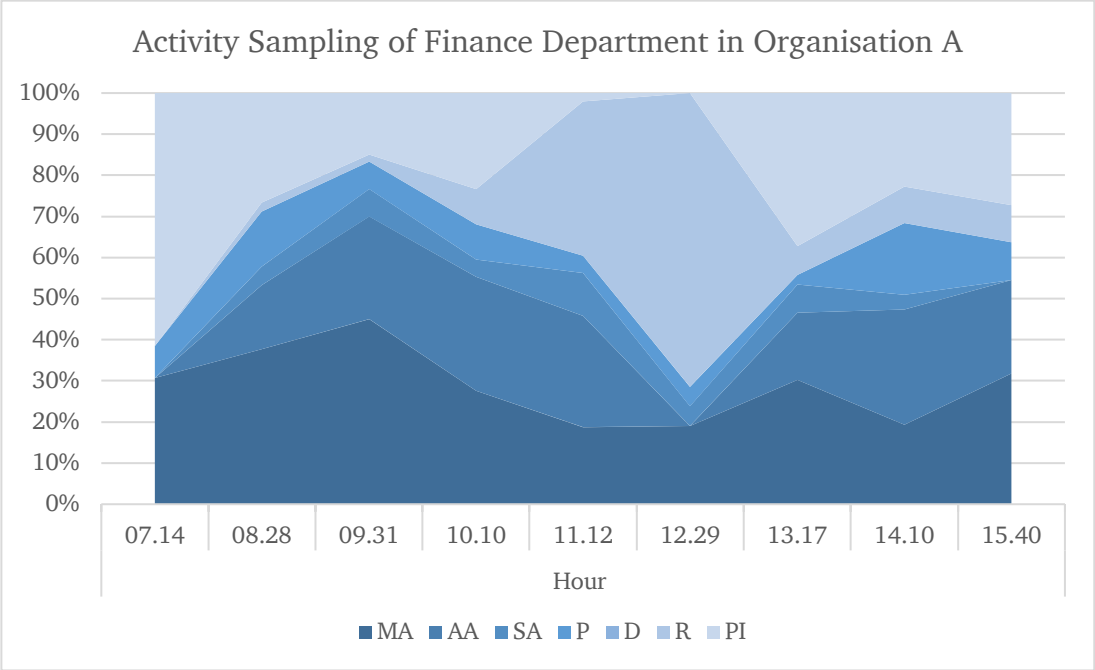


Figure 6.11: Activity Sampling statistic during office-hour of Finance Department (Support Function) in Organisation A (31st Floor)

Multifunction Floor

Unlike other floors of workspace that majorly provide more space for individual working, multifunction in 36th floor has various kind of work setting for group working. This offers also specific design purposes with different seat capacity, technology, and ambience. The type of rooms includes, as follows:

Function	Capacity	Amount	Total Capacity
Open discussion zone 1	4	3	12
Open discussion zone 2	4	3	12
Open discussion zone 3	4	1	4
Open discussion zone 4	4	2	8
Closed discussion rooms	4	2	8
Small meeting rooms	6	15	90
Small meeting rooms	8	2	16
Small meeting rooms	10	3	30
Medium meeting rooms	12	7	84
Medium meeting rooms	14	1	14
Medium meeting rooms	18	1	18
Large meeting rooms	28	2	56
Collaboration rooms	14	1	14
Training room	33	1	33
Quiet zone	8	1	8
Lounge zone 1	20	1	20
Lounge zone 2	15	1	15
Lounge zone 3	5	1	5
Breakout zone	10	1	10
Breakout zone	10	1	10
Total Capacity			**467**

Table 6.1: Working zone capacity of multifunction in 36th floor

In terms of accessibility, this floor was one of the public floors in Organisation A's office that was accessible for visitors while contrarily workspace floor can only be accessed by employees only. Therefore, the utilisation of facilities in 36th floor, especially meeting rooms, was primarily for external purposes except if (1) the employees' internal activities needed specific requirement, such as high technology facilities provided in the collaboration room that were not available within workspaces floors or (2) meeting rooms within workspace floors were fully occupied or lacked of capacity. Based on the observation, 35 of 50 facilities in 36th floor are used, whereas the rest were completely vacant during the day.

Figure 6.12: Activity Sampling during office-hour of multifunction-public floor in Organisation A (36th Floor)

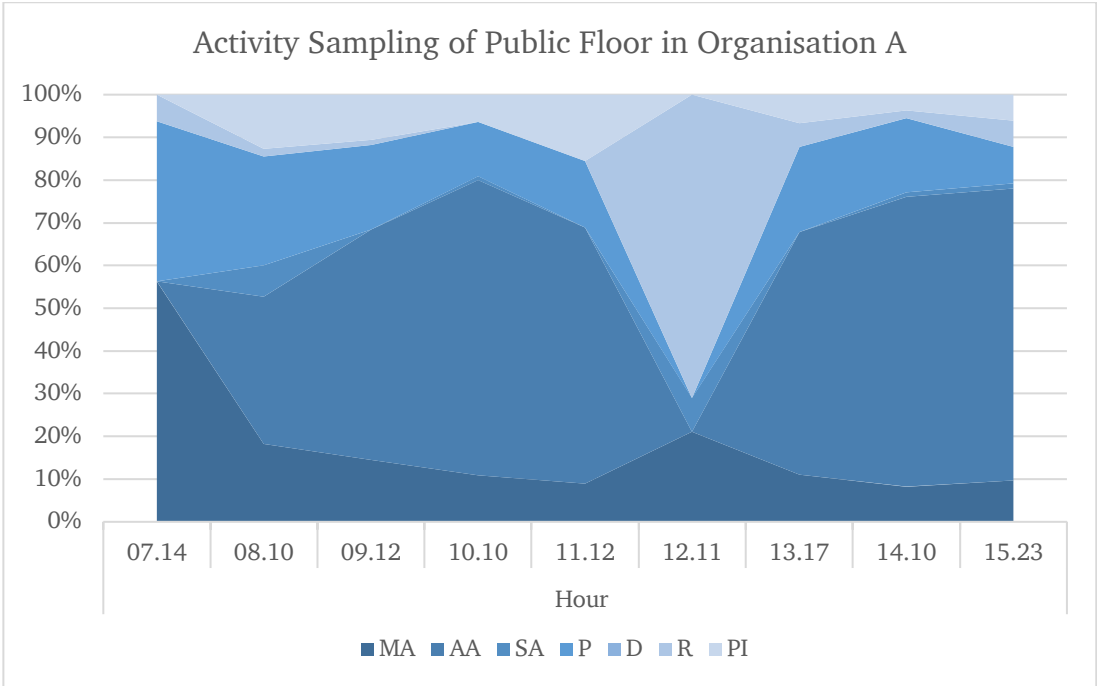


Figure 6.13: Activity Sampling statistic during office-hour of Multifunction in Public Floor (36th Floor)

The Offices of Supervisory Committee, Vice Chairman, VPMR, and Internal Audit

The offices of Supervisory Committee, Vice Chairman, VPMR and Internal Audit in 37th floor, on the other hand, displayed a dramatic number of MA (48%). It is clear that they worked individually with low interaction among employees and low movement during office-hour. It is also unique that the percentage of AA and SA was almost equal (9% and 7%). AA and SA are determined as activities that mostly involve interaction; AA is meeting or discussion that requires a longer time of interaction, while SA is talking about their work face-to-face or on the phone that needs commonly only a short time of conservation. This indicates that meeting room for internal use in 37th floor was barely crucial. Still, since job descriptions of Internal Audit are related to confidential actions, employees used closed-office when they needed to discuss in a longer time.

Figure 6.14: Activity Sampling during office-hour of Supervisory Committee, Vice Chairman, VPMR and Internal Audit (Support Function) in Organisation A (37th Floor)

Alluded previously in sub Chapter 5.1 regarding the potential concept of hot-desking for Supervisory Committee and VPMR and in the relation to Occupancy Rate measured in Sub Chapter 5.2, this Chapter will discuss precisely about the actual activities within the offices of Supervisory Committee and VPMR in 37th floor. In overall, 37th floors were

75% administratively occupied with apparently 35% of the offices were physically used during office times.

However, activity sampling shows that physical activities appeared insignificant within the Supervisory Committee offices, which were only 28 activities of 99 possible activities. This means, physical occupancy rate of Supervisory Committee offices was 28%. Activity samplings also recorded that the activities were only found in open plan area of Staff, whereas the cellular offices were completely vacant during office times.

Further down from Supervisory Committee, the activities occurred in VPMR offices were only 27 compared to 189 possible activities. This indicates that physical occupancy rate within VPMR offices was only 14%. However, unlike Supervisory Committee offices, activities of VPMR offices appeared both within in open plan area and cellular offices even though the time consumption at their desks/ offices were not full office times. Accordingly, this is not exaggerated if hot-desking is suggested to replace the concept of dedicated workspaces in Supervisory Committee and VPMR offices since most of the workspaces were temporarily vacant or even completely vacant during office times.

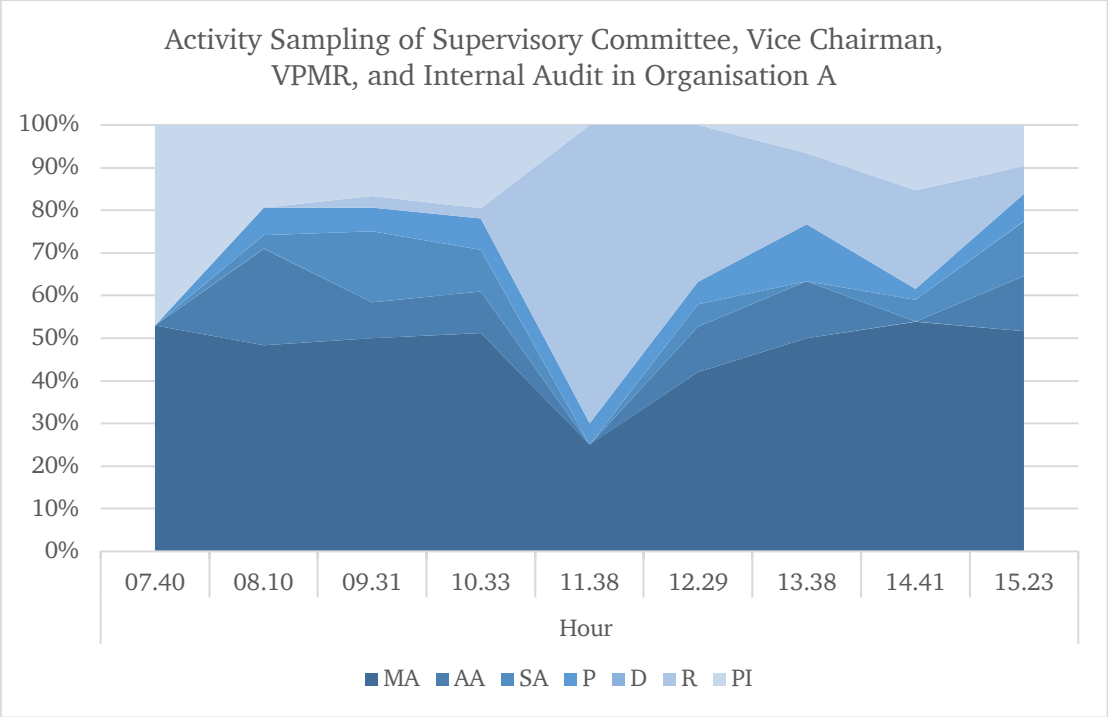


Figure 6.15: Activity Sampling statistic during office-hour of Supervisory Committee, Vice Chairman, VPMR and Internal Auditor (Support Function) in Organisation A (37th Floor)

The offices of Chairman, Expert Advisor, Business Support, and Corporate Secretary

Mentioned earlier within Chapter 5, this group of function in Organisation A that occupies the highest floor of the office premises. The Chairman was surrounded with Functions that intensively work closely to the Chairman himself. Investigated through activity samplings that the floor worked dominantly individual, employees within the floor started working individual (63%) early at 7 o'clock. Although individual working dropped its number at 8 and afterwards relatively fluctuative around 40% until 15 o'clock when the end of office times.

The floor used cellular offices considerably obvious for group working. This was shown from the green dots and circles drawn within the layout (Figure 6.16) that illustrate where the communications required to finish their tasks take place. On the other hand, the communications heard within the open plan area of staff were personal and informal, which were barely related to work. Instead, the employees in open plan area worked mostly individual.

Similar to 37th floor, the physical occupancy of cellular offices were dissatisfying. Particularly within the Advisor offices area, the utilisation of cellular offices was 0%, while the rest of the cellular offices were used but not extensively most of the office times.

Figure 6.16: Activity Sampling during office-hour of Chairman, Expert Advisor, Business Support Department and Secretary (Support Function) in Organisation A (39st Floor)

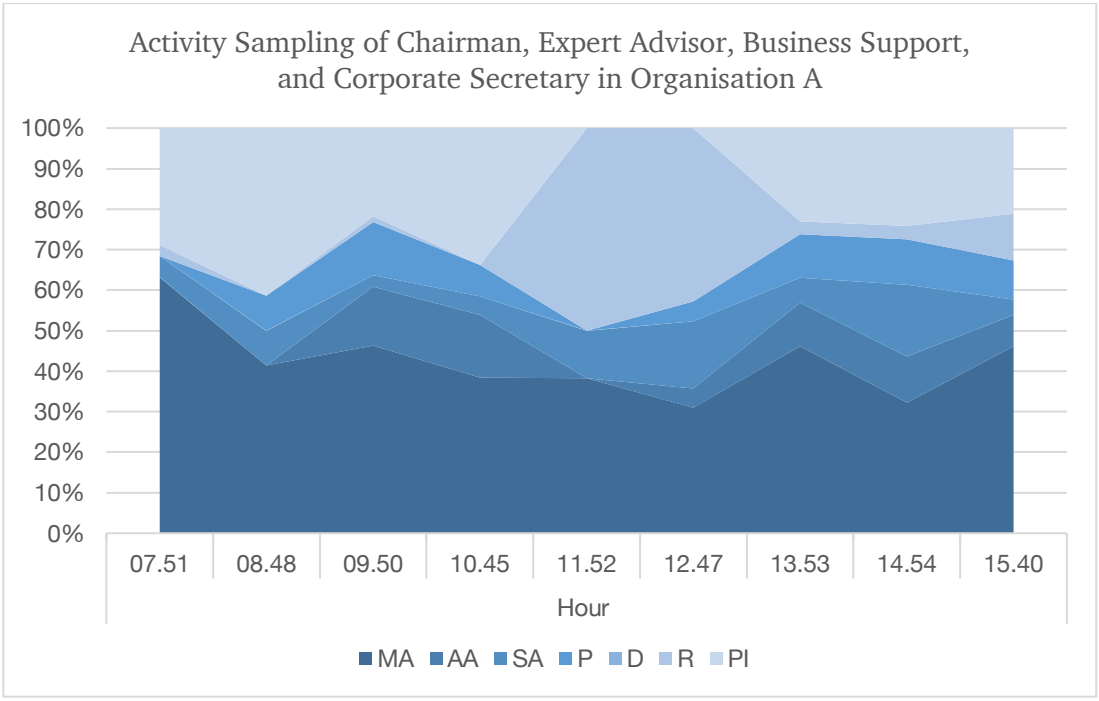


Figure 6.17: Activity Sampling statistic during office-hour of Chairman, Expert Advisor, Business Support Department and Secretary (Support Function) in Organisation A

6.2 Activities of Upstream Oil and Gas Sector in Indonesia

Aims to find the activities correlation between organisations of the sector, this sub chapter will describe the activities of upstream oil and gas sector: (1) of each organisation, (2) based on the function i.e. core or support, and (3) based on size of the companies.

Organisation A, as regulator of the sector, worked almost balance between individual (30%) and in group (26%). It performed notable typical timing for working individual at the beginning of office hour at 7-8 o'clock and significantly in group through formal and informal meeting at 10-11. The rest hour, on the other hand, were relatively comparable between work individual and in group. Steep demand of meeting room at specific hour had caused the use of meeting room within the office was either highly occupied or dramatically idle. As consequence, individual workspace can be low occupied during peak hour of meeting. However, employee of Organisation A stated casually during observation that they sometimes have to use their assigned individual workspace to hold a meeting since looking for a meeting room in Organisation A was almost everytime not available in which also validated that this research recorded meeting activities in the workspace area instead of meeting room.

Further, time recordings of employees in Organisatio A also shows that at least 21% of their activities in their individual workspace were working in group even though individual working still dominated 49%. They also liked to shortly communicate with their colleagues during their own tasks as this research indicated 14% of activities were supplementary work. Surprisingly, both activity samplings and time recordings prove that Personal Interruption was proportionately observable.

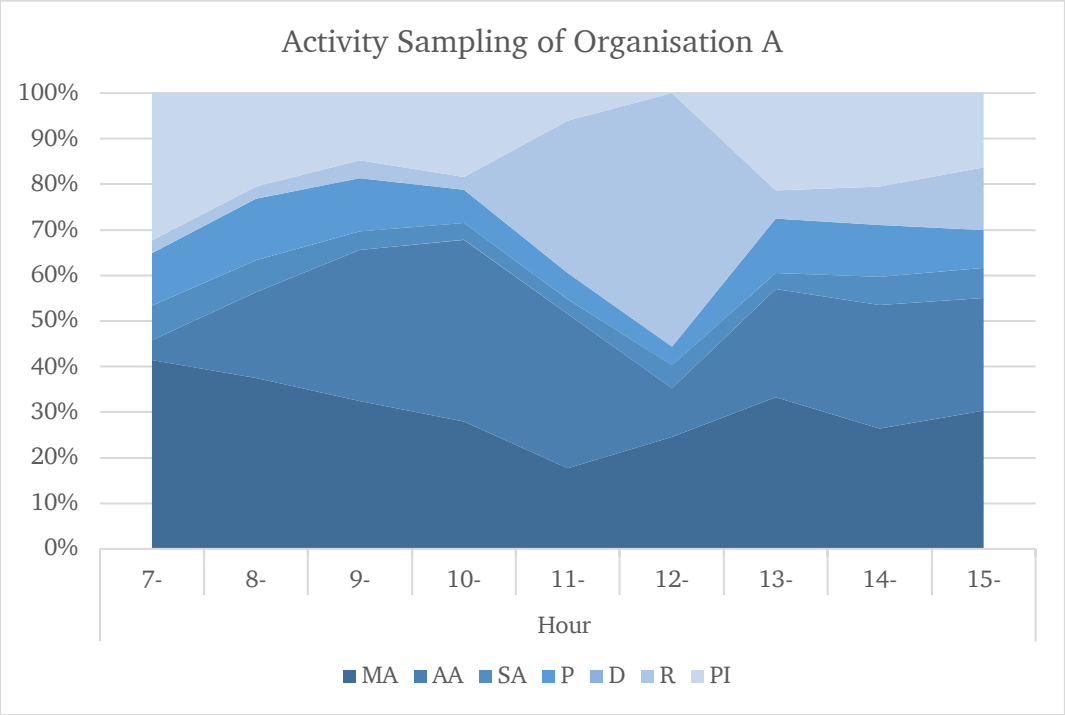


Figure 6.18: Activity Sampling statistic during office-hour of all floors in Organisation A

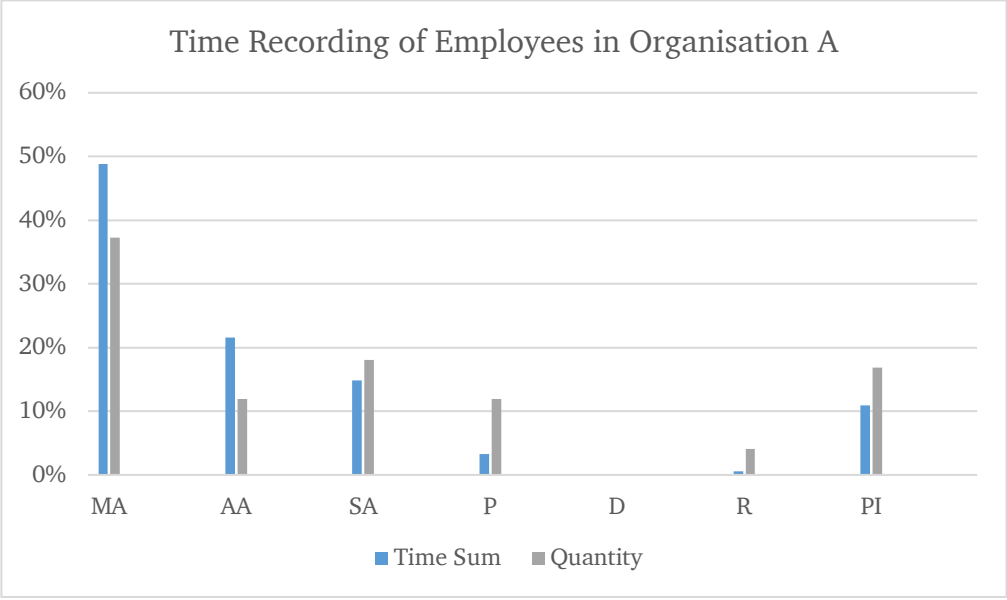


Figure 6.19: Time recording during office-hour of all floors in Organisation A

Activities of Organisation B, a large size national company, were investigated in this research using sample of Core function (Exploration and Production Department),

Support Function (Relation, Finance, GS, HSE, BidCom Department) and Multifuction floor (Public: Receptionist, Meeting Rooms and Main Kitchen). In general, the office types of Organisation B were combi-offices in which Staff and Administrator were assigned in open plan area, while Manager to Top Management level occupied cellular offices. Through activity sampling, this research found out that Organisation B worked dominantly individual (42%) while work in group also noticeably high (27%). Except disturbance that undetected, the rest activities, which were supplementary, process related, recovery and personal interruption occurred relatively similar between 6-11%. On the top of that, this research enthusiastically expressed that Orgnisation B worked productively as 81% of total activities were work-related activities, i.e. main, ancillary and supplementary, and process.

Time recording of employees in Organisation B, showcased correlated performance of individual work that appeared high 53%. In contrast, work in group as formal or scheduled meeting was significantly irrelated to the finding of activity sampling of the Organisation as it only appeared 14% during observation. Work in group as spontaneous brainstorming process between employees took place more often (18%), instead.

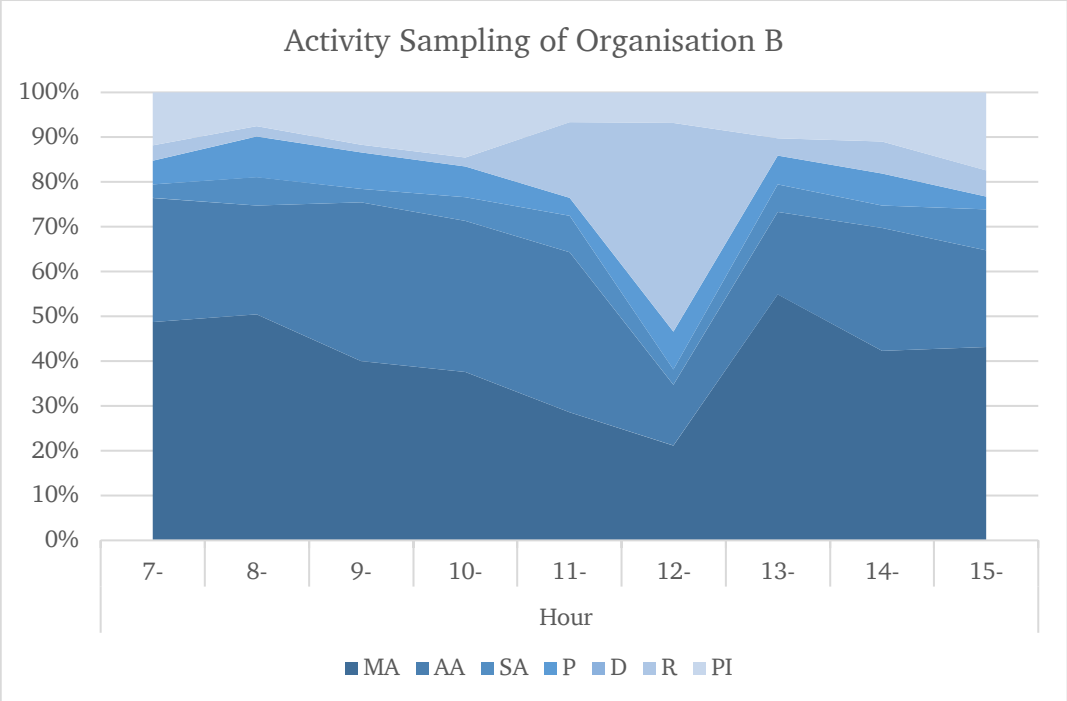


Figure 6.20: Activity Sampling statistic during office-hour of all floors in Organisation B

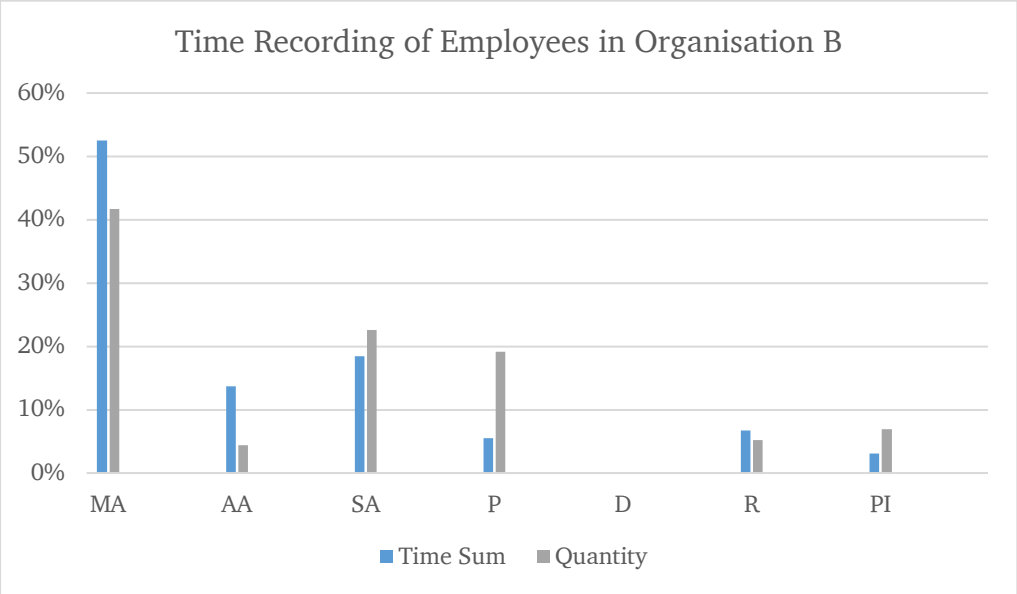


Figure 6.21: Time recording of employees in Organisation B

Organisation C, a large size multinational company, was the only case study of this research that Headquarters of the organisation were located in 2 (two) different city: (1) in the Capital City of Jakarta and (2) a city in Borneo Island that their working areas (offshore and onshore) were located. The office in Jakarta, in one hand, was occupied by Support Function and the office in Borneo Island, on the other hand, facilitated the activities of Core Function. This research, however, had been given opportunities to investigate the office in Jakarta, specifically in HR, Finance and General Service Department. Since meeting rooms in Organisation C was also particularly zoned in public floor, this research also covered this area to specifically find out the activities of group working that potentially appeared within this area.

Regarding office configuration, this research had noted that the Jakarta HQ of Organisation C was unique compared to the office of other organisations; cellular offices were provided to Staff to Top Management level whereas open plan areas were dedicated to Secretary and Administrator. It somehow provided a higher privacy of offices, rather than promoted a collaborative environment of work. Activity samplings of this research, however, proved that employees' activities during observation mismatched to the office configuration of Organisation C in which the proportion of work individual and in group was almost analogous (31% and 23% respectively), particularly at 9-10 o'clock and 13-14 o'clock. Individual work more frequently can be found in the beginning of office hour at 7-8 o'clock and in the transition of lunch break at 12 o'clock, whereas group working surprisingly dominated in the end of office hour at 15 o'clock. Furthermore, mismatch of organisational behaviour and office

configuration at the same time arguably impacted the productivity of employees, as this research easily recorded observable Recovery and Personal Interruption within the office (14% and 17% respectively).

Activity sampling of employees that recorded in workspace area also showed interesting findings in the relation to mismatched behaviour vs office configuration; employees frequently collaborated with their colleagues (18%) in which at the same time demanded them to walk from their room to their colleagues' room as process related activities were noted repeatedly (20%).

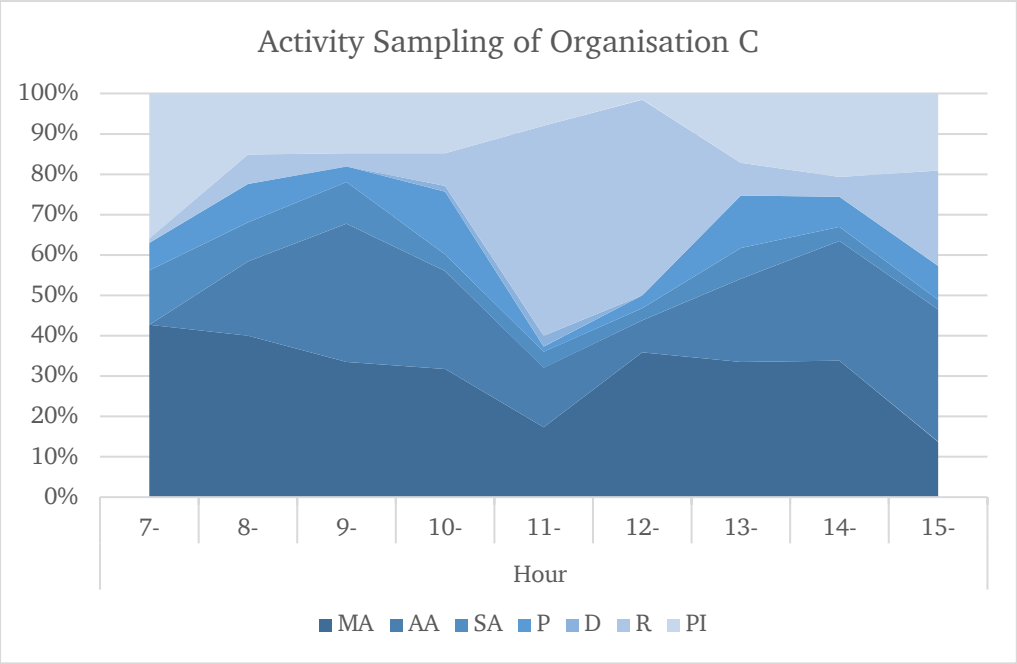


Figure 6.22: Activity Sampling statistic during office-hour of all floors in Organisation C

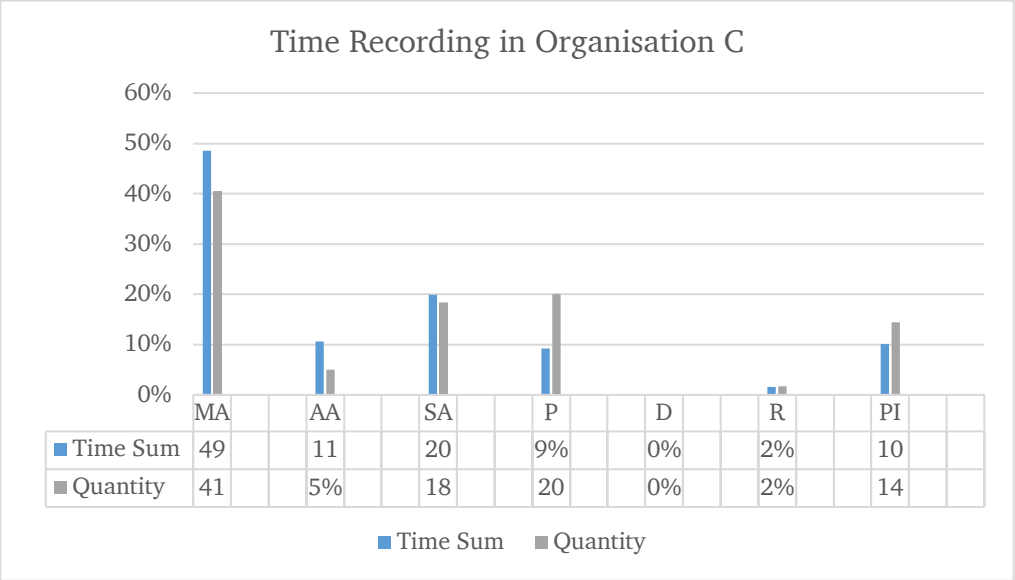


Figure 6.23: Time recording of employees in Organisation C

As introduced initially in Chapter 4, Organisation D, also a large size multinational company, was the only organisation of case studies that had partly applied Activity-Based Working (ABW) office concept in which highly agile and collaborative way of work were promoted. The pilot project of this concept was implemented in FM Department offices in which expert of the organisation stated that Organisation D will fully implement this concept in the future if this project successfully meets their working culture.

This study provided evidence about how Organisation D actually performed in their office that may be used by the organisation to review their future office strategy. Similar to Organisation B, this research satisfyingly found out that the employees of Organisation D worked productively as 81% of total activities detected during observation were work related (main, ancillary, and supplementary activities) while recoveries and personal interruptions were observable but auxiliary (9% and 10% respectively). Additionally, time recording of employees in Organisation D also displayed correlative findings to activity sampling in which individual work dominated their activities (49%) and most frequent activities (40%). Instead of formal group work in meeting room (4%), group working was more noticeably done casually (26%).

In the relation to ABW concept, encouraged collaborative working was unaggresively showcased here as group work only appeared by half (19%) of individual work (41%)

instead. Although it is also attractive to point out that group work occurred regularly thoughout the day between 14-27%, except during lunch break that group work activities dropped to become only 8%. In this case, this research argues that there are contradictive circumstances about the implementation of ABW concept in Organisation D: (1) the necessity of group working in Organisation D barely demanded, so that stimulation provided in ABW concept to create a more collaborative work between employees was questionably optimal, however (2) well distributed and comparatively stable percentage of group working during the day benefited the office to potentially avoid over or under utilised sharing facilities, e.g. meeting room and lounge, since ABW concept allowed employees to carry out their tasks in whichever area that employees preferred.

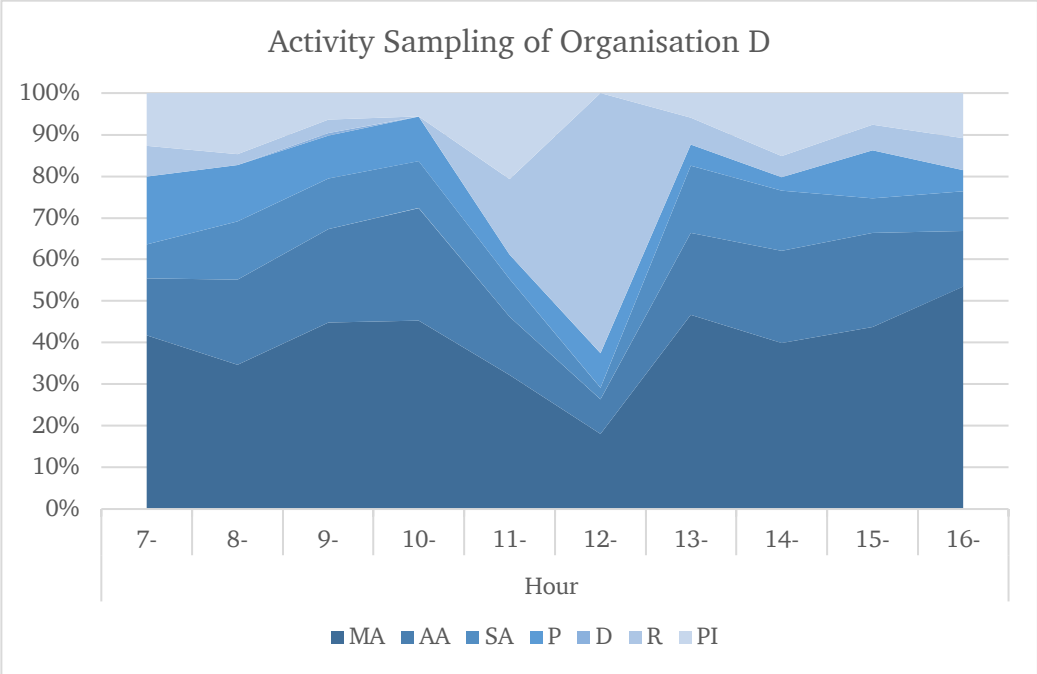


Figure 6.24: Activity Sampling statistic during office-hour of all floors in Organisation D

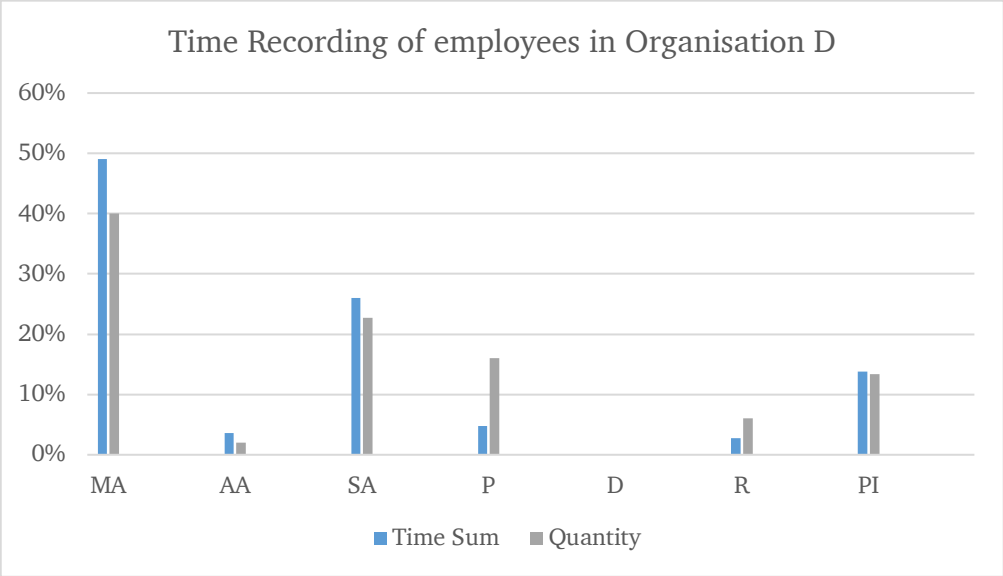


Figure 6.25: Time recording of employees in Organisation D

Organisation E, a medium size national company, occupied the same office building with Organisation A. The office types were also similar to Organisation A which both of Organisations provided assigned combi offices (cellular and open plan cubicle) for their employees. It can be interestingly compared between Organisation D and A to prove whether organisational behaviours of both organisations can be alike due to the influence of similar office configuration and environment.

Commonly, Organisation E worked more frequently individual (38%) rather than in group (19%). Individual working appeared significant high in the beginning of office hour at 7 o'clock (52%) and after lunch time at 13 o'clock (50%). Notwithstanding, group working rose dramatically at 10 o'clock (42%) and at 14 o'clock (27%). However, if this study check into a more in-depth analysis, contributions of group working were performed mostly by Core Function (26%) rather than Support Function (13%). Further, this research also identified that productivity of their employees was hardly satisfying since the total of main, ancillary and supplementary activities was slightly underperformed (74%) compared to the average of other case studies (76%), meanwhile irrelated activities to work, i.e. recovery and personal interruptions, were marginally higher (26%) confronted to the average (24%). Time recording of employees in Organisation E reassured that Organisation preferred to work individually (54%) rather than group working in formal (12%) or casual settings (18%).

Accordingly, this research examined that Organisation A and D acted similar in terms of:

- Productiveness in which Organisation A and D were lightly underperformed (71% and 74% respectively).
- Peak timing of formal meeting that can be found significantly at 10 in Organisation A and D (40% and 42%).
- Non-work-related activities in both organisations were in consequence higher (29% and 26%) confronted to the rest case studies (24%).

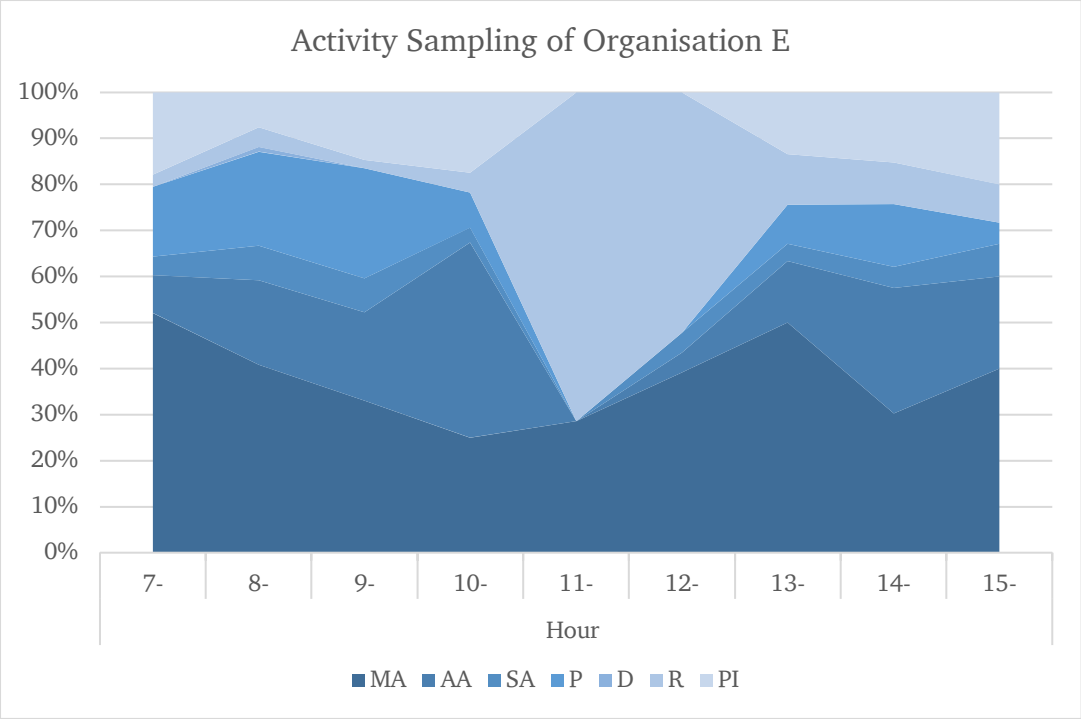


Figure 6.26: Activity Sampling statistic during office-hour of all floors in Organisation E

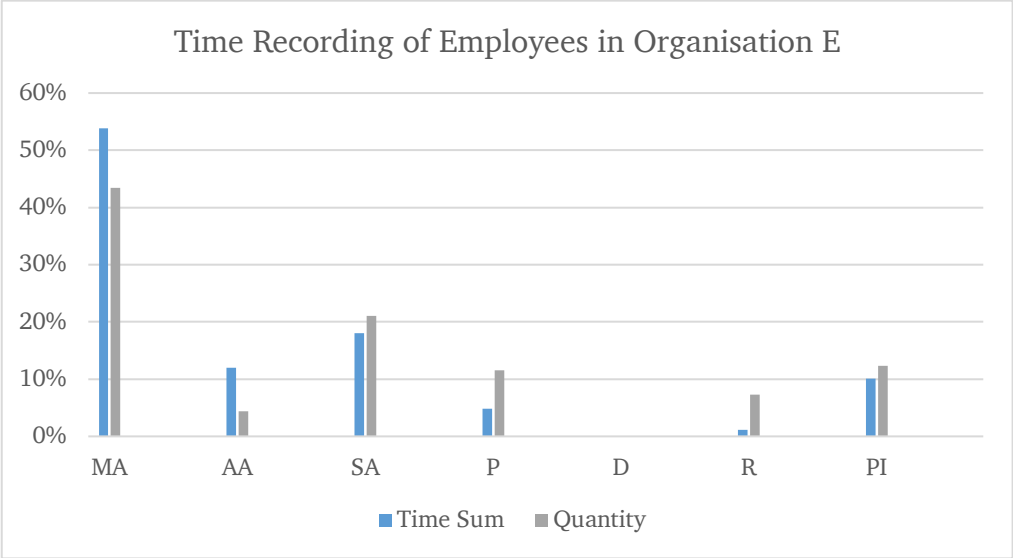


Figure 6.27: Time recording of employees in Organisation E

Organisation F, a medium size multinational company, provided combi offices for their employees: (1) cellular offices for Manager to Top Management, and (2) open plan cubicle for Administrator, Staff, and Supervisor. This research was granted opportunity to observe offices of Core Function (Production, HSE, Procurement and Logistic Department), Support Funtion (Finance, HR, and ICT Department), as well as Public Area (reception, lounge, and meeting rooms).

In common, organisation F worked mainly individual (45%) with ancillary of 20% and supplementary of 7% from the total of activities. Unlike Organisation E that was also its fellow medium size company of the case studies, Core Function in Organisation F doubtfully demanded the necessity of group working as group working only appeared 14%, whereas Support Function interested more in group working (26%). This was the organisation that achieved the highest productivity compared to the rest of case studies as the total work-related activities were evidently outstanding (87%). Accordingly, recovery and personal interruptions were insignificant (13%) confronted to the average performance of other case studies (24%).

Time recording of employees at the same time confirmed the findings revealed in activity sampling that employees of Organisation F remarkably worked individual (69%) with periodical group working in formal (16%) and informal settings (13%). Non-work-related activities were almost unseen (2%).

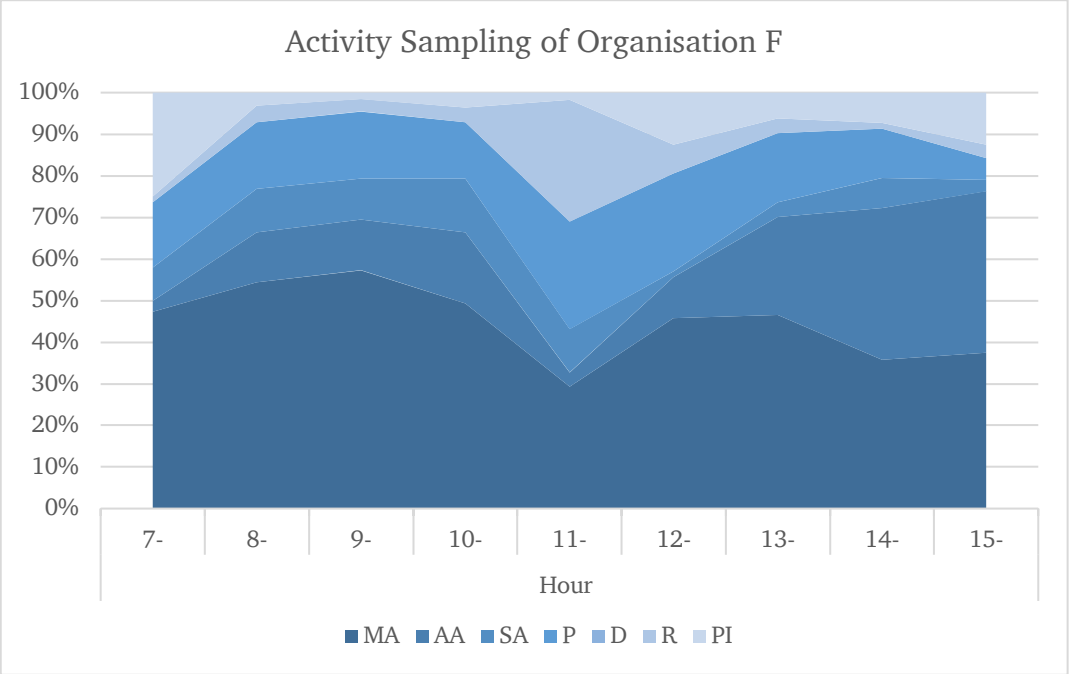


Figure 6.28: Activity Sampling statistic during office-hour of all floors in Organisation F

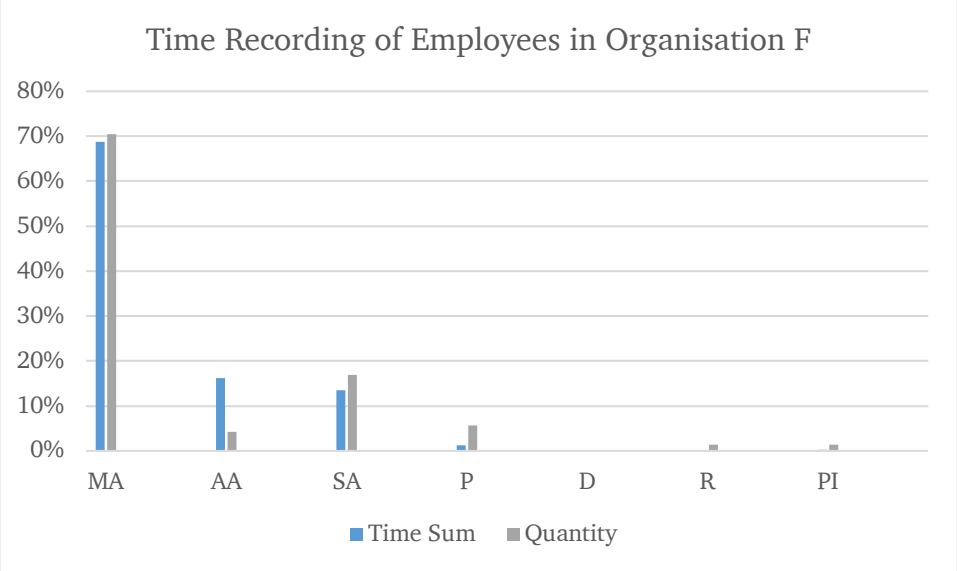


Figure 6.29: Time recording of employees in Organisation F

Organisation G, a small national company, was part of the biggest state-owned upstream oil and gas company. It occupied the same office complex to its main sub-holding company in which they also shared some of office facilities and manpower, e.g. main hall and FM team. In this case, this research accomplished observations in Core

Function (Operation Department) and Support Function (IT Department) of Organisatio G.

According to activity sampling collected by this research, Organisation G worked mainly, ancillary and supplementary just right on the average of case studies (36%, 25%, and 6%). This organisation particularly showcased that individual working can be often seen in the beginning of office hour at 7 o'clock (40%), at 10 o'clock (45%) and also after lunch time at 13 o'clock (50%). At 10 o'clock and at 13 o'clock was considerably the busiest office hour in which invidual and group working occurred more significantly within these hours (74% and 71% respectively) compared to the average of office hours (61%).

In terms of productivity, this research figured out that the activities of Organisation G was insignificantly underperformed as total work-related activities was lower (74%) compared to the average of case studies (76%). Non-work-related activities were dominated by personal interruptions (15%), rather than recovery process (10%).

Time recording of employees in Organisation G, on the other hand, displayed a contradictive performance to the result of activity sampling, as the activities of employees during time recording were extremely focus and predominated by individual working (83%) with only minor demand of collaboration (7%) as well as personal interruptions (1%).

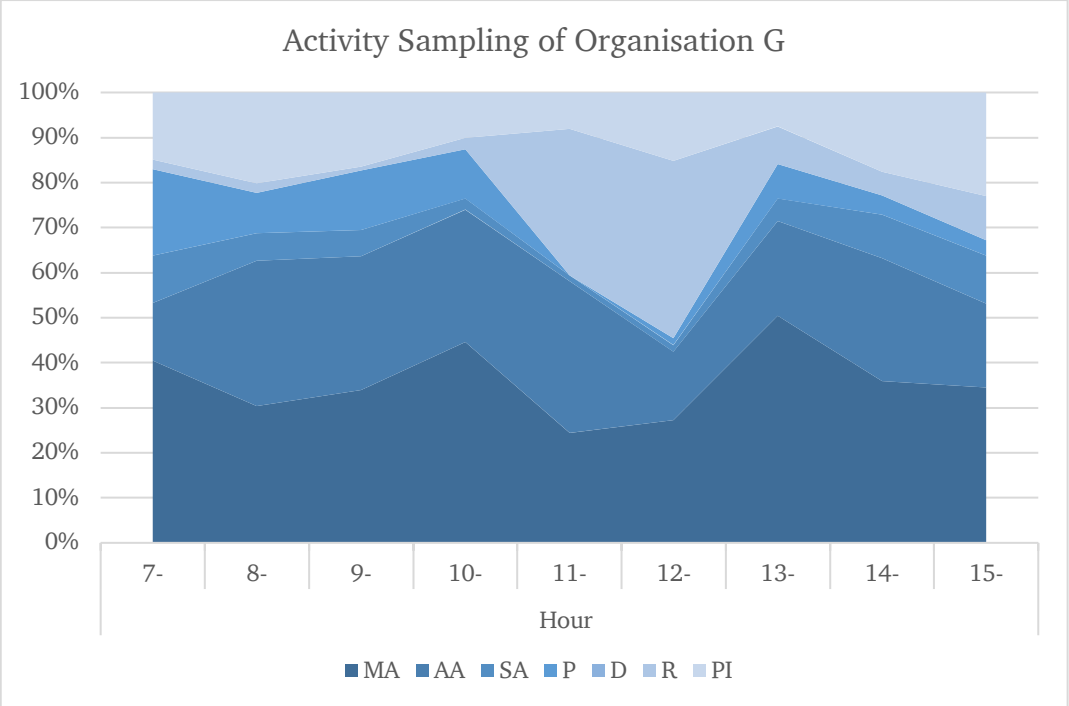


Figure 6.30: Activity Sampling statistic during office-hour of all floors in Organisation G

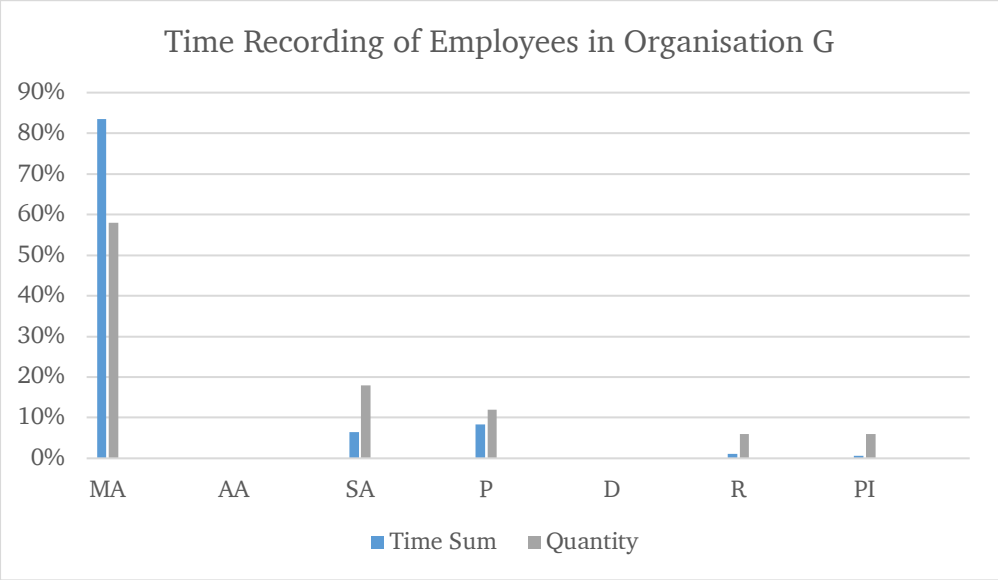


Figure 6.31: Time recording of employees in Organisation G

Organisation H, a small size multinational company, was designated to occupy office space of previously expired Upstream Oil and Gas Company. Office configuration, including its furniture were also given and only minor of assets were bought directly by FM of Organisation H. According to activity sampling of Organisation H, working culture of Organisation H was one of a kind compared to other case studies as the appearance of group working (42%) exceeded the percentage of individual working (30%). It was only in the beginning of office hour at 7 o'clock that invidual working mostly took place. Whereas, group working outstandingly recognised at 9-10 o'clock (40% and 48% respectively) and at 13-15 o'clock (59%, 56%, and 60% respectively).

It was the second productive company (86%) after Organisation F (87%) that work-related activities predominated their process compared the average of case studies (76%). Additionally, non-work-related activities were more noticeably relevant to recovery prrocesses (8%) instead of personal interruptions (6%).

Referring to time recording of employees in Organisation H, although individual working predominated the total process (47%) collaborative working activities were remarkably noted (43%) in formal (34%) and informal (9%) settings. Consistently, non-related activities were barely observable (4%).

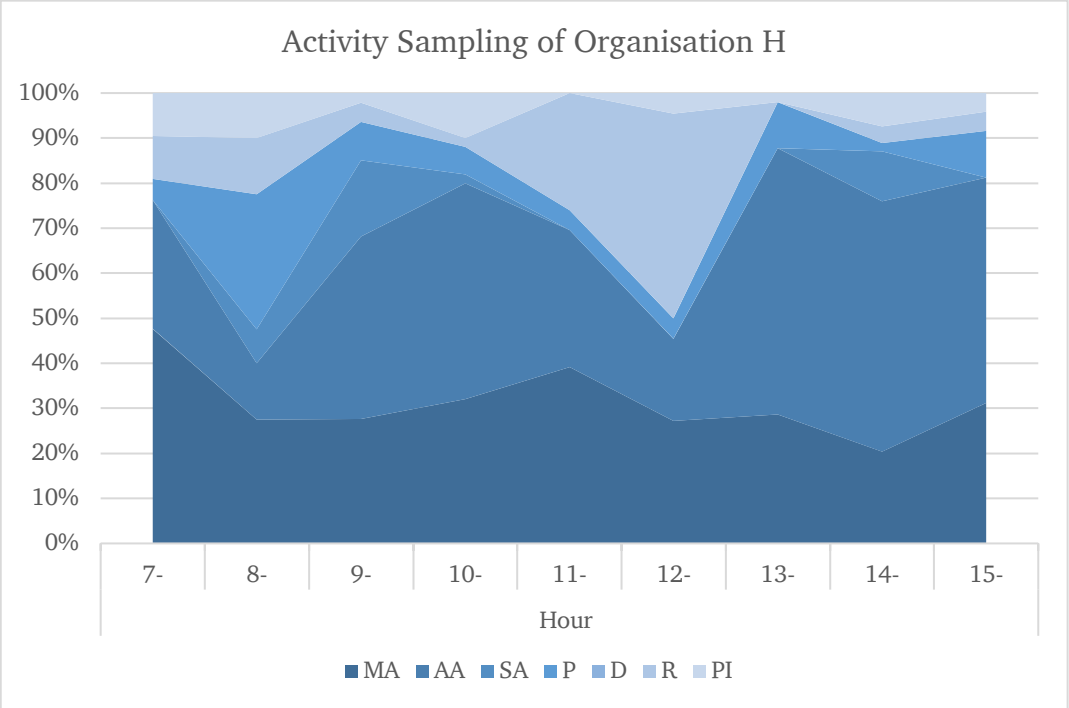


Figure 6.32: Activity Sampling statistic during office-hour of all floors in Organisation H

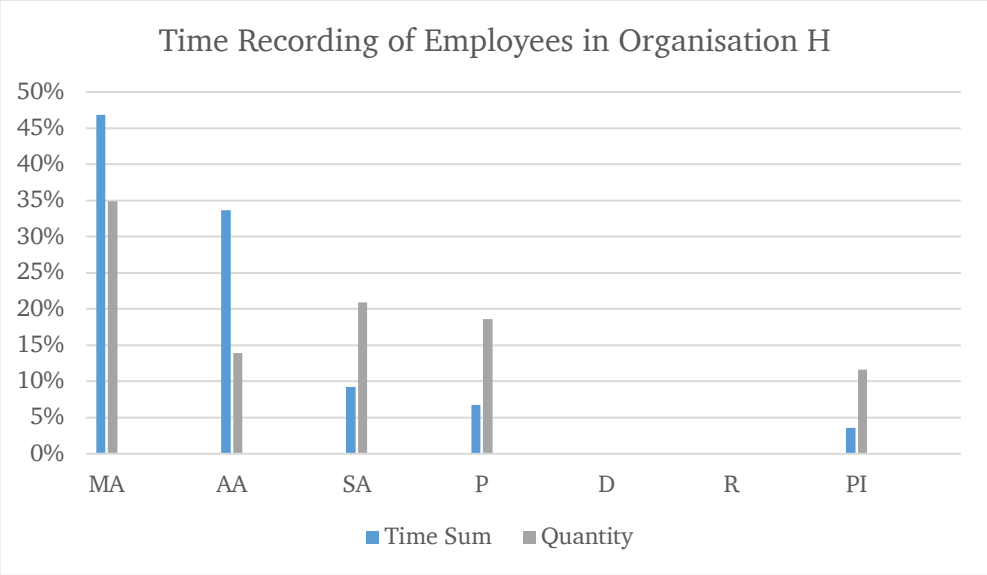


Figure 6.33: Time recording of employees in Organisation H

According to work process analysis of each organisation that has been discussed above has showed that each organisation acted uniquely. Part of them worked traditionally more individual (organisation B, D, E, and F), while the others nearly proportionated

the necessity between individual and group working (Organisation A, C, and G) and one demanded more collaboration to help them finish their tasks (Organisation H).

Distribution of activities in the sector, on the other hand, was relatively typical in which individual most notable can be found in the beginning of office hour at 7 o'clock (45%), whereas formal group working appeared predominantly at 10 (34%). Aside from formal group working, short-time collaborations between employees were also observable between 4-8% the whole day. Process related, e.g. walking to one desk to another desk or to printing station, occurred more higher at 7, 8, 9, and 13 o'clock. Initially this research predicted typical disturbance of office environment that might be occurred during office times, e.g. broken tools of work/computer, problem with building condition (lighting or ventilation) that may disrupt comfortness of employees. However during intensive observations to all case studies, this research was satisfied that upstream oil and gas sector were free of technical disruption in which also comfirmed by FM and HSE assessment within all case studies that main principles of FM and HSE was well concerned as well as statement of Experts that Upstream Oil and Gas Sector in Indonesia set a higher standard of HSE.

Non-related-work activities were also interesting to note that personal interruptions were proportionately distributed during the day (12-16%) except at 7 o'clock (21%) that was aimed the peak time since they usually took on conversation about personal life with the colleagues. The percentage also dropped at 11-12 o'clock during lunch break as most of employees spent their time to have lunch in (31-48%) or outside office space.

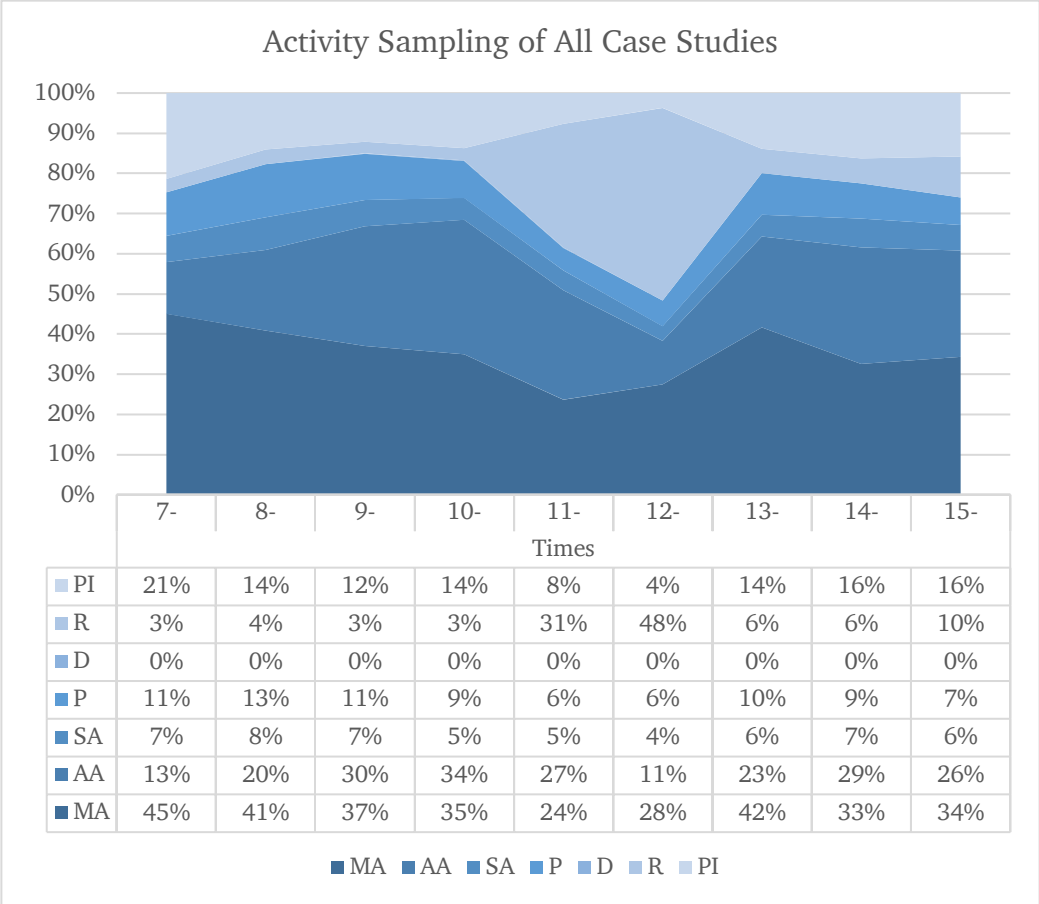


Figure 6.34: Activity Sampling statistic during office-hour of oil and gas sector

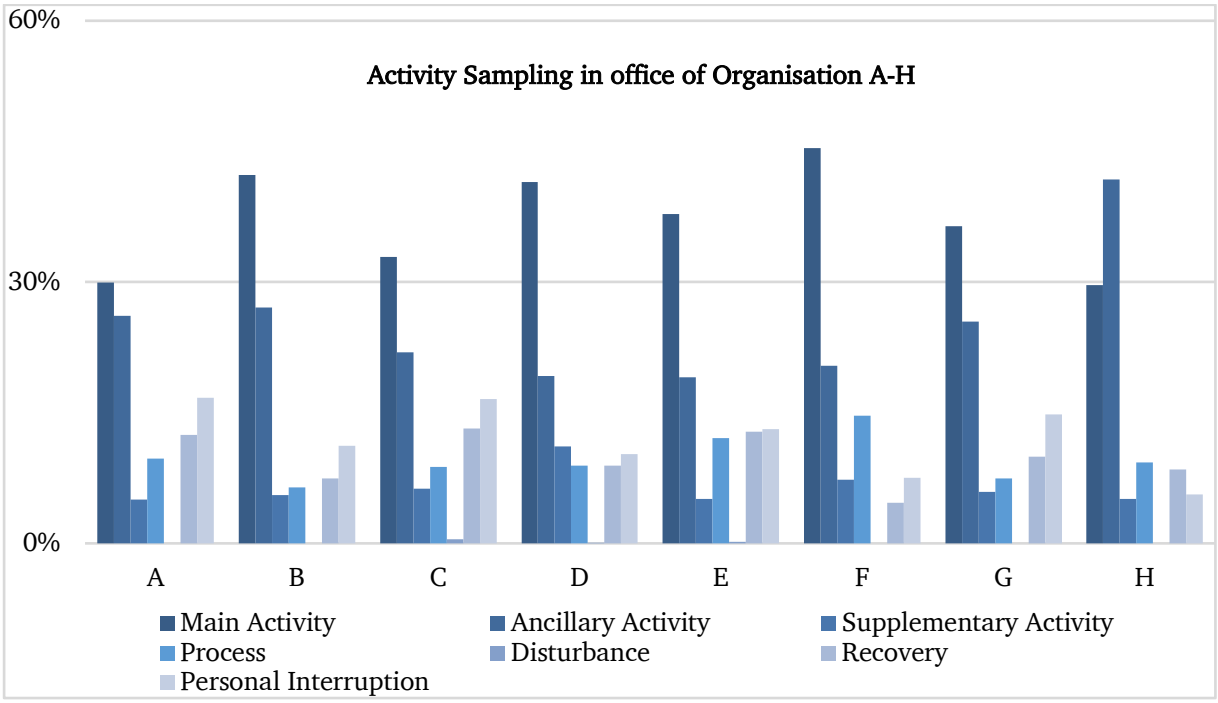
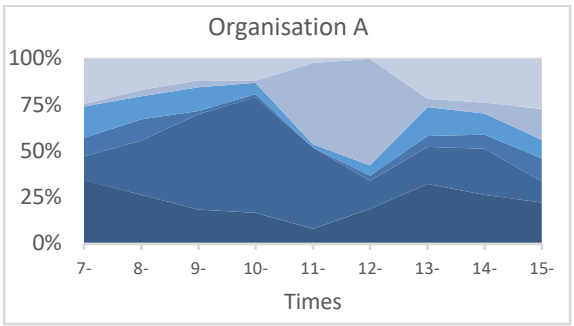
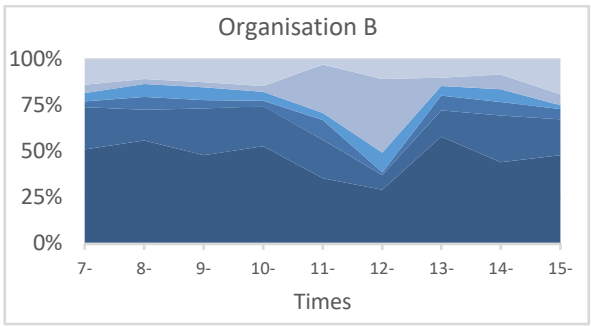


Figure 6.35: Activities in office of Organisation A-H

Below, this research showcases the comparison of activity sampling according Core/ Support Funtion, background and size of the company in which then this research concludes that:

- Working culture of employees in Core Function was somewhat random; Organisation A and H worked massively in group (30% and 56% respectively), while Organisation B and stayed mostly individual (47% and 52% respectively). The rest case studies, however, were just nearly the average activities of Core Function; 38% individual working and 24% group working.
- Working culture of employees in Support Function appeared in a more regular pattern; all Support Function of case studies displayed that individual working was typically demanded (40%) rather than group working (20%).
- In terms of productivity, large size offices of large size company appeared less productive (73% vs 27% of work-related and non-work-related activities) compared to the medium size (79% vs 21% of work-related and non-work-related activities) and small size (76% vs 24% of work-related and non-work-related activities), but it was clearly not significant.
- Working culture of national and multinational companies were apparently similar in which national companies worked slightfully more collaborative (26%) compared to multinational companies (23%). Whereas multinational companies kind of worked individually more often (38%) confronted to national companies (35%). However, this was also clear that the differentiation of working culture between national and multinational companies almost blurred.
- Multinational companies worked more productively as work-related activities occurred higher in multinational companies (80%) compared to national companies (74%).





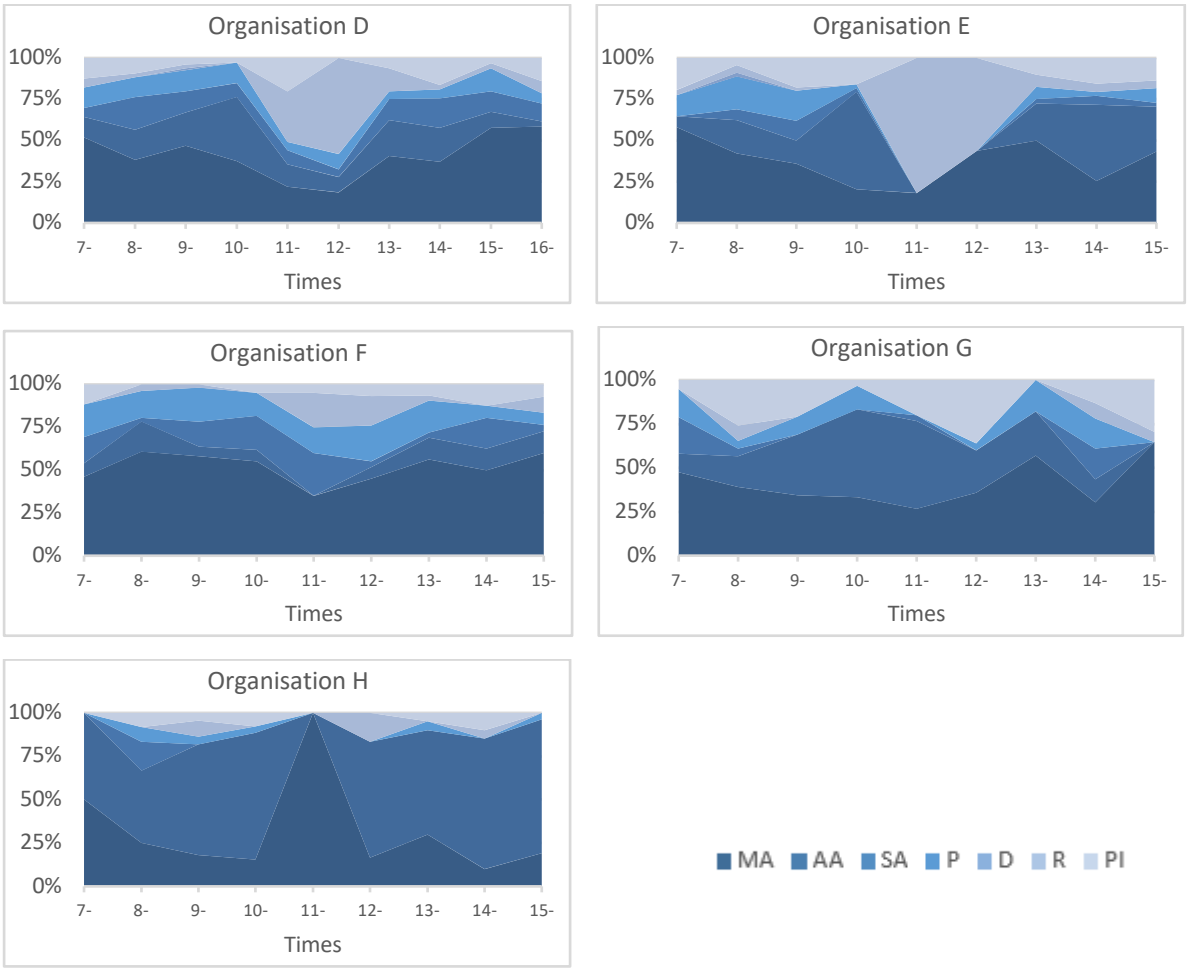
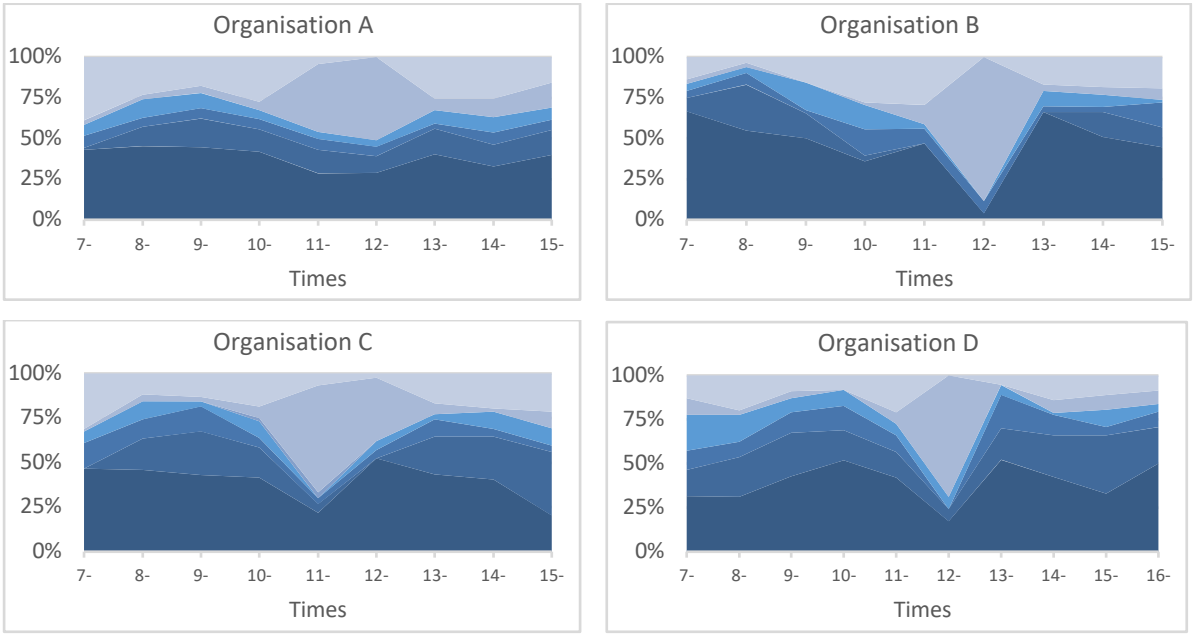


Figure 6.36: Activity Sampling statistics comparison between core function of all case studies during office-hour



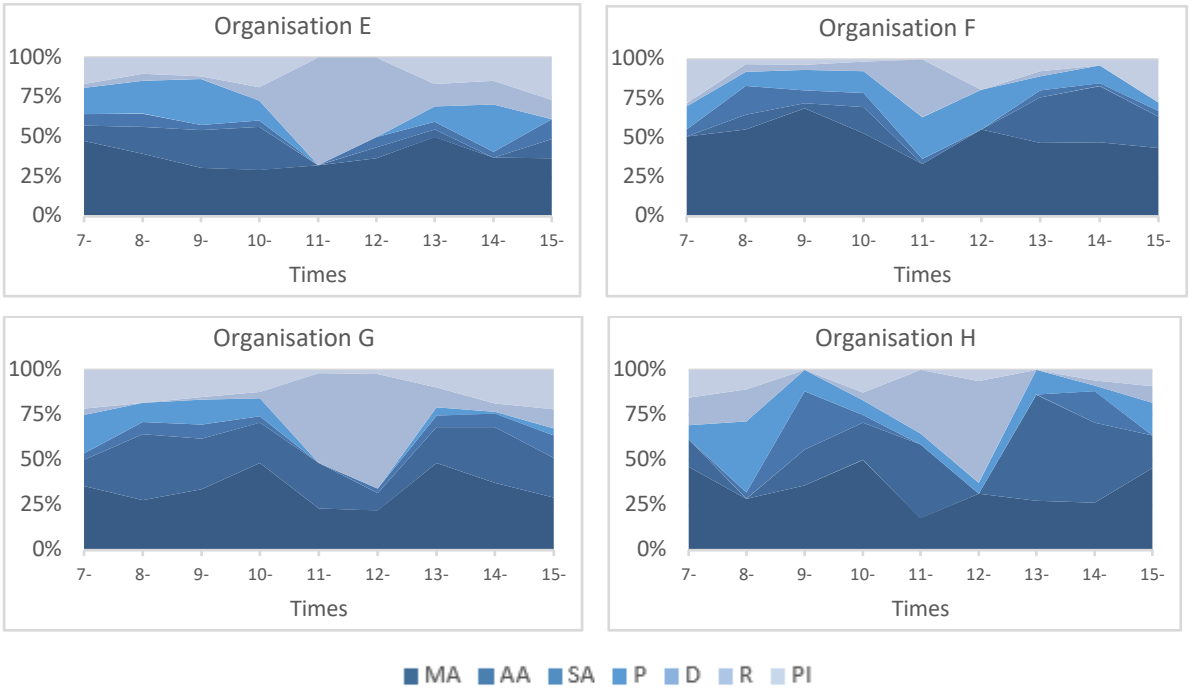
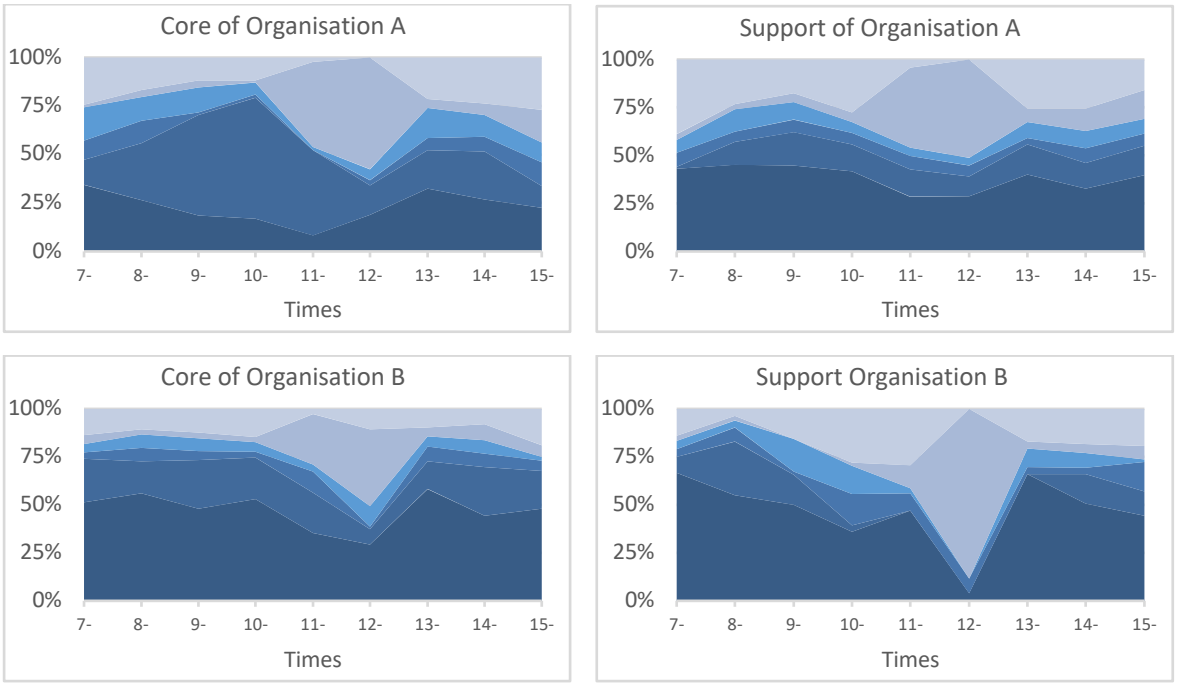
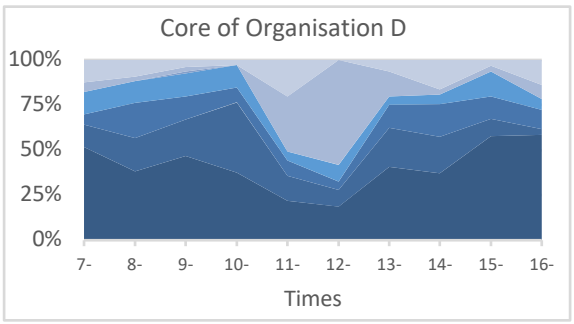
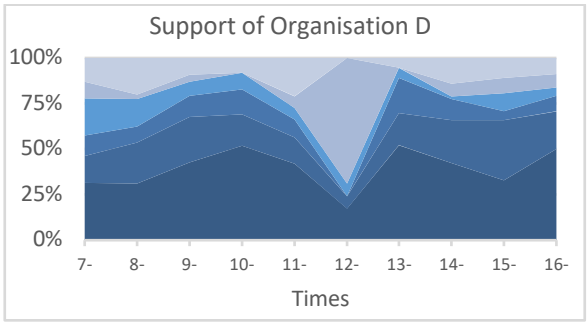
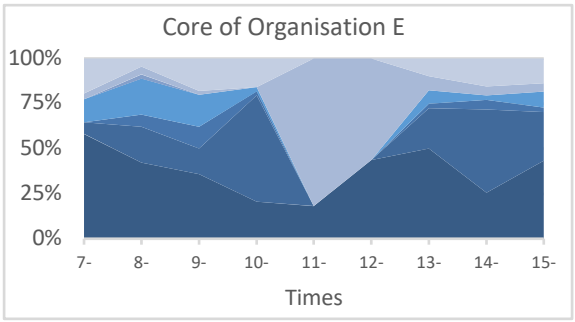


Figure 6.37: Activity Sampling statistics comparison between support function of all case studies during office-hour




Core of Organisation D
100%
75%
50%
25%
0%
7- 8- 9- 10- 11- 12- 13- 14- 15- 16-
Times


Support of Organisation D
100%
75%
50%
25%
0%
7- 8- 9- 10- 11- 12- 13- 14- 15- 16-
Times


Core of Organisation E
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25%
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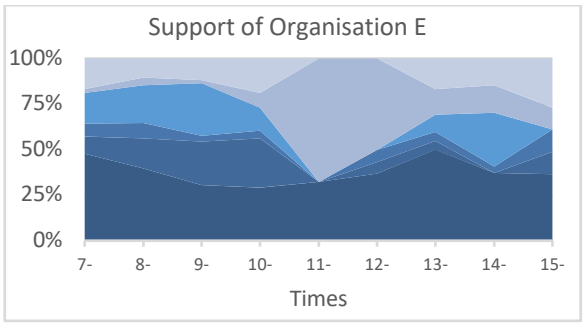
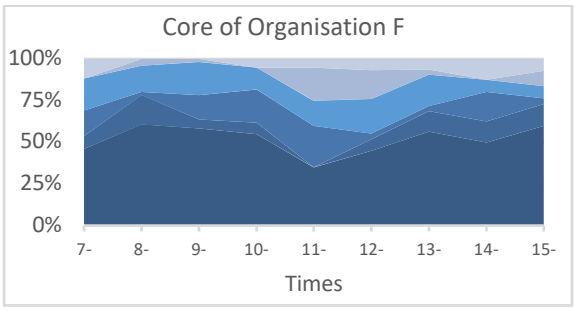
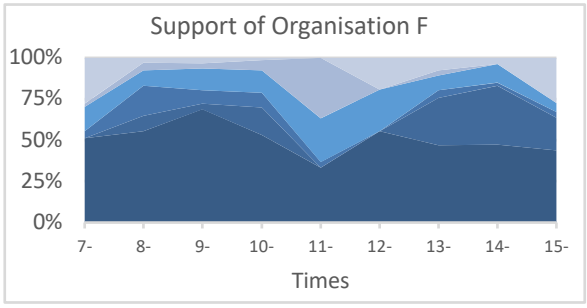
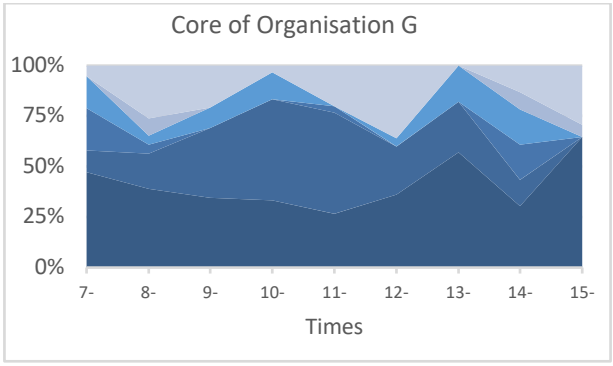
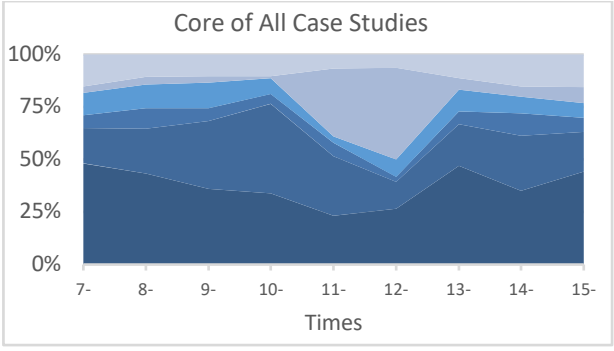
7- 8- 9- 10- 11- 12- 13- 14- 15-
Times


Support of Organisation E
100%
75%
50%
25%
0%
7- 8- 9- 10- 11- 12- 13- 14- 15-
Times


Core of Organisation F
100%
75%
50%
25%
0%
7- 8- 9- 10- 11- 12- 13- 14- 15-
Times


Support of Organisation F
100%
75%
50%
25%
0%
7- 8- 9- 10- 11- 12- 13- 14- 15-
Times


Core of Organisation G
100%
75%
50%
25%
0%
7- 8- 9- 10- 11- 12- 13- 14- 15-
Times


Core of All Case Studies
100%
75%
50%
25%
0%
7- 8- 9- 10- 11- 12- 13- 14- 15-
Times

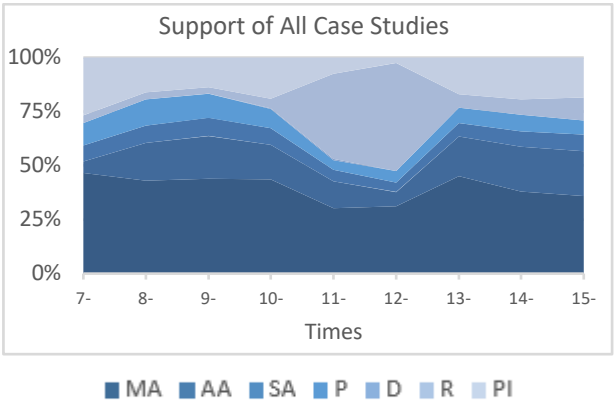


Figure 6.38: Activity Sampling statistics comparison between core vs support function during office-hour of all case studies

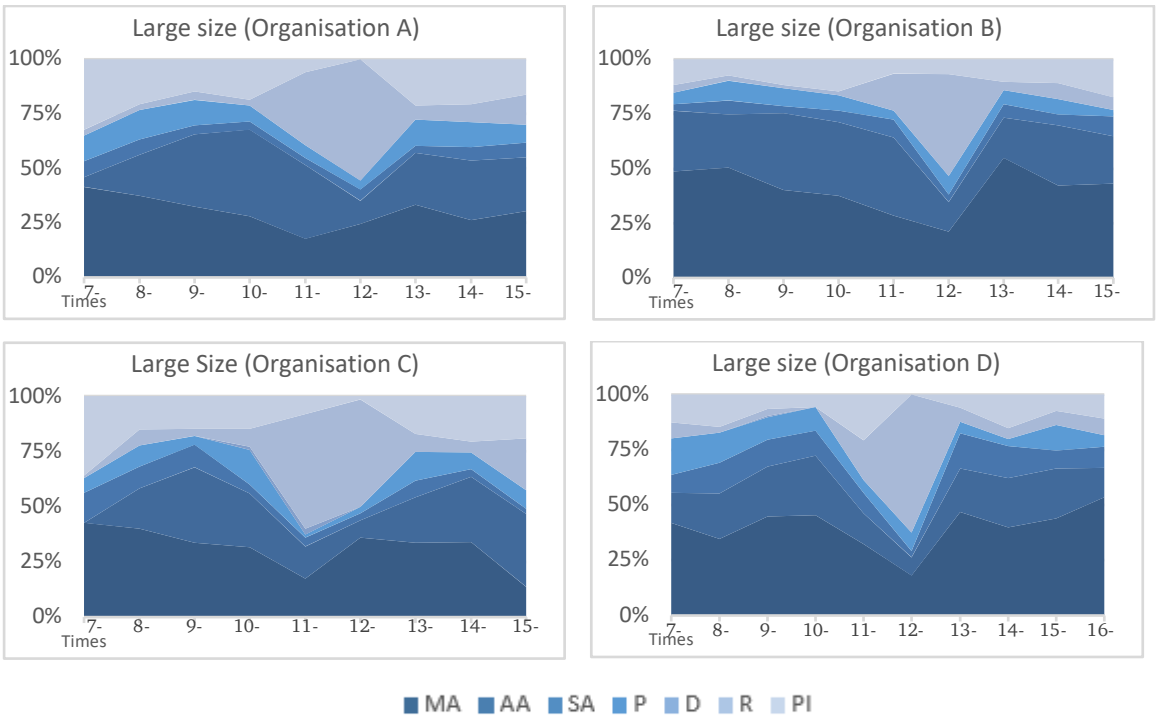


Figure 6.39: Activity Sampling statistic comparison between large size organisation during office-hour

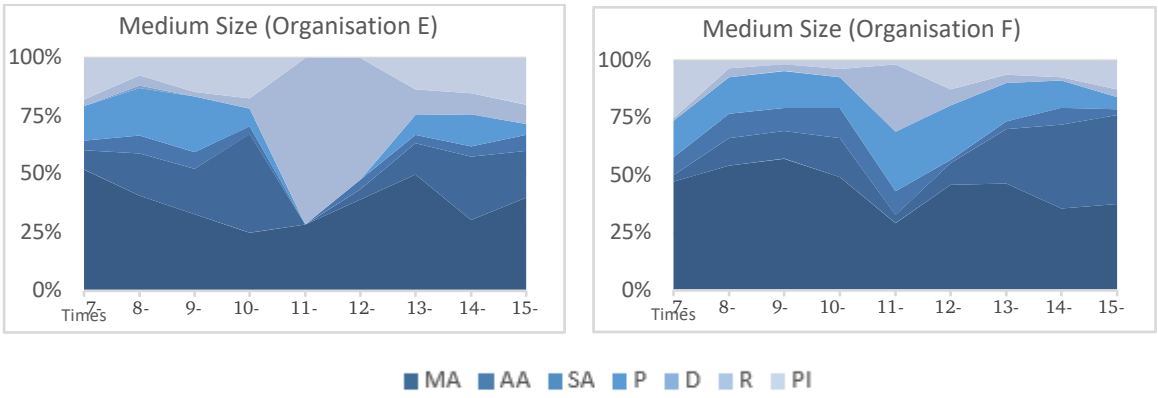


Figure 6.40: Activity Sampling statistic comparison between medium size organisation during office-hour

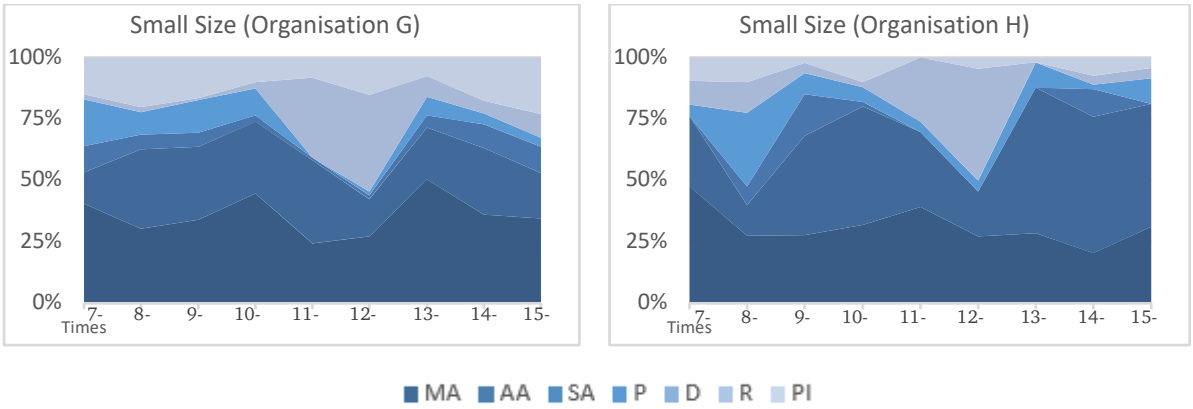
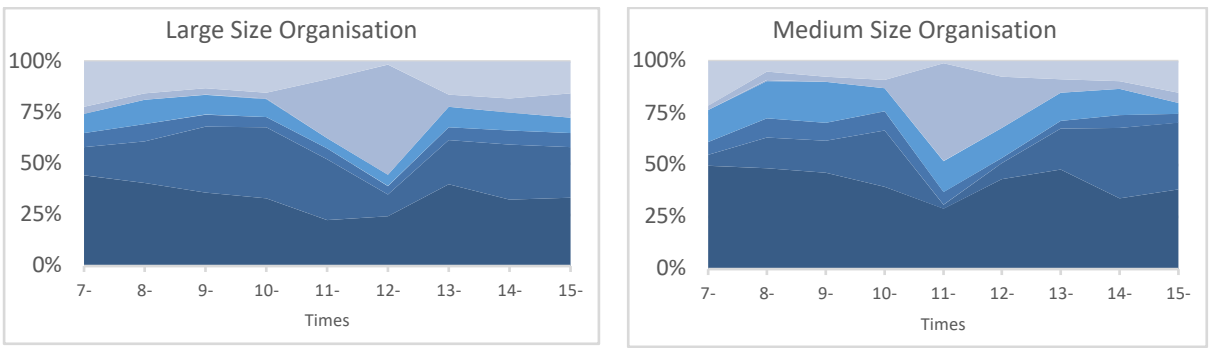


Figure 6.41: Activity Sampling statistic comparison between small size organisation during office-hour



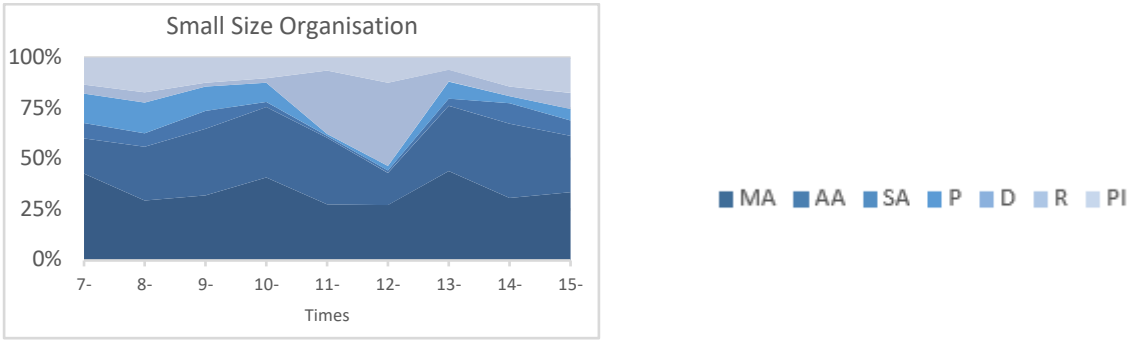


Figure 6.42: Activity Sampling statistic comparison between large, medium and small size organisation during office-hour

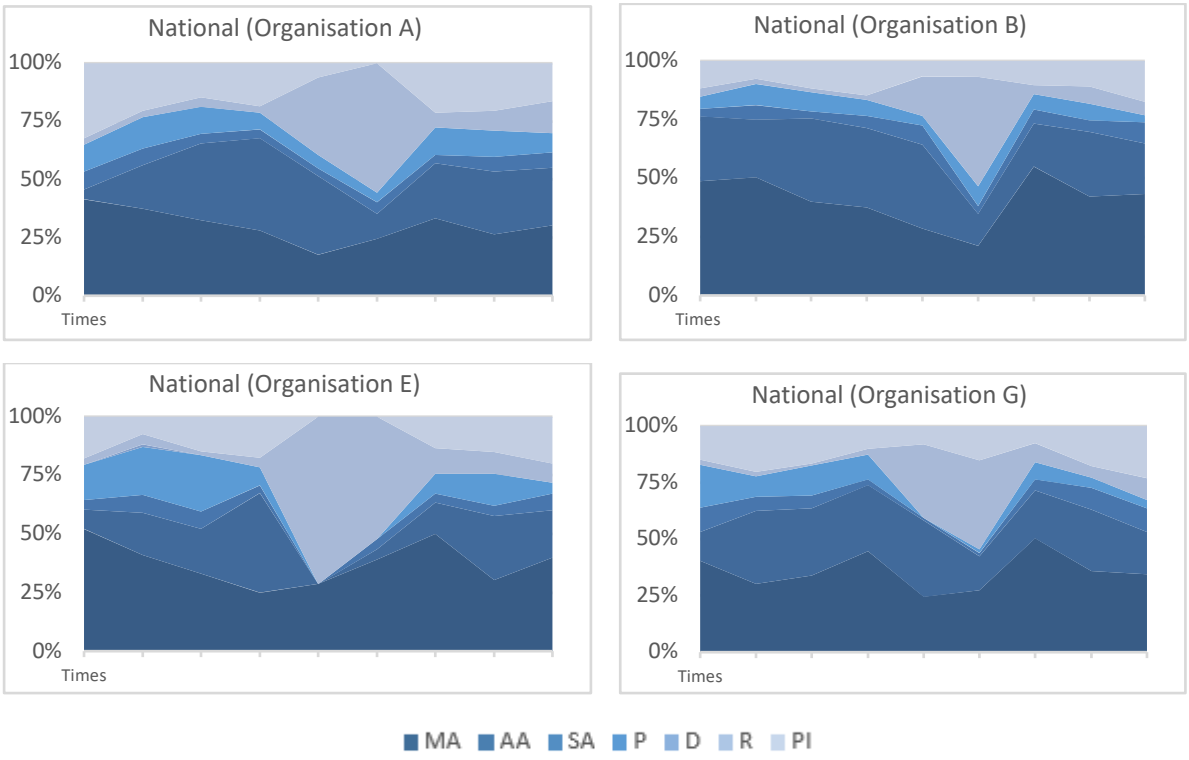
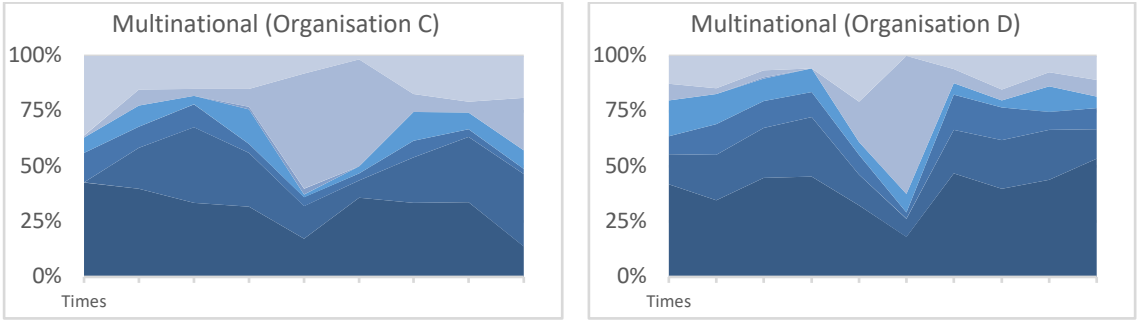


Figure 6.43: Activity Sampling statistic comparison between natinal organisation during office-hour



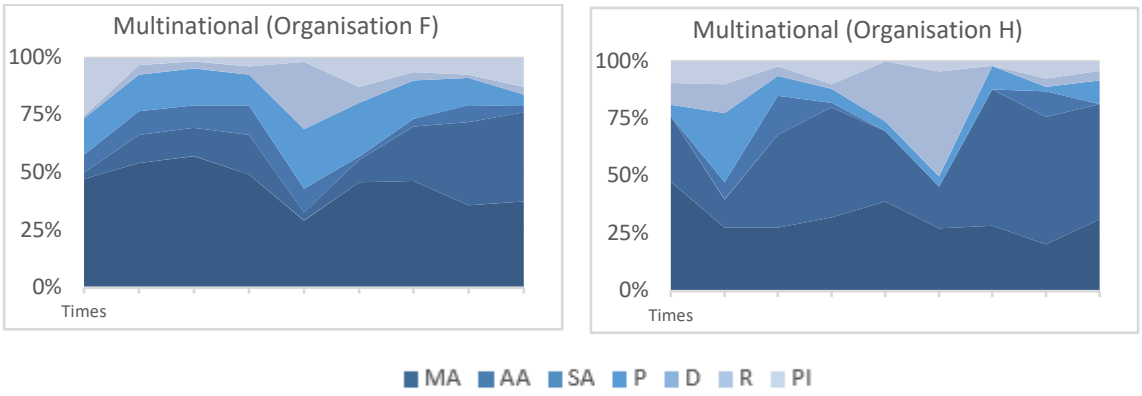


Figure 6.44: Activity Sampling statistic comparison between multinational organisation during office-hour

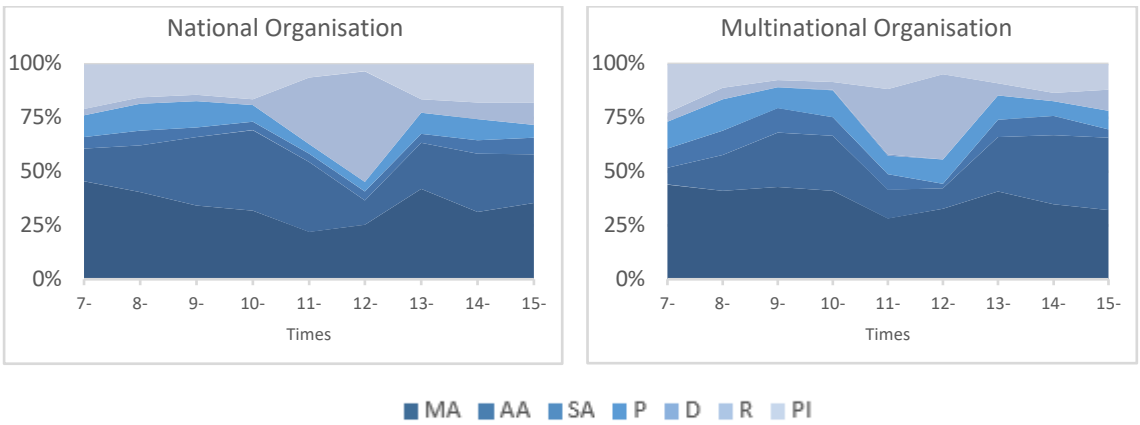


Figure 6.45: Activity Sampling statistic comparison between national and multinational organisation during office-hour

6.3 Work Life during Pandemic

This research was actually almost reach its study closure in Q1 2020. However, since March 2020 the first case confirmed in Indonesia, Organisation A decided to completely lockdown their office by the third week of March 2020 until June 2020. The Headquarters Office of Organisation A reopened on June 2020, as a follow up of the new regulation released by the local government regarding the loosening of lockdown. This research then interestingly was given the chance to observe the work processes in Organisation A in July and August 2020. At that time, Organisation A limited their occupancy rate by 50% by grouping their workforce into 2 (two) batches in which each batch worked in the office every 2 (two) weeks in a row.

After the first batch worked in office for 2 (two) weeks, the office changed crew with the second batch and the first batch had to work from home also for 2 (two) weeks. This methods applied continuously until the new local government regulation was appointed in September 2020 in which limited the occupancy rate of offices even lower by 25%. This then made Organisation A split their workforce batches by 4.

In addition, internal regulation of working during pandemic in Organisation A was also placed:

- Only employees with a non-reactive antigen test can work in the office. This regular test was taken by employees of each batch every 2 (two) weeks before their schedule of work in the office.
- Employees were only allowed to work locally within their office floor and the access to another floor is prohibited. Special case may be allowed with the approval of internal doctor.
- Group work was done virtually, e.g. meeting.
- The batch that worked from home was forbidden to work in the office for any reason.

6.3.1 Working Process Analysis and Occupancy Rate of Organisation A

In the relation to the internal regulation regarding Covid-19 protocols mentioned above, this research is keen to find out how is the working culture during pandemic and what differs the most to the era of working before pandemic.

The case studies in Organisation A were chosen identical to the observation done before pandemic to objectively compare the way of working before and during pandemic, as follows:

- Planning Department in 22nd Floor
- Operation Department in 27th Floor
- Supply Chain Department in 29th Floor
- Corporate Secretary in 30th Floor
- Finance Department in 31st Floor
- Vice Chairman, VPMR and Internal Audit in 37th Floor
- Chairman and Business Support Department in 39th Floor

The Offices of Planning Department

Before pandemic, Planning Department in 22nd Floor was one of the busiest floor in Organisation A with group working dominated. They tended to occupy a smaller ratio space, e.g. meeting room, rather than individual workspace. Individual workspace, however, were used mostly only the early and later time of office hour or during the time of meeting break, instead of a whole day spent to finish individual work task.

During pandemic, on the other hand, Planning Department presented a significant different way of work. Employees recorded working individually at their desks dominantly (36%), while work in group, e.g. meeting, dropped significantly (9%) and be done virtual. Remarkably, spontaneous short discussion in person between employees rose sharply during the observation (10%) with a similar number to work in group. This indicated that although the regulation of work in office limited the interaction between employees by changing the way of group work from physical to virtual, the necessity of physical office is still required to collaborate and allow ideas exchange between employees that are not able to be done virtual.

The movement within the floor was also obviously seen predominantly in elevator area, receptionist, and main corridor to or from the workspace area. In contrary, movement from one desk to another desk was faintly remarkable. This explains that employees within the floor were immobile during office-hour and move mostly at arrival, break and departure time of the office as the number of people moving at 8-, 12-, and 15-o'clock were surged compared to the rest hours. In addition, it is also interested to highlight that count out at 12 o'clock, the percentage gap between in physical and space occupancy was comparably static (7%-12%) between office hours, to the same degree that they barely moved and changed the place of work when they do their tasks.

To discuss more about the occupancy rate, the percentage of physical appearance in Planning Department was actually placed right on the average numbers of physical occupancy of Organisation A (16%). This was considerably on the opposite of physical occupancy before pandemic that Planning Department obviously one of the floors with a higher percentage of physical appearance (48%) compared to the average (40%). In which, formal meetings before pandemic held in Planning Department floor were attended by employees of other floors or visitors that this kind of condition during pandemic was completely nonexistent. As consequences, disappearing activity of formal

physical meetings in pandemic era that had been mentioned earlier were done online had at the same time affected the number of physical appearance within the floor.

The space occupancy before and during pandemic, on the other hand, exposed a similar circumstances; Planning Department used a smaller ratio of space in the way that it was also apparently captured in activity sampling that employees mostly can be found in workstation of open area (smaller ratio) and hardly any in closed office (bigger ratio).

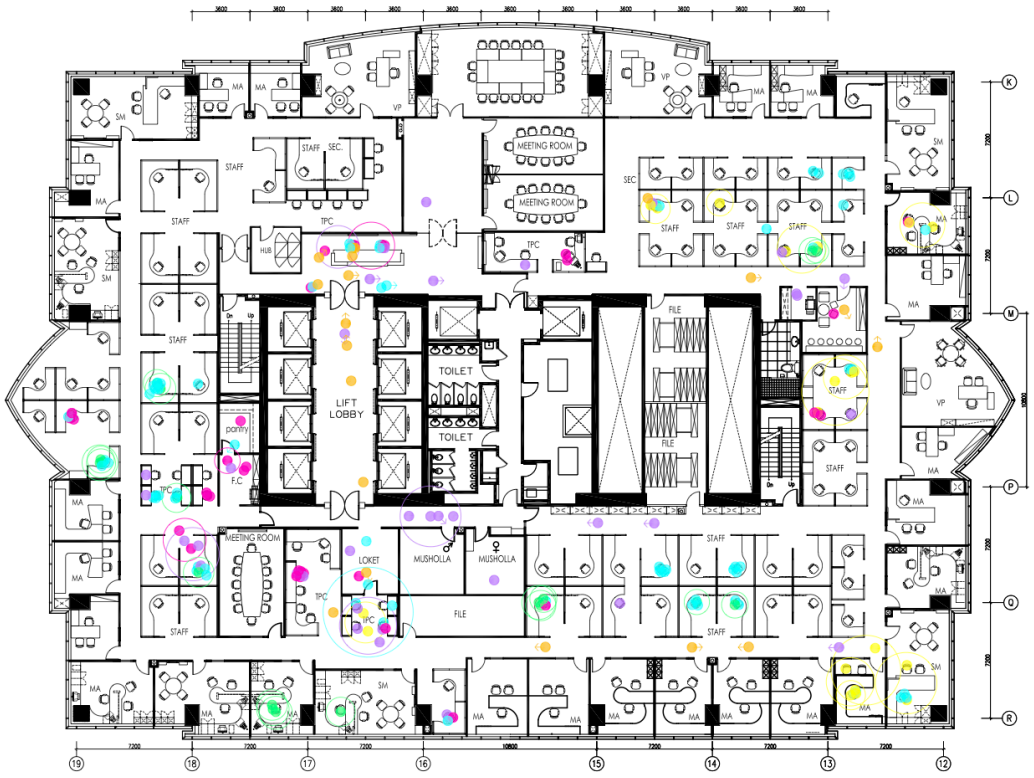


Figure 6.46: Activity Sampling during office-hour of Planning Department in Organisation A (22nd Floor)

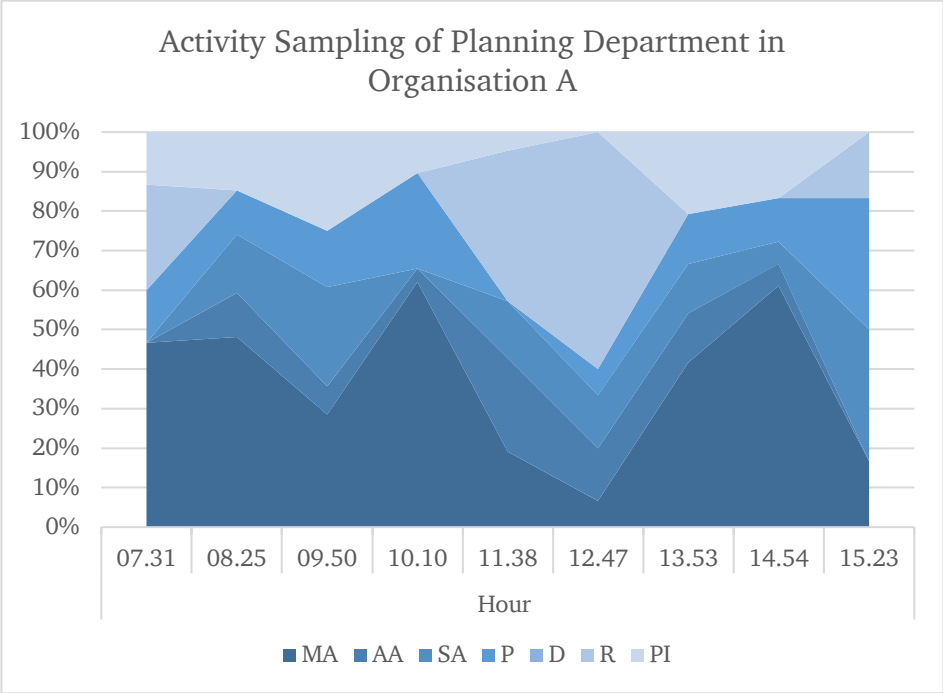


Figure 6.47: Activity Sampling statistic during office-hour of Planning Department in Organisation A (22nd Floor)

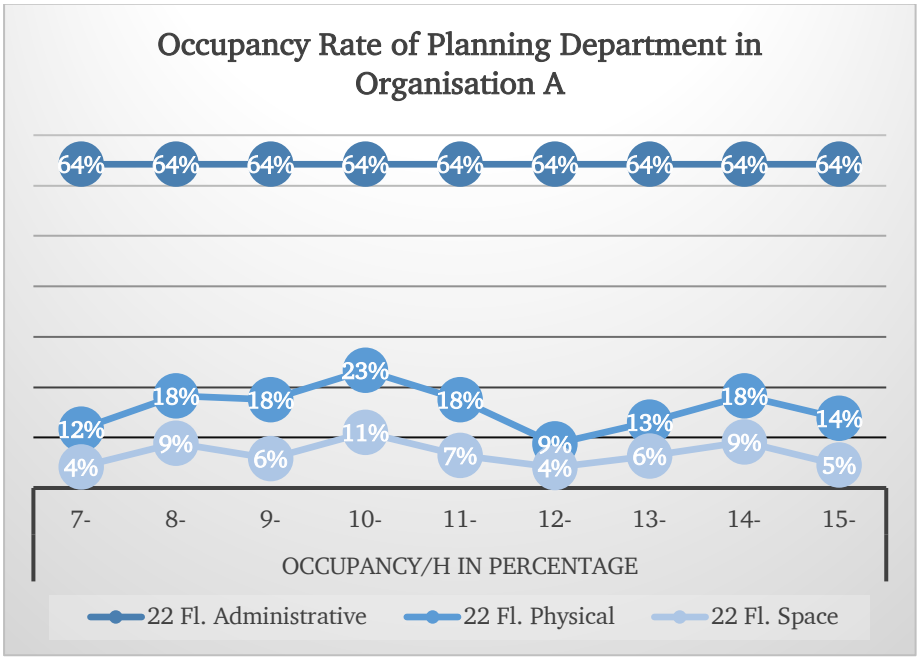


Figure 6.48: Occupancy rate during office-hour of Planning Department in Organisation A (22nd Floor)

The Offices of Operation Department

Operation Department known as one of the functions that worked mostly in group before pandemic. High mobility of movement within the floor was also observable as employees intensively collaborate between one to another during office hours. The distribution of busy hour was also typical before and during pandemic; Operation Department worked individual and in group mostly at 10, 13, and 14 o'clock.

The circumstance during pandemic, however, copied. During pandemic, the requirement for working in group continued; although they apparently did the meeting online (9%), spontaneous group discussion between employees still occurred tangibly (12%). In addition, employees moved from one place to another place within the workplace during office peak time at 10 o'clock detectably high (23%) as work in office became reasonably opportunity for the employees of Operation Department to collaborate in person with their colleagues in informal settings as the communication appeared at least 20% of the total activities.

However, the pandemic had concerned the employees to maintain the physical distance. Previously before pandemic, a wider gap between physical and space occupancy rate confirmed that the employees worked relatively dense and in close proximity with their colleagues. This had changed relatively during pandemic as the gap between physical and space occupancy rate became narrower in which indicated that the employees worked distantly between one to another to maintain physical distance. Notwithstanding, the gap varied between hours in which also affected by to some extent high mobility of the employees in the act of seeking another place to work during their tasks (13%).

Another contrariety between before and during pandemic can be also found in the duration of stay within the office. Before pandemic, the number of employees in Operation Department that left the office early at 15 o'clock was 40% of population during observation day, whereas the 35% in fact still worked individually and in group (formal and informal). On the other hand, employees left the office substantially earlier as of the number of employees recorded during observation was only 20% of population of the observation day, in which the 10% still worked individually and in group.

Figure 6.49: Activity Sampling during office-hour of Operation Department in Organisation A (27th Floor)

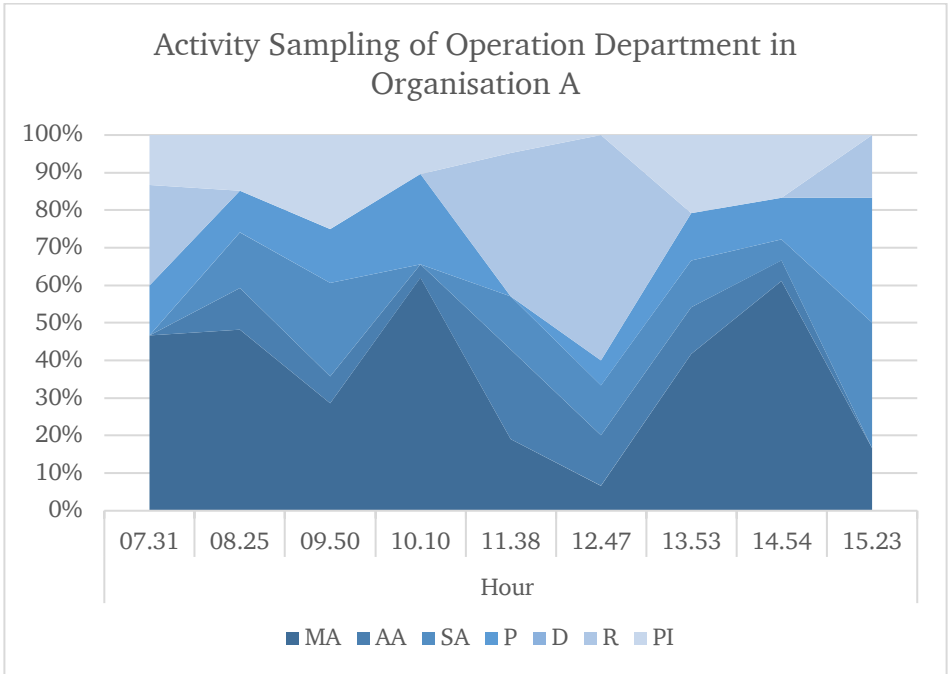


Figure 6.50: Activity Sampling statistic during office-hour of Operation Department in Organisation A (27th Floor)

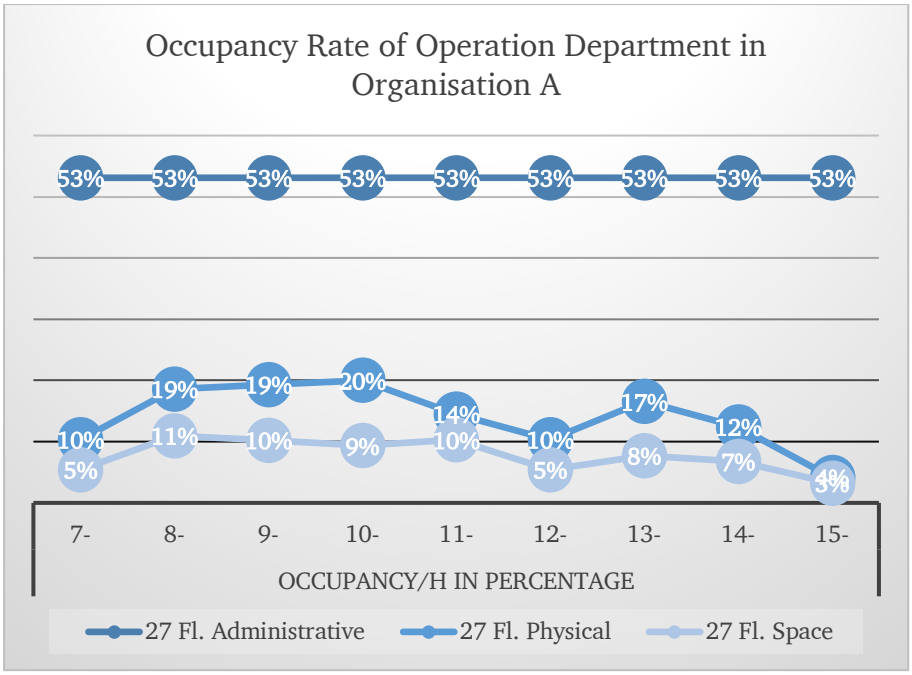


Figure 6.51: Occupancy rate during office-hour of Operation Department in Organisation A (27th Floor)

The Offices of Business Support and Supply Chain Management Department

Supply Chain Department worked more individually and barely stayed at the office before pandemic. The use of space had the least number (12%) compared to the other floors (14% - 22%). There were even 39% closed offices and 25% open plan offices completely vacant during the day. Together with Financial Department, the physical occupancy of the Department had also been the lowest (32%) collated to the rest Functions (35% - 56%).

Alike to the condition before pandemic, individual work appeared predominantly in Supply Chain Department during pandemic. However, the way they worked developed; similar to Planning and Operation Department, Supply Chain Department also exploited the best opportunity of work in the office by working spontaneously collaborative with their colleagues (10%). This had increased 4% in the comparison to the time before pandemic (6%). Beside informal group discussion, interaction between employees as personal interruption activity was likewise higher (19%) compared to condition before (16%).

Alongside, a higher percentage of movement noticed within the floor during pandemic even though was not expected mainly from the activity during their tasks, i.e. walking from one desk to another desk, but mostly when they arrived to and departed from the office. Meaning that interactions between employees occurred within the floor appeared mainly because their offices placed close to each other and barely demanded to walk from one desk to another desk as a process activity.

In addition, they switched to become one of the highest percentage of physical (17%) and space (7%) occupants within the office. Also set side by side to other floors, the occupancy rate appeared relatively stable during office hours. This indicated that employees of the Department stayed mostly at the office during the day as the number only decreased during break-time (at 12-13 o'clock) but insignificant.

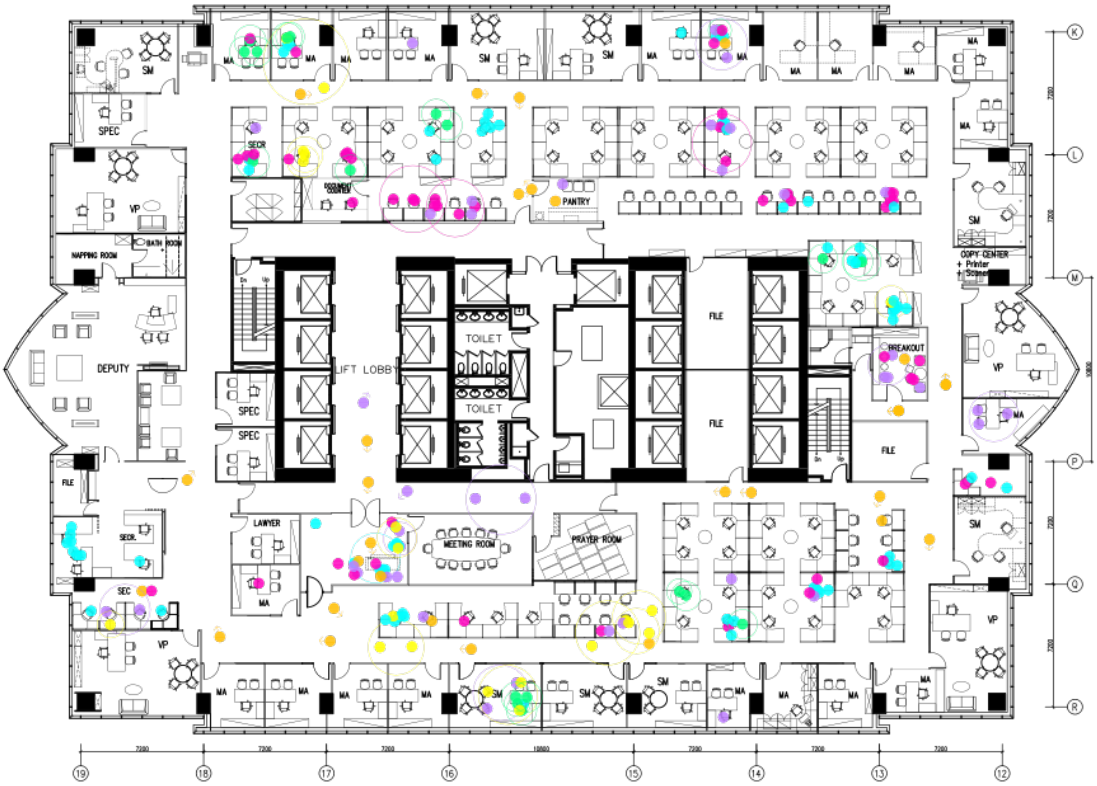


Figure 6.52: Activity Sampling during office-hour of Busines Support and Supply Chain Management Department (29th Floor) in Organisation A

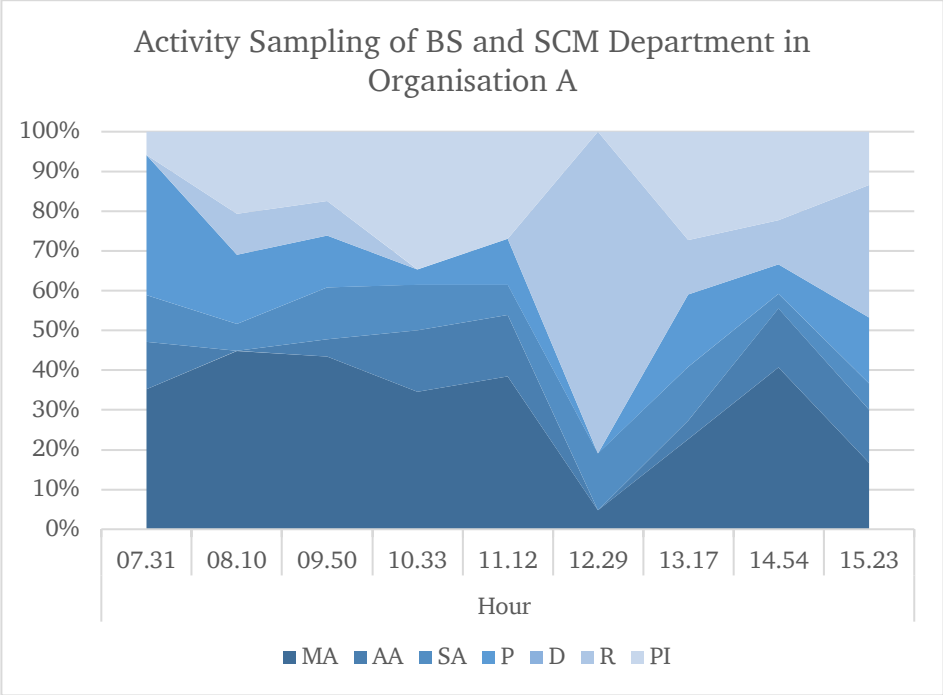


Figure 6.53: Activity Sampling statistic during office-hour of Busines Support and Supply Chain Management Department (29th Floor) in Organisation A

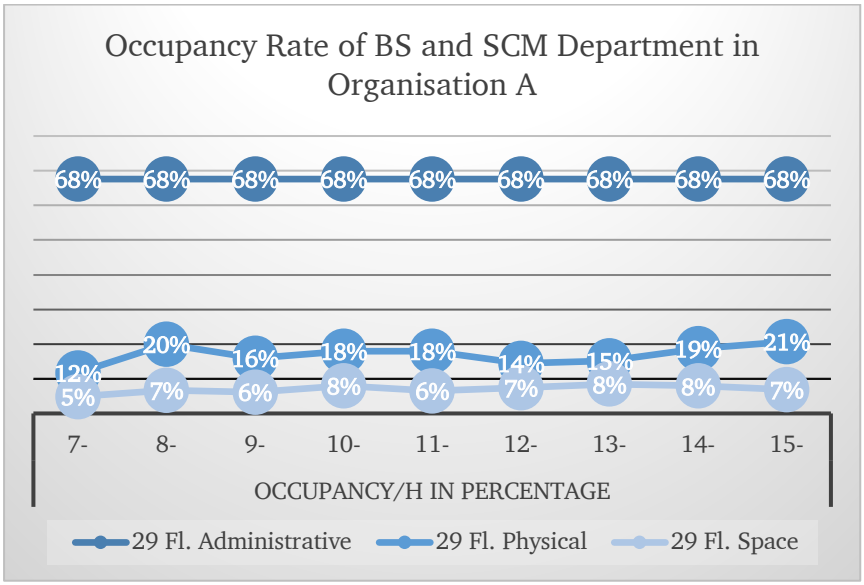


Figure 6.54: Occupancy rate during office-hour of Supply Chain Department (29th Floor)

The Offices of Secretary

Before pandemic, Secretary had outstandingly the highest number of administrative (90%), physical (48%) and space (22%) occupancy rate among the other floors (average 75%, 40%, and 15%). The employees also worked during pandemic dominantly individual, rather than in group.

The condition during pandemic, however, continued. The number of administrative (90%), physical (24%) and space (16%) occupancy remained the highest outstandingly compared to other functions (75%, 16%, and 8% subsequently). On the top of that, the number of employees work individual increased but not significant from 40% to become 42%.

Nonetheless, similar to other functions, the number of spontaneous collaborations among employees rose remarkably from 5% to become 12%. On the other hand, high number of personal interruptions that frequently involved physical interaction between employees occurred before pandemic (23%) had declined noticeably during pandemic (9%) as the employees showed their commitment to limit their contact in person only for important subject as an effort to prevent the spread of the virus during work in office.

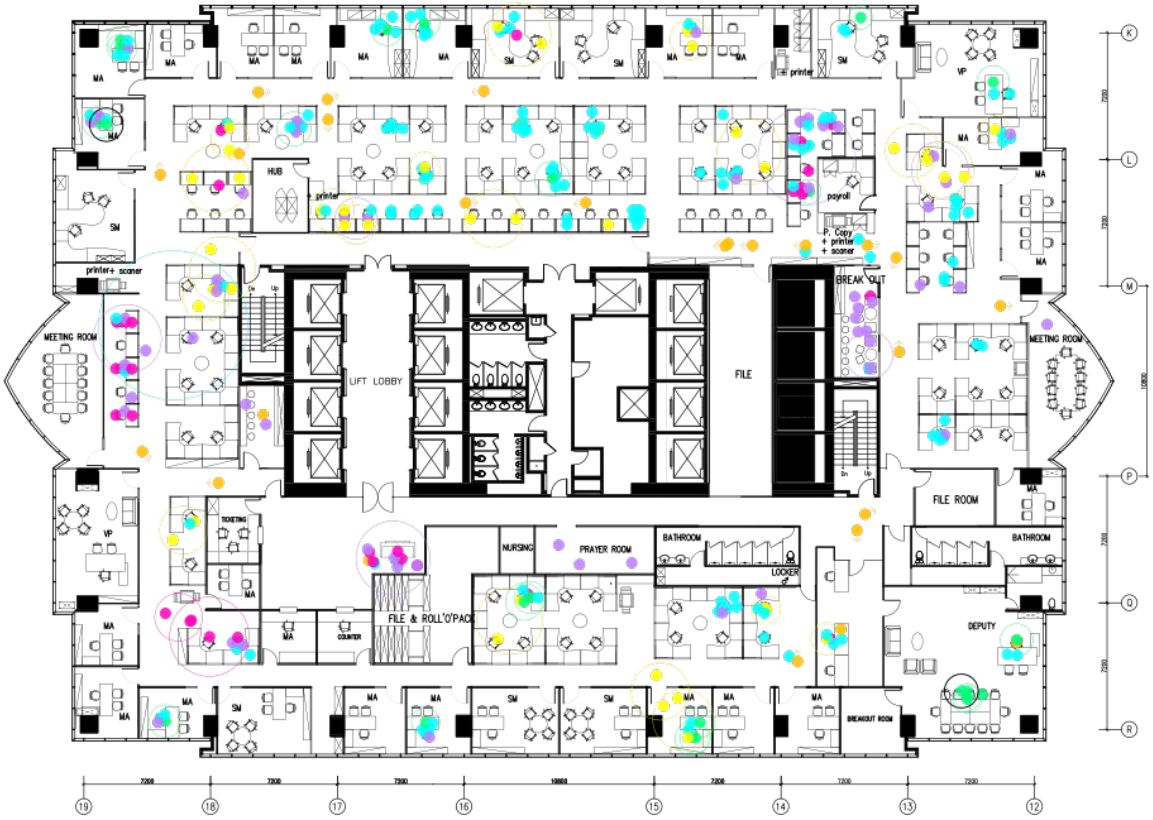


Figure 6.55: Activity Sampling during office-hour of Secretary in Organisation A (30th Floor)

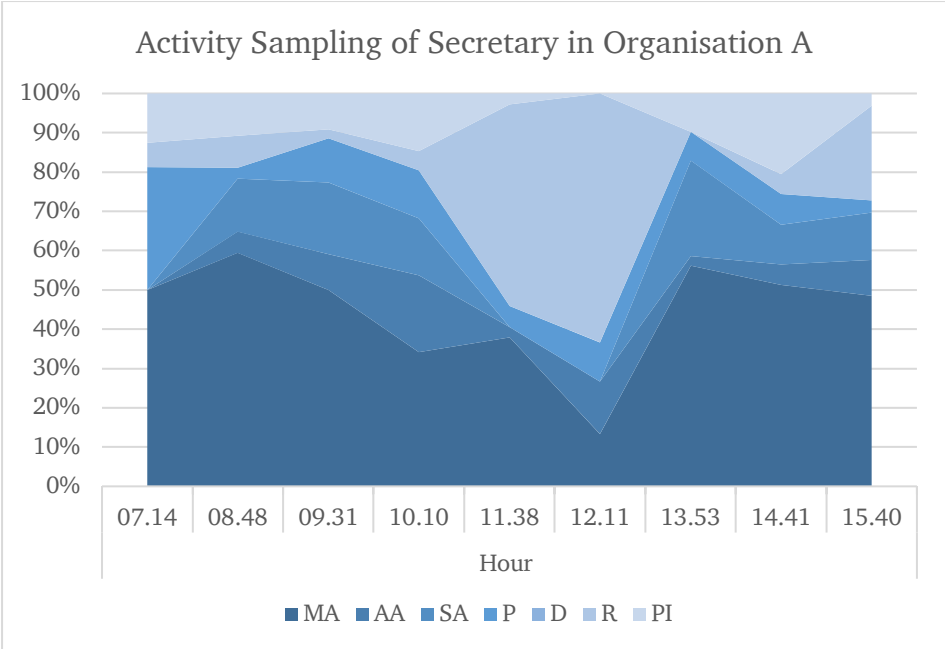


Figure 6.56: Activity Sampling statistic during office-hour of Secretary in Organisation A (30th Floor)

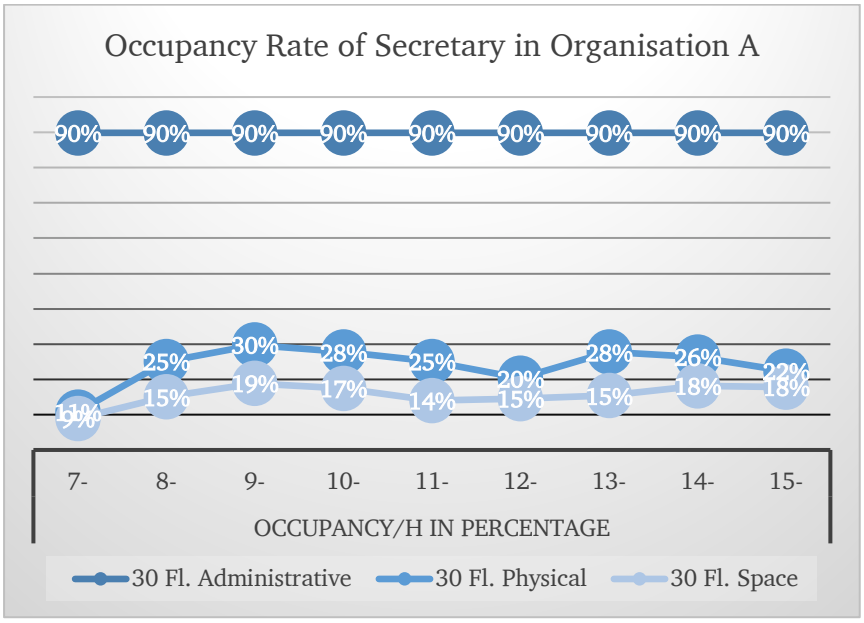


Figure 6.57: Occupancy rate during office-hour of Secretary in Organisation A (30th Floor)

The Offices of Finance Department

Finance Department worked barely at the office before pandemic with only 32% physically occupied during the day in which the lowest occupancy alongside to the Supply Chain Department. There were even 50% of closed offices and 45% open plan offices of the floor completely vacant all day. Except arrival (at 7 o'clock) and break (at 12 o'clock) time, formal meetings were spotted in a relative stable amount during the whole observation day. Finance Department (21%) was even one of top-three after Planning Department (37%) and Operation Department (32%) that had a higher percentage of formal meetings held within the office floor.

In fact, the way of Finance Department work changed; the percentage of formal meetings dropped drastically from 21% before pandemic to 6% during pandemic. Contradictory to before pandemic, they began their tasks individually in the morning at 7 o'clock and continued by having spontaneous discussions at 8 o'clock to finally at 9 o'clock the formal meetings occurred dominantly aside from individual working. Still, the highest percentage of formal meetings at 9 o'clock during the day did not stay the whole day, along with the percentage gradually started to decrease already at 10 o'clock.

Process-related activity, in one hand, appeared higher correlated to the condition before pandemic (9%) as well as in the comparison to the average percentage of other floors during pandemic (11%). The types of process consisted of 30% of waiting activity, e.g. printing, and 70% of movement, e.g. move from one place to another place in the office, where happened almost the whole day except at 7, 9, and 10 o'clock. This explained that the employees in Finance Department stayed at their desks after their arrival as well as when they attended formal meetings. However, the nearly steady percentage of movement during the day did not stand side by side to the percentage of interaction between employees, which means that the movement required during their tasks was not directly connected to the need of being collaborated with their colleagues.

In addition, it is also important to note that the highest percentage of Recovery Activity found within the floor (21%) compared to other floors (16%) was actually not all performed by the employees of Finance Department. Instead, significant numbers of recovery activity appeared was partly spotted from the Janitors Office that shared the same floor to the Finance Department whereabouts at 11-13 o'clock Janitors spent their break time within their office.

Further and in conjunction to their working culture, the occupancy rate during pandemic likewise concluded on the opposite to before pandemic; Finance Department was one the highest rate after Secretary to occupy the office physically (20%) and spatially (9%) in which both were above of the average physical and spatial occupancy (16% and 8% respectively).

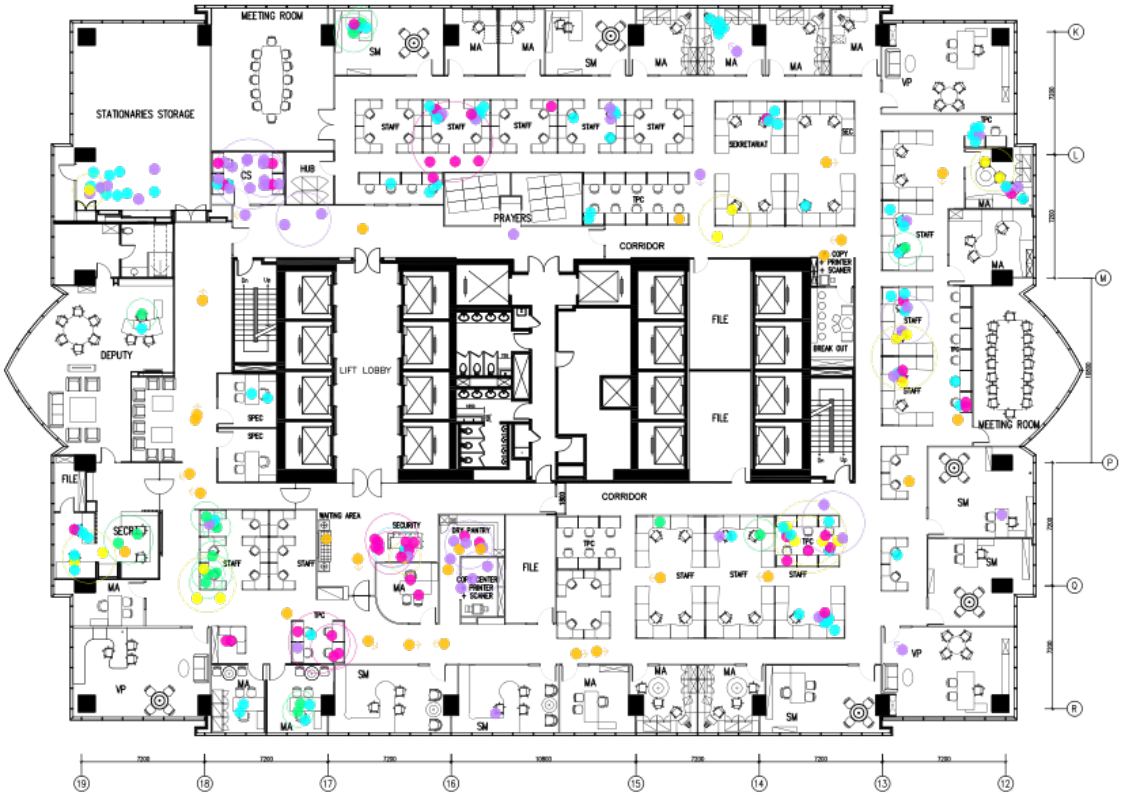


Figure 6.58: Activity Sampling during office-hour of Finance Department in Organisation A (31st Floor)

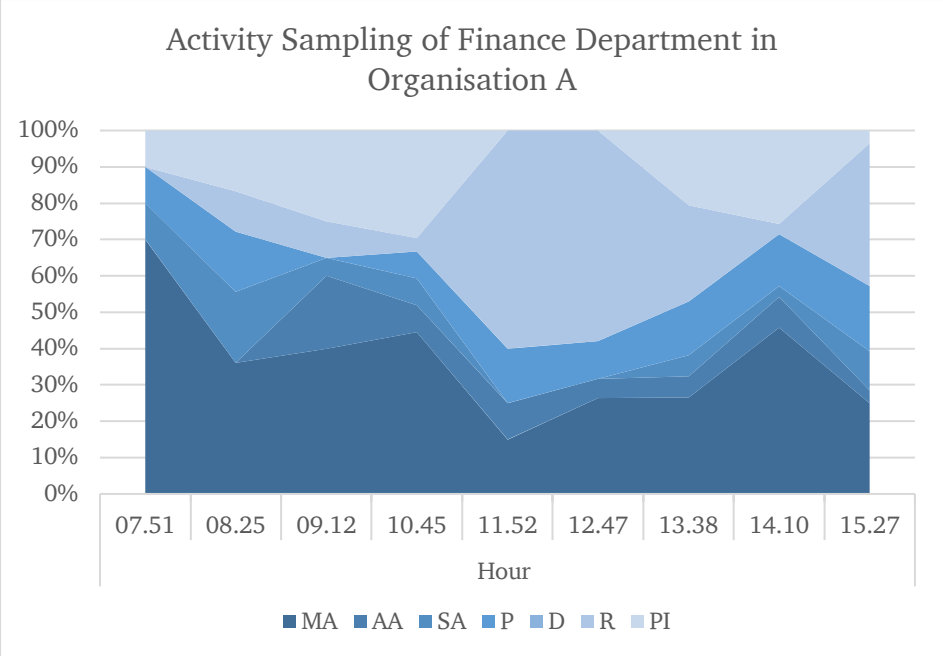


Figure 6.59: Activity Sampling statistic during office-hour of Finance Department in Organisation A (31st Floor)

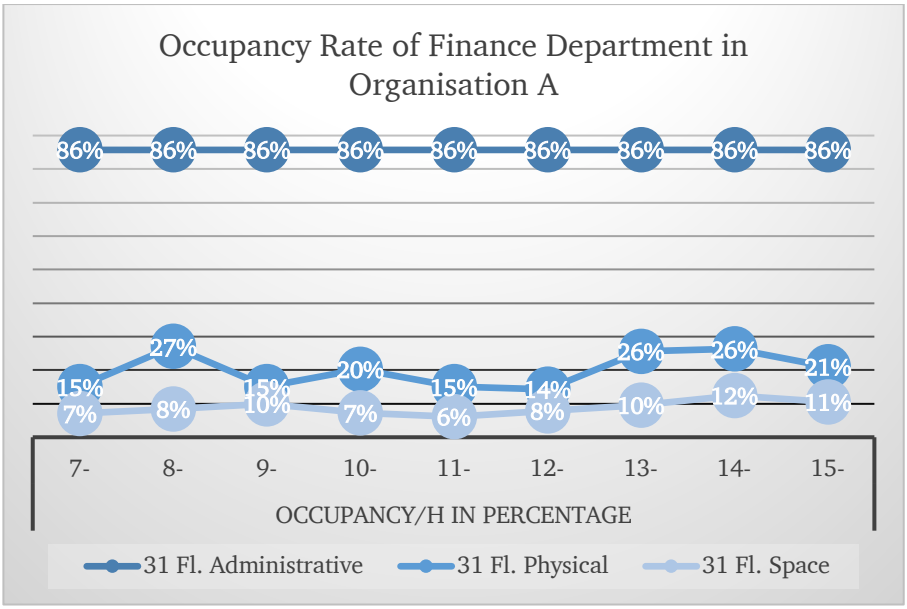


Figure 6.60: Occupancy rate during office-hour of Finance Department in Organisation A (31st Floor)

The Offices of BOD, Vice Chairman, VPMR, and Internal Audit

The 37th floor of Organisation A office was populated by multi-function; (1) BOD or officially known as Supervisory Committee, (2) Vice Chairman, (3) VPMR, and (4) Internal Audit. It was the floor that the population before pandemic worked generally on the opposite to the other floors; the highest percentage of working individual and only insignificant percentage of working in group (48% and 9%) compared to the average performance of Organisation A that the percentage of working individual and in group was nearly indistiguishable (30% and 26%). Further, the occupancy rate of the floor was also identified as one of the lowest percentage in terms of physical (35%) and spatial (14%) even though administratively the offices of the floor were 75% dedicated for the employees in which exactly identical to the average.

During pandemic, 37th floor was only 8% physically occupied in which the lowest percentage of physical occupancy rate of Organisation A and under average compared to other floors (12%). Most physical appearances (70%) were actually identified in Internal Audit Department with predominant work related activities of individual work (29%) and also group work through formal meeting that was held online (19%). The communication between employees during the day was unidentified, resulted the circumstance of the office was relatively silent and focus.

Despite the domination of working individual compared to group working continues within the floor, the highest percentage of activities within the floor was apparently related to personal concern (34%) that occured most frequently in reception and secretariats office areas of BOD, Vice Chairman and VPMR. As mentioned earlier that Organisation A did not allow visitors to enter office area during pandemic and as a matter of fact that the physical appearance was low in 37th floor, resulted the unproductive work of Receptionist. In addition, the office areas of BOD, Vice Chairman and VPMR were also observed completely unoccupied during the day except the office areas of the Secretariats that the activities dominantly irrelevant considering fulfilled mostly with personal activities. However, ontologically, Receptionist served employees and visitors of the floor while secretariats assisted their Superior. Since the observation day noted that visitor nonexisted along with BOD, Vice Chairman, and VPMR that unattendeed during the observation day, it was natural that both Receptionist and Secretariats became idle with work related and accomplished their working times with personal matter instead. The rest types of activities, consequently, were seen insignificant (0%-7%).

Figure 6.61: Activity Sampling during office-hour of BOD, Vice Chairman, VPMR, and Internal Audit in Organisation A (37th Floor)

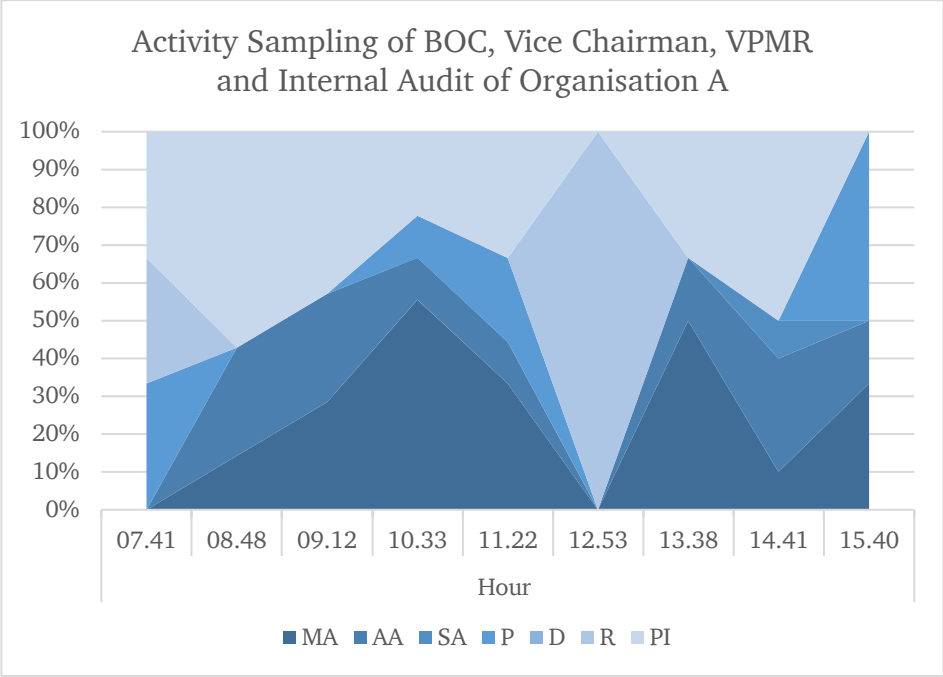


Figure 6.62: Activity Sampling statistic during office-hour of BOD, Vice Chairman, VPMR, and Internal Audit in Organisation A (37th Floor)

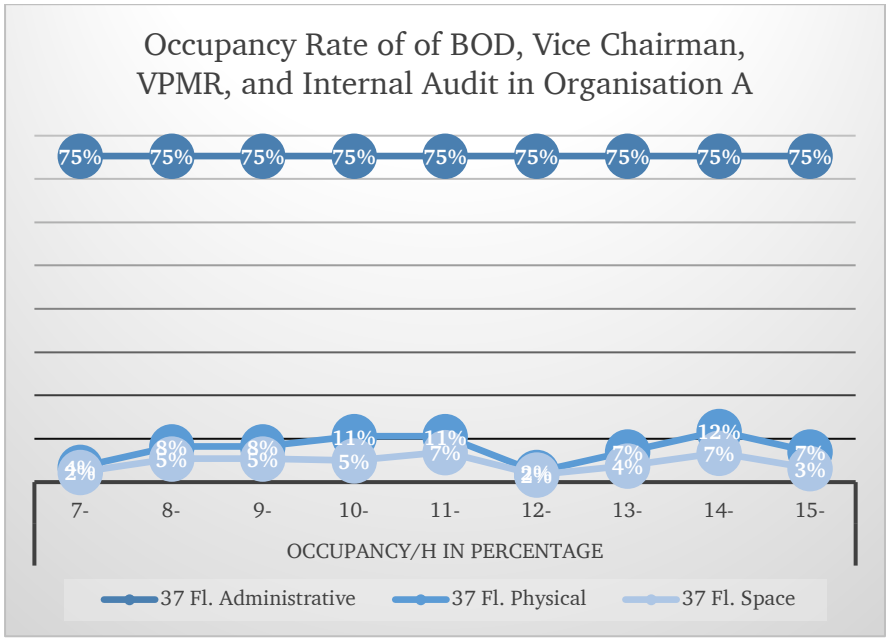


Figure 6.63: Occupancy rate during office-hour of BOD, Vice Chairman, VPMR, and Internal Audit in Organisation A (37th Floor)

The Offices of Chairman, Expert Advisor, Business Support Department and Secretary (Support Function) in Organisation A

Previously before pandemic, 39th floor was the office that the number of physical occupiers increased at the beginning and the end of office times. Together with 37th floor, it was one of the floors that work significantly individual. Spatial occupancy rate of the floor (14%), however, under but almost typically the same to the average (15%) to which proportionately employees occupied mostly at the open plan/ Staff area instead of the cellular office.

During pandemic, 39th floor worked individually compared to other activities (44%), while in contrast formal meeting was hardly noticeable (6%). Instead, collaborative way of work was performed more spontaneously as short-term discussion occurred higher compared to formal meeting (13%). Collerated to it, process activities, i.e. movement of employees from one place to another place within the floor, however appeared as frequent as spontaneous collaboration (13%). Further, non-work related activities were considerably high, particularly personal interruptions that contributed 20% of total activities of 39th floor.

In terms of occupancy rate, 39th floor was clearly underperformed as this was the second lowest after 37th that physical and spatial occupancy rate was dissatisfyngly low-lying (10% and 6% respectively).

Figure 6.64: Activity Sampling during office-hour of Chairman, Expert Advisor, Business Support Department and Secretary (Support Function) in Organisation A (39st Floor)

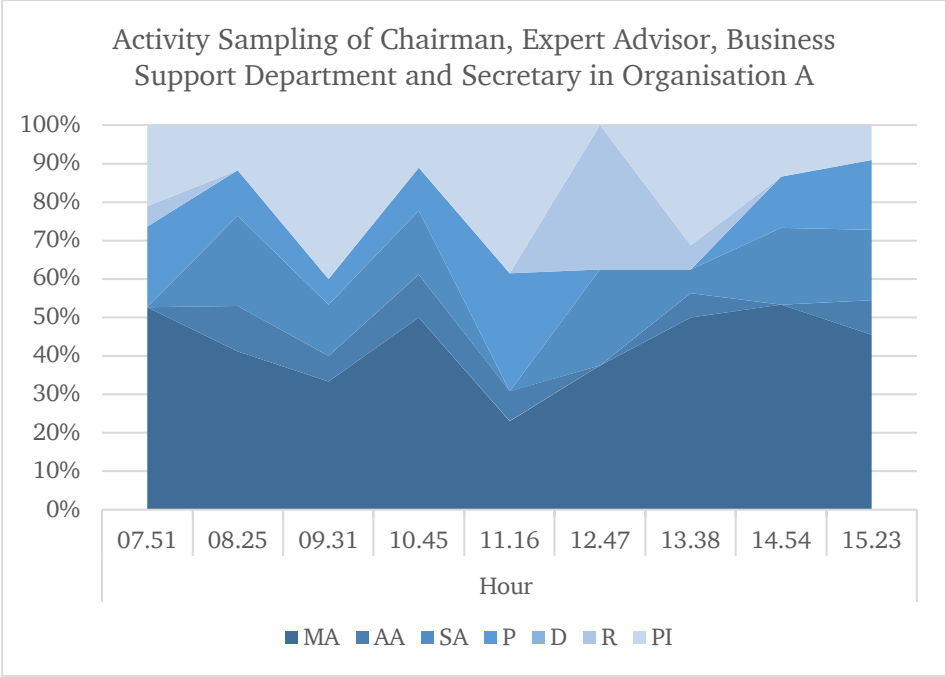


Figure 6.65: Activity Sampling statistic during office-hour of Chairman, Expert Advisor, Business Support Department and Secretary (Support Function) in Organisation A (39st Floor)

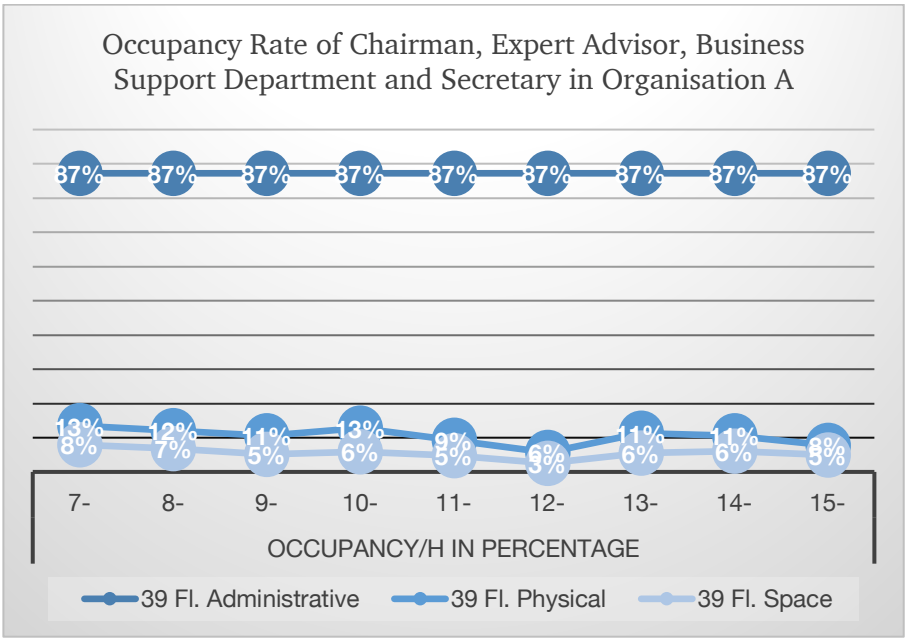


Figure 6.66: Occupancy rate during office-hour of Chairman, Expert Advisor, Business Support Department and Secretary (Support Function) in Organisation A (39st Floor)

Working Culture and Occupancy Rate of Organisation A during Pandemic

After in-depth analysis and discussion regarding work culture and occupancy rate of each Organisation A, this research may conclude that:

- Generally, physical or offline formal meeting was completely disappeared. It was replaced by online meeting in which the necessity of technology to collaborate was finally realised and intensively used within Organisation A.
- Researcher during ethnographic observation also noticed that even online meeting can be done multi tasking with main activity, e.g. work with paperwork.
- Surprisingly, although the percentage of online meeting dropped significantly to become only 8%, individual working was not remarkably increased (38%) compared to before pandemic (30%). Instead, spontaneous or short-term collaboration rose from 5% before pandemic to become 10% during pandemic. As spontaneous or short-term collaboration required employees to move from one space to another place to visit their colleagues desk, process activities were about as frequent as spontaneous or short-term collaboration (11%).

- In terms of productiveness, Organisation A become more unproductive as non-work-related activities inclined but insignificant from 29% before to become 32% during pandemic.
- Regarding occupancy rate, physical occupancy rate dramatically dropped from 40% before pandemic to become only 16% during pandemic. Space occupancy was reasonably also at the same time dropped, but surprisingly not as extreme as physical occupancy since during pandemic work in smaller ratio and share space with colleagues were not advised.

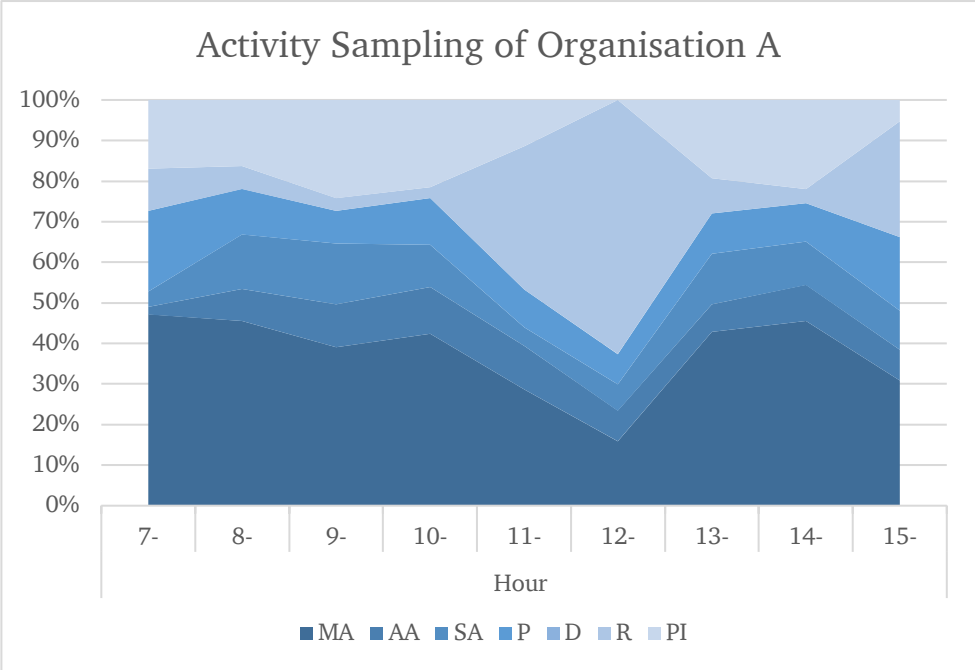


Figure 6.67: Activity Sampling statistic during office-hour of Organisation A

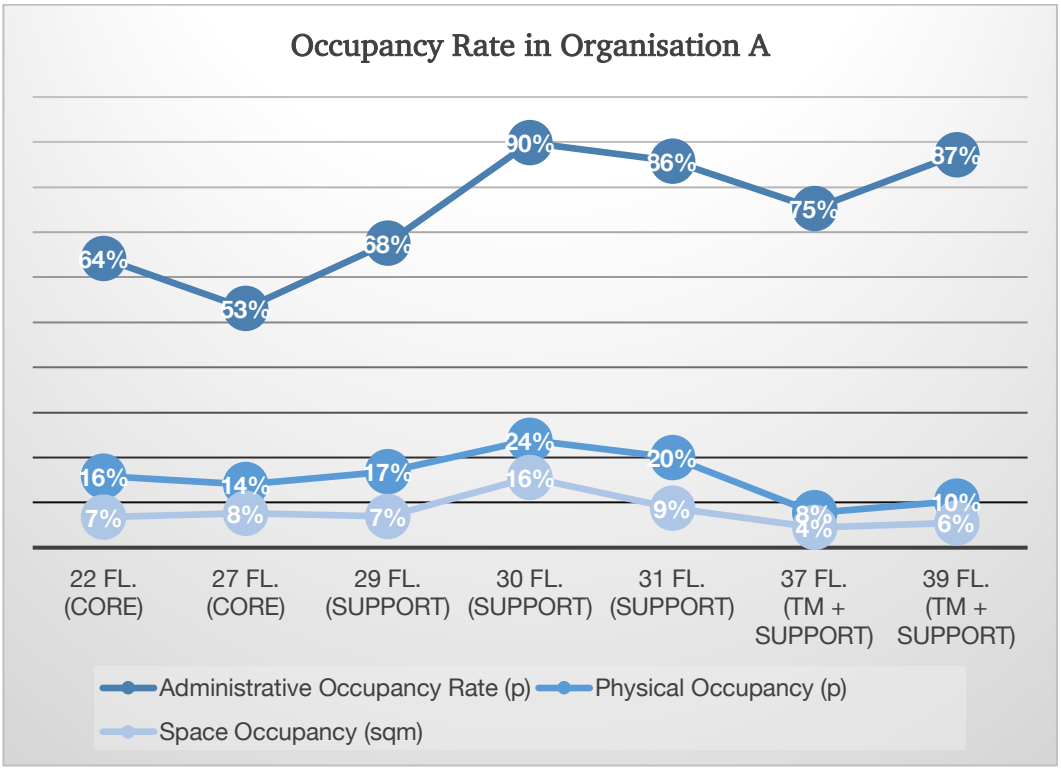


Figure 6.68: Occupancy Rate in Organisation A during pandemic

7 Conclusions and Further Research

7.1 Conclusions

Discussed previously within the methodology chapter, this dissertation had defined individual working as the main activity and group working as the ancillary activity. This was driven by the new office concept that challenges the old office concept by promoting collaborative work as the new office concept offers agile workspaces and other types of facilities that can be used by employees to suit their diverse activities. In reverse and practically common, the old concept obligates dedicated office space for each individual to carry out their tasks instead. However, this dissertation was actually skeptical if the new office concept is generally applicable to Upstream Oil and Gas Sector, or even to every organisation within the sector.

Through work process analysis, this dissertation had successfully captured interesting findings from the case studies about their actual working culture of upstream oil and sector, place to work, occupancy rate and spatial planning - organisation behaviours relationship that will be elaborately describe within this sub chapter and address the answers for the research questions.

Working Culture in Upstream Oil and Gas Sector Republic of Indonesia

Upstream oil and Gas Sector almost balanced their work processes between individual and group working; the percentage of employees who work individually was only 10% higher compared to work in group. The difference remained on the time distribution in which individual work reached its peak at 7 o'clock, whereas group work intensively occurred at 9, 10, and 14 o'clock.

According to work processes of each organisation, work processes in Organisation A – H diverge. Individual and group work in Organisation A was comparable. In contrast, the rest organisations worked significantly individual or significantly in group.

In terms of the Function, Core and Support Functions in Organisation A worked differently; Core Functions preferred to work in group whereas Support Functions worked individually more often. On the other hand, work processes in Core Functions and Support Functions of PSCs showed similarity between one another, e.g. both Core Functions and Support Functions in Organisation B worked more extensively individual.

Place to Work

Activity Samplings of REFA Observation contributed to answer this research question by identifying the location and measuring the size of the workspaces or facilities used by the employees to carry out their tasks. According to the observation on the offices of Upstream Oil and Gas Sector in Indonesia completed within this dissertation, space occupancy rates of the sector were relatively low, which were averagely 20% from the total office size of each Organisation. This appeared as the results of:

- The activities of the employees more actively occurred within the open plan areas, compared to cellular offices. This also recorded that Staff stayed within their workspaces more comprehensively. Managerial levels, on the contrary, rarely seen working within their offices.
- The necessity of work in group of UOG Sector that had consequences a denser utilisation of communal spaces or meeting rooms with a lower ratio compared to dedicated workspaces used individually.

Office Occupancy Rate

Administrative occupancy rates in UOG Sector were between 53% - 86%. Although, case studies of large dan medium size offices had shown a higher occupancy rates (75%-86%) compared to small size offices (53% - 68%). This was potentially caused by:

- Small size offices were occupied by start-up and growing organisations. Its status of these organisations had become the organisations' justification to provide spare rooms as anticipation if the organisations hire new employees massively in the future.
- Often, landlords of commercial office buildings set a minimum office size per zone within shared-floor that can be rented by the Tenant. For example, if prospective tenant actually requires only 500 m^2 of office size but landlord determine 800 m^2 as minimum office size per tenant, then prospective tenant must agree to rent the office space based on the size offered by landlord.

Physical occupancy rates of large size offices, contrarily, were lower (36% - 40%) compared to medium and small offices (47% - 59%). A lower physical appearance indicated that a higher percentage of work outside offices within large size offices (35% - 47%) compared to the rest size of offices. Moreover, small offices proved that the gap between administrative and physical occupancy rates was narrow; 2% - 12% which means that smaller organisations stayed mostly at their offices.

On the other hand, similar circumstance was more expressly be found in space occupancy rates as these were only 15% - 24% of the office spaces were used during the office hour. These conditions was effected by:

- High necessity of group working that required generally smaller ratio compared to individual working.
- Managerial levels worked more often outside their offices due to business trip or meeting events. Ethnographic observation also found out that occasionally Managerial levels worked with their Staff within open plan areas. These findings then confirmed that a higher ratio of cellular offices were utilised even ineffectively.
- Highly cumulated meeting activities within particular office times inflicts FM to invest extra meeting rooms to accommodate meeting activities during peak-hour, but unproductive during slack period.

Office Spatial Planning and Organisational Behaviours Relationship

Conforming to the ethnographic observations within the case studies oh this dissertation, there were incompatibility between spatial planning and employees' behaviours that appeared within the offices. For example, Organisation C applied a more segregated office concept in which cellular offices were dedicated to employees started from Staff to Managerial levels. Nonetheless, observations recorded that Organisation C worked individually even more rarely (31%) compared to the average percentage of other case studies (35%).

Under different circumstances, Organisation B, D, and F that applied a more open office concept, worked more frequently individual (41%, 45%, and 45%) than average. Besides, Organisation D had implemented partly Activity-Based Working (ABW) concept that this concept appears to promote a more collaborative ways of working.

Incompatibility between spatial planning and employees' behaviours had proved that spatial planning need to be chosen accurately based on the actual working culture of each organisation, and so that the office spatial planning will successfully fulfil the working requirement correctly.

7.2 Contributions and Impacts

Experts and Elites in FM stated that oil and gas sector had a higher standard of ratio compared to other sectors. Based on the data compilation of 36 offices in oil and gas sector discussed in Chapter Case Studies has shown that UOG Sector in average had a higher standard compared to the office ratio standard (10 m^2 per person) determined in Presidential Regulation regarding “Construction of State Buildings.

Nevertheless, the wide gap of offices standards in OUG Sector was apparently injustice for organisations within the smallest offices range under 10 m^2 per person (28%) that may suffer from inconvenience and safety issues while their fellow UOG organisations within the medium and the biggest offices ranges entitled to a decent (10 m^2 - 12.6 m^2 per person) (22%) or by far higher standards (12.7 m^2 - 22.10 m^2 per person) (50%) workplace.

At the same time, REFA observation had complemented the argument that the space occupancy rates within the large size office category in UOG Sector were at the lowest (15%) compared to the average (20%). Furthermore, office designs and organisational behaviours were partly (50%) disconnected.

Accordingly, the study offers UOG Sector to review their office requirement through work process analysis and so that office design may support the activities of the sector accurately with evidence to aim a higher productivity and reduce cost by optimising the occupancy rates of the offices, particularly through space occupancy. Using the tools set within this dissertation, the findings of the investigation before and during pandemic have helped the organisation of the case study to achieve the objective of the study.

COVID-19 Impact

By no choice, COVID-19 pandemic changed the way people work. At the beginning of the pandemic, offices were closed and developing regulations issued by local government. Alongside, employees were demanded to fastly adapt to the new worklife during pandemic to prevent the spread of the virus.

This dissertation was given the opportunity to find out the life during pandemic in UOG Sector through Organisation A and interestingly compared it to their worklife before. Before pandemic, this sector implemented proportionately conservative way of work: each employee was facilitated with dedicated office and worked full time at the office. Physical appearance was also obligated during collaboration process, e.g. formal meeting or group discussion. In spite of relatively sophisticated technology, IT infrastructure was also designed to support the way of the organisations worked in

traditional way, e.g. Organisation A provided immobile PC at each office and only by request that the employees can be equipped with mobile laptop.

Although, before pandemic this sector started to consider Activity-Based-Working office design that allows employees to become more agile compared to conventional office, the impact of this study has helped the sector to discover their needs and decide their office strategy whether their organisational culture suits the ABW or conventional office design. However, the emergence of the novel virus has added another model of office strategy to consider. The discussion is nowadays not only taking account of office design model, but also office operation, i.e. work in office, from home or hybrid.

The investigation done by this study during pandemic has recognised that Organisation A implemented batch system to group their employees for the office operation. The objective was to avoid the exceeded number of employees who come to the office at once of a time in which the appearance of the employees in the office during pandemic was defined by the batch system. They came to the office was more because they have the obligation to attend rather than the ability of work flexibly based on the activity required to carry out their tasks. The activity occurred within the office, instead, was rules based. Collaborative working was found rarely since only minimum physical interaction allowed between employees. Alternately, the need of collaboration of Organisation A was fulfilled by the use of online meeting room facility that was actually already provided before pandemic by the IT but barely utilised by the employees.

Undoubtedly, COVID-19 impact has flipped the demand and supply between physical and digital office room. The usage of technology to integrate employees and stakeholders of the sector has undeniably risen since observations of this research noted that meeting activities were all done online. It may also give the opportunity for employees to be multi-tasking: work with their own paperwork and attend the meeting at the same time which productively save time and cost.

On the other hand, occupancy rate analysis that has been conducted by this dissertation has recognised that Organisation A never exceeded the physical appearance of the employees more than 40% and 16% of the office capacity before and during pandemic respectively. This means the utility of physical office was obviously under usage both before and during pandemic. In this case, this dissertation argues that the implementation of batch system for office operation during pandemic in Organisation A was questionably well aimed since naturally the working culture of Organisation A before pandemic required people to collaborate. In contrast, asking employees to attend the office but restrict their interaction during office times may also potentially limit their natural being to be able to ideally finish their tasks. Although the help of technology is presented to integrate people, this dissertation has noted that the increase

percentage of spontaneous discussion between employees appeared during observations indicates that the existence of physical office is still crucially demanded.

7.3 Further Application

Flatten the Curve

Investigations of this study found that UOG Sector has a premier office facility standards: (1) surplus of seat capacities are between 14% - 47% compared to the actual administrative occupancy rate, (2) higher office ratio compared to the standard office ratio regulated within the Presidential Regulation, (3) in-house various types of office facility aside from a decent dedicated office desks, e.g. public floor for meeting rooms, hall, breakout room, fitness centre, library, etc.

The intentions in providing these standards were: (1) to be ready if the organisations significantly hire new employees, (2) as the symbol of establishment of the sector that contributes a significant revenue to the state, and (3) to reduce business trip costs or meeting mobility outside of the offices.

However, the fact occurred within the offices were: (1) business trip costs and meeting mobility outside the offices were barely potential to be avoided, so that the gap between administrative occupancy rate and physical occupancy rate was apparently wide, (2) busy work schedule was not evenly distributed during office times, e.g. gap between “peak hour” and “slack period” was extensive in Planning Department of Organisation A (81% vs 26%). When users complain about insufficient number of room or seat capacities of the offices and FM accommodates employees’ request without sufficient studies, the conditions that will be occured are: (1) additional capital expenditure on extra space and (2) extra rooms or facilities will only optimal on peak hour and dull during slack period.

For that reason, this study recommend the sector to distribute the time for working evenly to avoid broad gap between peak hour that may discomfort employees for having insufficient rooms or facilities and slack period that may impact false capital investment in providing excessive amount of space and potentially lead to cost wasting in office facility rental and operational.

Down-Sizing Cellular Office

REFA observation shown that activities within cellular office of Managerial levels are low compared to activities within open plan area of Staff and Outsource Staff. This is

because of: (1) Managerial levels are often on business trip or a meeting outside of the offices, or (2) frequently Managerial levels work with their Staff in open plan area when they are at the offices.

As the space occupancy rates were also proven low, particularly in cellular offices, this study suggests the sector to review the size of cellular offices to become ideally more efficient. Yet and still, special aspects are prompted to be prioritised, e.g. neatness, security, desk/ office position, technology, and ergonomic, as these aspects were chosen by the employees within the sector to be importantly fulfilled within their offices.

Best Practice with Evidence-Based Design

New working trends that are collaborative and high technology attract organisations to change their office concepts from conventional dedicated workspaces to become agile Activity-Based Working (ABW). FM Experts argue that the concept of ABW is not always functional to their clients if organisations work individually and highly privacy since ABW promotes openness, sharing, collaborative with the risk of highly noise that may occur within the offices. Based on the observation in UOG Sector done within this research, there were 4 (four) of 8 (eight) of the case studies that the office designs and organisational behaviours were mismatched.

Aside from that, unique working process of each organisation has become the evidence that each organisation act differently and it is insufficient justification if upstream oil and gas sector implement office facility management standard without considering actual working process of each organisation. This research convince the sector to continue implementing the methods constructed within this research to evaluate their office performance through work process analysis by collecting relevant data, structural behavioural observation and accurate data interpretation.

Changes Ready

Go over to initial global office history, the trends of office were easily changing as the impact of economic situation and technology robust development. FM is demanded to become anticipative to the possibility of change in the future. This may become at the same time dilemmatic for FM to: (1) provide generic function of office facility to ease the work of FM when changes happen, while (2) organisation acts uniquely and cannot be generalised one to another.

In connection to that matter, this study encourages FM within the UOG Sector to involve highly competence team with strong knowledge management. So that, whenever the

changes occur, FM team is able to decide the strategy that needs to be taken and capable to access all the integrated data within digital platform.

Additionally, change management skill is crucial for FM to master to be able to implement the changes flawlessly and avoid conflict that potentially happen if the impacted parties are not well informed and involved during the changing process.

7.4 Limitations and Future Research

This dissertation finalised during the Ukraine war in 2022. Geopolitical situations will dramatically change the condition of subject, particularly in the relation to the global oil and gas crisis that causes supply and demand adjusted significantly and currently results the rise of the world oil prices.

Inversely, this study was originally proposed to solve the Facility Management problem of upstream oil and gas sector in Indonesia in adapting to the global drop oil prices and later to examine the worklife during COVID-19 pandemic. Correspondingly, this dissertation suggests to extend the result of this study in the context to the geopolitical issues and worklife after pandemic by:

- Observing the future changes: transfer the result of this study to the Republic of Indonesia to adopt the methodologies established by this dissertation since the study of office spatial planning is potentially demanded by the country as the RI is currently moving out the Central Government in the Capital City of Jakarta to the newly named Capital City, Nusantara, in Borneo Island that currently in the early stage of basic infrastructure and projectedly will finish completely in 2045.
- Promoting digital transformation to the future work: continue and develop the usage of the digital platform that during pandemic had dramatically risen to help people to stay connected whether their work from the office or their home. Furthermore, if the organisations of the sector decide to implement hybrid model work in combination between work from home and work in office, then thorough collaboration between Facility Management and IT of the organisations to integrate virtual and physical office is acceleratedly demanded.

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2010	Matthias Bergmann	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Jürgen Schwarz	Ergonomiegestützte Multiagenten-Simulation von Montageprozessen im Baubetrieb
2010	Ingo Giesa	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Rainer Wanninger	Prozessmodell für die frühen Bauprojektphasen
2009	Nils Hinrichs	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Hans-Joachim Linke	Strategien der öffentlichen Hand – Ein kompetenzorientierter Ansatz aus Sicht des Immobiliencontrollings
2009	Carola Maffini	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Konfliktbehandlung in Bauprojektorganisationen
2009	Markus Demmler	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Detlef Heck	Risikomanagement im internationalen Tunnelbau unter Anwendung der Vertragsform FIDIC Red Book
2008	Christoph Pflug	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. habil. Harald Schlemmer	Ein Bildinformationssystem zur Unterstützung der Bauprozesssteuerung
2008	Jens Elsebach	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Bauwerksinformationsmodelle mit vollsphärischen Fotografien – Ein Konzept zur visuellen Langzeitarchivierung von Bauwerksinformationen
2007	Falk Huppenbauer	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Nachunternehmermanagement: Die Entwicklung eines prozessorientierten

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			Entscheidungsmodells für die Beschaffung und das Controlling
2007	Ali Akbar Elahwiesy	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Multiprojektmanagement für Infrastruktur-Bauprojekte
2007	Torsten Fetzner	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Ein Verfahren zur Erfassung von Minderleistungen aufgrund witterungsbedingter Bauablaufstörungen
2007	Christopher Cichos	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Untersuchungen zum zeitlichen Aufwand der Baustellenleitung
2007	Jörg Klingenberger	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Detlef Heck	Ein Beitrag zur systematischen Instandhaltung von Gebäuden
2006	Julia Schultheis	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Public Private Partnership bei Stadthallen – Rahmenbedingungen und Gestaltungsmöglichkeiten in Deutschland
2006	Helmuth Duve	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Entscheidungshilfe zur Auswahl eines geeigneten Streitregulierungsverfahrens für das Bauwesen unter besonderer Berücksichtigung baubetrieblicher Aspekte
2006	Markus Stürmer	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Beitrag zum Qualitätsmanagement im vorbeugenden baulichen Brandschutz – Untersuchung von ausgewählten Brandschutzmängeln der Ausführungsphase
2005	Ingo Goldenberg	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Optimierung von Supply Chain Prozessen in der Bauwirtschaft durch mobile Technologien und Applikationen
2005	Jörg Huth	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Baubetriebliche Analyse von selbstverdichtendem Beton
2005	Joachim Ruß	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Ausführungsdauern und Kapazitätsplanung von Bauleistungen im Organisierten Selbstbau
2004	Karl Bangert	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Christoph Motzko	Untersuchungen zum Einsatz von mit Seilen geführten Lastballon-Kransystemen (LTA Kran-Systeme) im Bauwesen

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2004	Shervin Haghsheno	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Analyse der Chancen und Risiken des GMP-Vertrags bei der Abwicklung von Bauprojekten
2004	Carsten Toppel	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Carl-Alexander Graubner	Technische und ökonomische Bewertungen verschiedener Abbruchverfahren im Industriebau
2002	Alexander Glock	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Christoph Motzko	Technisch-wirtschaftliche Untersuchung luftschiffbasierter Schwerlastlogistik im Bauwesen
2002	Patrick Büttner	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Christoph Motzko	Abbruch von Stahlbeton und Mauerwerksbauten – Entwicklung einer Entscheidungshilfe zur Auswahl von Hydraulikbaggern
2002	Marc Heim	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Die zeitnahe Leistungsfeststellung von Baustellen unter besonderer Berücksichtigung von Bildinformationssystemen
2002	Torsten Ebner	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Bauen im Bestand bei Bürogebäuden
2001	Markus Werner	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Einsatzdisposition von Baustellenführungskräften in Bauunternehmen
2001	Theresa Pokker	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Christoph Motzko	Kalkulation von Erdarbeiten in kontaminierten Bereichen
2001	Frank Müller	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Marktstrategische Fremdvergabe unter Berücksichtigung entscheidungsrelevanter Einflusskriterien
2001	Alexander Bubenik	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Die Fassade und ihr Einfluss auf die schlüsselfertige Bauausführung
2000	Dirk Mayer	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert	Entscheidungshilfe für die Beurteilung von Fußbodensystemen im Hochbau
2000	Bernhard Griebel	Prof. Dr.-Ing. Christoph Motzko Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Gerhard Girmscheid	Der zeitnahe Soll-Ist-Vergleich aus Sicht der Baustelle

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1999	Heinrich Wengerter	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Christoph Motzko	Rationalisierungsmöglichkeiten im Mauerwerksbau durch eine robotergestützte Wandvorfertigungsanlage
1999	Katja Silbe	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Christoph Motzko	Wirtschaftlichkeit kontrollierter Rückbauarbeiten
1997	Peter Racky	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Christoph Motzko	Entwicklung einer Entscheidungshilfe zur Festlegung der Vergabeform
1997	Achim Hitzel	Prof. Dr.-Ing. Eberhard Schubert Prof. Dr.-Ing. Christoph Motzko	Ein Entscheidungsunterstützungssystem für das Instandhaltungsmanagement der Bundesfernstraßenbrücken
1996	Carsten Dorn	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. jur. Klaus Vygen	Systematisierte Aufbereitung von Dokumentationstechniken zur Steuerung von Bauabläufen und zum Nachweis von Bauablaufstörungen
1995	Friedo Mosler	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Dr. –Ing. e.h. Gert König	Wirtschaftliche Instandhaltung von Betonaußenbauteilen
1995	Hermann Kraft	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Dr. –Ing. e.h. Gert König	Steuerung und Entwicklung von Brückenerhaltungsmaßnahmen
1995	Egbert Keßler	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Thomas Bock	Rationalisierung im Schalungsbau durch Einsatz von Robotern
1994	Boming Zhao	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Volker Kuhne	Ein Verfahren zur Entwicklung eines wissensbasierten Planungssystems für die Terminplanung von Rohbauprojekten im Hochbau
1994	Stefan Plaum	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Hans-Peter Lühr	Umweltrelevante organisatorische Anforderungen an Betriebe der Bauwirtschaft – Lösungsmöglichkeiten, aufgezeigt am Beispiel der Baurestmassenbehandlung
1993	Hellwig Kamm	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Reinhard Seeling	Materialwirtschaftliche Steuerung im Baubetrieb, Analyse und Verbesserung baubetrieblicher Beschaffungsvorgänge

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1991	Henning Hager	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Claus Jürgen Diederichs	Untersuchung von Einflussgrößen und Kostenänderungen bei Beschleunigungsmaßnahmen von Bauvorhaben
1990	Dirk Reister	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. rer. pol. Karl Robl	Entwicklung eines Verfahrens zur projektübergreifenden Personaleinsatzoptimierung
1989	Lothar Ruf	Prof. Dr. –Ing. Eberhard Schubert Prof. Dipl. –Ing. Hansjakon Führer	Integrierte Kostenplanung von Hochbauten
1989	Christoph Motzko	Prof. Dr. –Ing. Eberhard Schubert Prof. Dipl. –Ing. Klaus Simons	Ein Verfahren zur ganzheitlichen Erfassung und rechnergestützten Einsatzplanung moderner Schalungssysteme
1989	Lothar Forkert	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Dr. –Ing. e.h. Gert König	Verfahren zur Prognose von Schadensentwicklungen bei einer kostenoptimierten Brückeninstandhaltung
1989	Gerd Bergweiler	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Eberhard Petzschmann	Strukturmodell zur Darstellung und Regeneration von Kalkulationsdaten
1988	Karl Rose	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Dr. –Ing. e.h. Gert König	Kosten der Erhaltung von Brückenbauwerken
1987	Andreas Lang	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Hans-Gustav Olshausen	Ein Verfahren zur Bewertung von Bauablaufstörungen und Projektsteuerung
1986	Lothar Krampert	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Dr. –Ing. e.h. Gert König	Der Einfluss von Arbeitseinsatz und Arbeitstakt auf die Kosten von Hochbauten in Ortbeton

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1985	Herrmann Keßler	Prof. Dr. –Ing. Eberhard Schubert Prof. Dr. –Ing. Wolfram Keil	Der Plan Soll-Ist-Vergleich mit einem Nachweis zeitvariabler Kostenänderung bei einer Bauzeitverschiebung