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EXECUTIVE SUMMARY

As the world is approaching a new age for all industries including the aviation sector, more companies are shifting away from the traditional Human Resources (HR) or Human Capital (HC) model. People nowadays are **critical**, especially millennials, towards the jobs offered as they do not want to be treated as a resource or as capital. This means that workers crave for more than just the business side, but also on the development and ethics of their employers. This is why companies are shifting to strategies which prioritize the employee's progress besides the economic values. The right approach will ensure optimum productivity at a low cost by placing the right people at the right time doing the right jobs.

Workforce in an airport environment is far more **complex** than other industries as there are various elements, services, requirements and compliances to be met simultaneously at all times. Additional manpower is also required during peak seasons to ensure smooth airport operations and seamless passengers' experience at the airport. Considering the recent unprecedented COVID-19 pandemic which adversely impacted aviation and the airport operations, investing in the **right workforce strategies** allow them to swiftly adapt to the ever-changing environment of a dynamic airport while ensuring their **extrinsic** and **intrinsic** needs are being carefully considered. Long gone were the days when employers treat workforce as assets only, which has proven to not be viable in any organization. Hybrid workplace that has become a preferred culture and hybrid workforce by blending in both people and technologies, has been embedded in many airports around the world. Mental health is also a crucial part in airport workforce as many were and are still affected from COVID-19 outbreak which has caused the industry to a near halt.

This paper explores the current **challenges** by airport workforce along with case studies from various airports around the world. Although different airports have different structures in management and layout, the flow and nature of operations are similar to one another hence, the recommendations proposed are applicable across all airports in shaping the **future** of airport workforce. The recommendations are categorized into external and internal needs in shaping the best future airport workforce who are **resilient** in facing challenges.



GENERAL OVERVIEW

One needs to grasp the true meaning of workforce or more commonly known as employees or manpower, to dive into the possibilities of future workforce framework at airports. Merriam-Webster dictionary **defines** workforce as "the workers engaged in a specific activity or enterprise" while Cambridge dictionary defines it as "the group of people who work in a company, industry, country, etc". Meanwhile, Collins Dictionary identifies workforce as "The total number of people in a country or region who are physically able to do a job and are available for work".

AIRPORT WORKFORCE

An airport, whether operated by a government agency or a private firm, is heavily dependent on revenues generated by both aeronautical (such as parking fee) and non-aeronautical charges (such as store rental) to sustain and pay for the daily operations and investments, including the workforce. Since an airport is a complex system which provides seamless interconnecting public service while upholding safety and regulatory requirements, tremendous involvement from different sectors and skills can be seen to fully operate a functional airport. The list below, not limited to, shows some of the current workforce at a typical airport.



The above shows some of the jobs that make up a workforce within an airport.

All these personnel must work hand in hand in a harmonized ecosystem in order to ensure a comprehensive seamless journey and experience not only by the passengers, but also by the airport community. Understanding the airport community makes it easier to identify and manage both its operations and cost.



Picture illustrates some of the airport workforce at an airport.

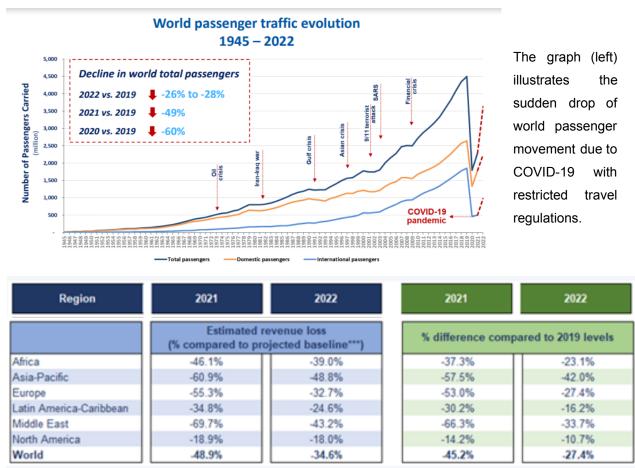
CASE STUDIES AND CHALLENGES FOR AIRPORT WORKFORCE

Airport workforce faces extremely high risk and high pressure by coming to work on a daily basis. Although the risk probability associated with airports is generally low, the severity of each occurrence however is very high with past events associated with airports have immensely affected the airport security, its workforce and its financial wellbeing. This section investigates the challenges that airport workforce face along with case studies in order to recognize possible improvements.

i. Unprecedented COVID-19 Global Outbreak

A report by International Civil Aviation Organization (ICAO) shows world passenger traffic had reduced by - 60% in the first year of COVID-19 outbreak, which put the traffic similar to approximately 20 years ago (shown in the graph). A sharp increase in the passenger traffic for the last decade translates to an increase of airport passengers and airport facilities. Unfortunately, the sudden steep decline of passengers due to restricted travel regulations have caused major retrenchment in the airport community in what can be seen as one of the worst events of aviation history. World airport revenues have been struggling to recover but to nowhere near the pre-COVID or baseline projection for 2021 and 2022. Revenue loss for 2021 and 2022 as compared to 2019 was at a shocking - 45% and - 27%, respectively. Airport community was hit the hardest because one of the measures taken to reduce loss was to cut down on the airport operations and manpower. An analysis by Oxford Economics, in conjunction with aviation trade bodies, shows that 2.3 million jobs have been lost across airlines, airports and civil aerospace groups since the pandemic. These 2.3

million aviation jobs have not been fully filled up since the market is **not as lucrative as before** with companies being very careful with their financial spending. As quoted from aerospace headhunter Emma Robinson on rehiring that "The biggest issue facing the aviation industry at the moment is **lack** of **staff**: they've lost the workforce during COVID, and they have **not** returned.".



The table above shows the revenue loss suffered by the aviation industry for 2021 and 2022 as compared to 2019 (pre-COVID), with - 45.2% and - 27.4% respectively.

ii. Security, Threats and Terrorism

One of many threats airport workforce faces is **terrorism**. From September 11 in 2001 to attempted London-liquid bomb plot in 2005 to Istanbul Ataturk Airport (ISL) attack in 2016, all these have resulted in increased of security checkpoints, **establishment of crisis control team and enhanced security technology** in ensuring a safe airport environment. These aviation security personnel with mandatory training requirements are regulated even during COVID-19 period as safety should not be compromised at all times. The attempted liquid-bomb attack which was thwarted by security personnel resulted in the restricted liquid

passengers can carry onboard. Therefore, security personnel requirements are must be made a priority regardless of the airport or airline's financial status.





The aftermath of ISL attack (left) and drink bottles with liquid explosives (right).

Besides terrorism, another biggest threat at an airport is cyber-attack. Since an airport is the main entry checkpoint for a country, it attracts criminal activities such as entry of illegal immigrants and smuggling. Highest cyber security is required to ensure data protection and no loophole is available for any intrusion. An airport is typically made up of landside (public) and airside (restricted area) in which entrance towards airside must be thoroughly managed. **Information Technology** (IT) and Cyber Specialists are crucial within the workforce in frequently updating and enhancing the airport system.

For example, in 2018, cyber attackers penetrated Cathay Airways system resulting in exploitation of its 9.4 million customers' data for malicious purposes. This breach of information is considered to be the largest cyber-attack ever to hit the airport industry.

Recently on October 10, 2022 cyberattacks on more than a dozen of US airports' websites had caused them to be temporarily offline including LaGuardia Airport and O'Hare International Airport with Russian-speaking hackers claiming responsibility. Although air traffic and security information were not interrupted, it caused major inconvenience for passengers to access information, showed how vulnerable the cyber security system was, and subsequently tarnished the airport's reputation.

In 2019, Kuala Lumpur International Airport (KLIA) experienced a technical glitch for four (4) days due to network equipment failure. Although this was not done by hackers, investment in a skilled cyber workforce and a reliable system towards cyber security should be obligatory for all airports.

iii. Mental Health Issues

Besides external threats, there were also some cases where threats came from the airport workforce themselves.

Mental health issues have affected many of the airport workforce especially during the COVID-19 with **pay cuts, retrenchment and overburdened workload** where manpower is below than minimum. Even before COVID-19 airport workforce had been struggling with mental health issues when their extrinsic and intrinsic needs were not met accordingly.

In the 2015 incident where a young co-pilot, Andreas Lubitz, deliberately crashed a Germanwings airliner into the French Alps, the **co-pilot was reported to suffer from a psychiatric condition** and had been taking medication before the tragic disaster.

Earlier this year, the incident with China Eastern Airlines suggested there may be an element of deliberate act where co-pilot might have suicidal thoughts and was plotting to seek revenge.

Since **1950**, there have been 24 such incidents of pilot or passenger suicides — including the Sept. 11 attacks in the U.S. — though many involved small aircrafts that killed only the pilots."



News headline on the Germanwings and China Eastern Airlines which claimed hundreds of innocent lives, believed to be deliberate acts of the co-pilots.

iv. Protest and Demonstration

Workforce or workers across all industries are humans with their own needs and taking care of them is far more complex than a system or a machine. **Poor and unequal treatment, no job security and even political issues** can turn airports into an undesired workplace resulting in disruption of operations, loss of revenue and loss of essential workers.

In October 17, 2022 unionized security staff employees at Brussels South Charleroi Airport (CRL) blocked access to the airport as part of a strike and

protested over a recent award of a security contract with the possibility of losing their wages and other rights due to the competition. Chaos ensued from passengers not able to catch their flight and airlines diverted their flights to other airports.

In the history of 2019 The Anti-Extradition Law Amendment Bill Movement in Hong Kong, Hong Kong International Airport staff and flight attendants joined demonstrators in a protest for democratic reforms and the withdrawal of a controversial extradition bill. Demonstration at the airport was aimed for international visitors to pay attention to the Hong Kong situation. This shows political matters can cripple the aviation operations and business.

In another case study of poor compensation and insufficient staffing, as reported by CBS News in September 2022, "Flight attendants at United and Southwest airlines on Tuesday staged protests at airports across the U.S. to draw attention to chaotic scheduling and other workplace woes,"

The Transport Workers Union Local 556 tweeted "A better operation will mean a better quality of life with fewer reroutes and technology failures that leave passengers and flight attendants stranded." Both airline and airport industry are facing challenges on shortage of manpower due to COVID-19 where many opted for early retirement or buyouts, if not being retrenched.



Blocking of entrance by security personnel at Brussels South Charleroi Airport (left) and demonstration at Hong Kong International Airport (right) resulted in interruption of flights.

v. Fast Evolving Technologies

As the aviation industry is one of the worst industries affected by the outbreak of COVID-19, it has forced aviation to evolve faster than anticipated with countless improvements to help assist both passengers and airport community in this current vulnerable environment. The latest technology debuted in many airports across the world which includes all kinds of contactless services robots and Artificial Intelligence (AI) to assist passengers. Robot assistant technology could be considered as a part of the workforce considering the role carried out is still being done by humans in many places.

Earlier this year, Istanbul Sabiha Gokcen International Airport (ISG) in Turkiye introduced its first social robot, "Aerobot" to assist passengers in wayfinding and giving reminders on safe travel practices.

Meanwhile, Kobe Airport in Japan launched its remote interactive robots to serve and promote product sales at the airport stores. Aeroporti di Roma (ADR), Italy also recently adopted a new fully autonomous delivery robot where passengers can scan a QR code to purchase food & beverages and retail items at the airport and get them delivered right up to the gate, providing a fully digital end to end service. There is a fear within the workforce that technology and AI will replace the need for human role, therefore upskilling current workforce is essential not only in navigating and maintaining these technologies, but to sustain human relevance to the airport and airline operations.



Introduction of robots at airports which has increased rapidly since COVID-19 is anticipated to be a significant part of the airport workforce.

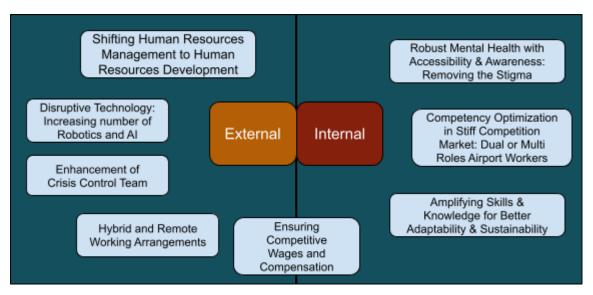
vi. Skills and Knowledge

Airport and aviation are encapsulated within a **niche market** considering it is highly localized and customized to the region and the facilities it offers. Airport employers will have to continuously provide specific and future predicted training to ensure their workforce is equipped with the latest knowledge and competency especially in the current fast paced evolution of the aviation industry. In order to do so, companies will be required to invest in their workforce more than just assets. However, more often there is a **disconnect between extrinsic and intrinsic** rewards as skills alone, although will make them perform well, they do not guarantee satisfaction or even mental health wellness which are also vital.

Due to its niche market, all these current skills and knowledge of the airport workforce are not in demand and they are forced to leave the industry especially during COVID-19. This high risk, high stress situation coupled with low job security will definitely affect the quality, performance and confidence of the workers.

FUTURE AIRPORT WORKFORCE STRATEGY PROPOSAL

This part proposes a workforce strategy covering both **external and internal needs of an employee**. The figure below illustrates, but not limited to, the proposal for future airport workforce in ensuring highly motivated and inspired airport employees.

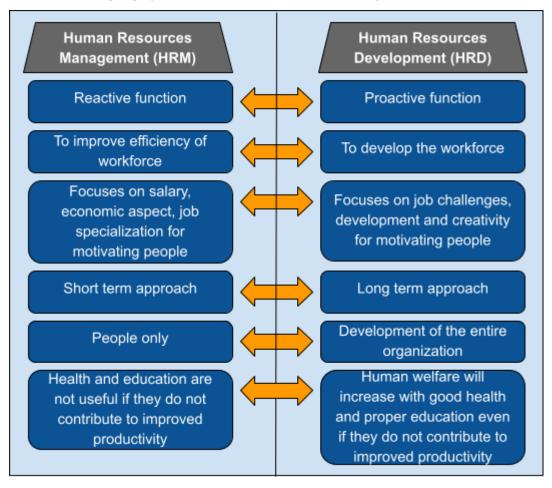


Future workforce proposal which covers both external and internal aspects of an employee.

I. New Workforce Outlook: Shifting Human Resources Management (HRM) to Human Resources Development (HRD)

The conventional Human Resources Management (HRM) is a reactive approach focused on managing current workforce with aims of profitability of the company. **Human Resources Development (HRD)**, which also includes the profitability for the company, **is a proactive approach focused on developing future workforce** with the ever-changing needs of employees by anticipating them beforehand. Although HRD requires more meticulous study and planning, it caters the need for workforce's development and gratification.

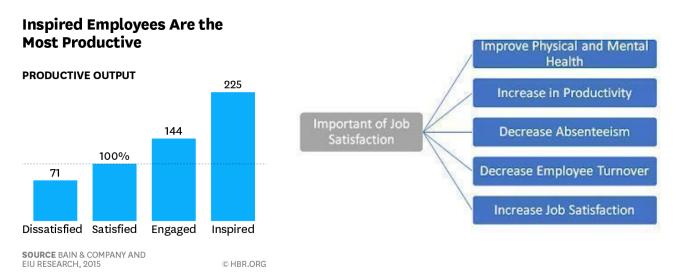
HRM approach is no longer viable for airport employees nowadays, especially with millennials being highly critical to not be perceived as only a resource or a capital.



Comparison of HRM vs HRD.

It is highly important for employers to acknowledge and implement improvements where their workers' needs and development are accommodated to ensure long term satisfaction. A recent article states that "On average, **positive** workplace satisfaction boosts productivity by **31%** – with unhappy workers' performance a full 10% less productive than their content colleagues.", while Harvard Business Review research

"found that **inspired employees** were more than twice as productive as satisfied ones, meaning it would take two and a quarter satisfied employees to generate the same output as one inspired employee". Figures below show that employers must aim in producing inspired employees through the HRD approach in order to gain the highest productivity.



Graph shows the relationship between satisfaction vs productivity (left) and the massive effects on job satisfaction to an employee (right).

Possible future job creation/ addition: Airport analysts, Human Resources Specialists, Lean / Lean Six Sigma Practitioners,

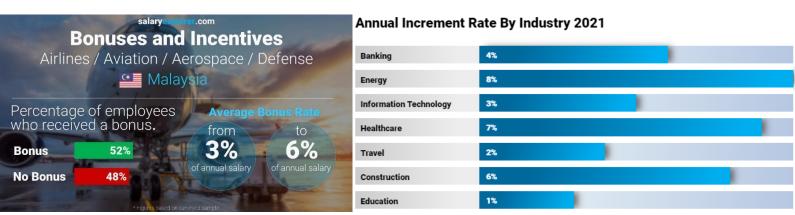
Outcomes: Highly inspired airport workers with increased productivity

II. Ensuring Competitive Wages & Compensation with the Market

Aviation workforce, depending on the job role and function, generally makes above average salary as compared to other industries pre-COVID. However, due to the unprecedented outbreak, the aviation workforce suffered tremendously with pay cuts, retrenchment, job insecurity and no increment or bonus. Working in a high-risk and high-pressure environment with reduced paycheck tends to demotivate the workers thus leading to low productivity and eventually quitting. As aviation is slowly recovering, the current workforce is burdened with extra workload (as mentioned in the case study of workers' protest) to cover for the vacancies during the outbreak. Discontent and long working hours will result in burnouts and affect their mental health, which has proven to be an issue worth looking into.

Aviation industry **needs to ensure competitive wages at all times** for all workforce in order to sustain the relevancy of the niche market and retain skilled workers at optimum level. Figures below show the aviation industry as compared to other industries in Malaysia for 2021. Almost half of the workforce did not receive any bonus for 2021 with one can only presume the worst for 2020. This is not inclusive of pay cuts which vary from one company to another. For example it was reported before that up to 50% of Singapore Airlines' captains on re-employment contracts pay was docked.

It is crucial for aviation employers to maintain the lucrative salary and compensation to retain the skilled workforce hence maximizing the level of satisfaction and optimizing the operations flow.



The statistics above show the situation in Malaysia where almost half of the workforce did not receive any bonus in 2021 (left) with comparison to other industries' annual increment in 2021 (right).

Possible job creation/ addition: Human resources specialists, financial & economic strategists

Outcomes: Motivated workers with low turnover, decreasing airport vacancies gap

III. Robust Mental Health with Accessibility and Awareness: Removing the Stigma In conjunction with the recent October 10th's World Mental Health Day, it is crucial to implement measures to ensure strong, good mental health of airport workforce through emotional support, awareness, counselling, behavioral health professionals and mental health check. According to a study by Oracle, 76% of workers believe their company should be doing more to support the mental health of their workforce. A survey by Netquote also states that 41% of employees have been diagnosed with mental health issues.

Another survey of more than 2,000 aviation workers – mostly pilots, cabin crew, air traffic controllers and engineers – in August 2020 found that this group suffered more than the general population during the pandemic. **A fifth** of pilots and 58% of cabin crew reported **moderate depression**. This was tied up to the fear of losing income and jobs leading to financial turmoil.

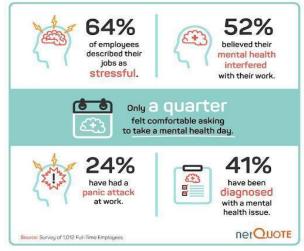
Like in the previous cases of Germanwings and China Eastern Airlines, failure to identify the mental condition of the pilots had caused tragic events, with other travellers losing confidence to use the said airlines.

Therefore, employers in the aviation industry should invest more on mental health of the workforce beyond the gym memberships, such as **peer support programs** in the event of losing jobs or loved ones, and access to counselling and therapy at all times. In return, this can break the stigma within the community associated with mental health issues. Currently, it is not under any regulations to provide airport workforce with these programs although cases are rising rapidly. Future healthy mind workforce will create a resilient community able to adapt in a vulnerable environment.





A study by Oracle shows that 76% of workers believe their company should be doing more to support the mental health of their workforce (left) and travellers are starting to fly again (right) amidst the lack of airport staff causing stress and overburdening of work.



The figure (left) shows that a survey found 41% of employees have been diagnosed with a mental health issue depicting the seriousness of mental illness in this current era.

Possible job creation/ addition: Peer support group, in-house psychiatrists, wellness officers

Outcomes: Mentally and physically healthy airport workforce with strong support system from both employers and peers

IV. Disruptive Technology - Increasing number of Robotic machines and Artificial Intelligence (AI)

Transitioning into Smart Airports with technology disruption is inevitable at this point. Technology disruptions in the form of robotics and AI, have been growing exponentially in the aviation industry particularly in the last few years where new innovations are a 'must' rather than 'nice to have', including the intensification of cyber security. **Technology disruption** refers to "innovation that significantly alters the way that consumers, industries, or businesses operate" hence affecting how a company strategizes its workforce. Latest technology making its way into airports includes social robots, interactive and guidance robots, delivery robots, and 3D heat map for social distancing.

These types of technology will create **efficient** service throughout an airport where the workforce is at optimum level since the process will become leaner than previous, with more training required on skills to operate these machines or systems. They offer solutions equal to that of the human workforce such as passenger check-ins, airport cleaning, and security checks.

For example, a social robot carries the same role as a customer service operator and UV Cleaning robot carries the same role as a cleaner. Instead of general workers, **specialists on the technology** will become a significant part of the future workforce for maintaining and upgrading the machines and systems.



Various robots and Artificial Intelligence (AI) at airports around the world from cleaning services to customer assistance for enhanced operations.

Possible job creation/ addition: IT Specialists, Data Scientists, Cybersecurity Engineers, High-skilled technicians/ workers

Outcomes: Strong cyber security, high deployment of airport robots, advance airport software, financial vitality in the long run

V. Enhancement of Crisis Control Team

Restoring a critical situation to a manageable one as quickly as possible is vital, with safety of the passengers and airport workforce as the utmost priority. It is foreseen that future airport workforce will include a highly trained and skilled **emergency response team** at all times to manage from the smallest to the highest risk.

In the event of the Brussels Airports attack in 2016, the airport community was down to seconds in order to convey the right message and actions to save lives. In another situation of cyber-attack, swift response from IT team and engineers including emergency team is required to mitigate the situation. When required, the security staff force will also have to act efficiently to vacate the area affected. An aerotrain breakdown at Denver International Airport recently caused delay and distress to many passengers, and most importantly affecting the reputation of the airport.

With the establishment of a strong crisis control team, future highly skilled and trained airport emergency response personnel will be able to alert all relevant parties and stakeholders immediately when the event occurs. Managing **public perspective** and resolving the problem as soon as possible are highly important which will result in saving money, time and reputation of the airport.

Possible job creation/ addition: Comprehensive crisis control teams with various backgrounds, public image perception officers

Outcomes: Optimum manpower and best practice for crisis management while maintaining public image



Airport Emergency Exercises and Emergency Response Team are crucial to ensure readiness of the airport and all its workforce.

VI. Amplifying Skills and Knowledge for Better Adaptability and Sustainability

Enhanced skills and knowledge for future workforce extends to their work competencies. It should cover basic airport operations to all and always be **alert** with any anomaly surrounding them. For example, an airport cleaner has skills on cleaning the airport with the right solutions and techniques, but should also know how to act instantly in the event of an emergency such as evacuating all passengers and contacting the right airport team. A technician specialized in maintaining the lift should be able to spot suspicious acts and provide assistance to a passenger losing his belongings. An airport retailer besides attending to customers should also be equipped with knowledge to report a non attending luggage to the right call center.

By doing so, the workforce will be able to contribute to improvement solutions as a part of a bigger airport community. All these, beyond the usual competencies skills and knowledge will instill the **alertness and wariness** within all airport workforce for an enhanced passenger experience and airport operations while minimizing unwanted circumstances.

Possible job creation/ addition: Airport operations trainers, skilled supervisors

Outcomes: All-round airport workforce, instill and increase alertness within all airport workforce

VII. Hybrid and Remote Working Arrangements

Prior to COVID-19, the term 'working remotely' was almost not practical to be practiced within the aviation industry. However due to global health policies to minimize the spread of the virus, most workers including aviation workers were forced to make drastic changes by reducing on-site workers and implementing working from home (WFH) arrangements. While many have since returned to office with employer's vaccination regulations, **hybrid working arrangement** is predicted to remain for airport and aviation workers in the future seeing how productivity soars with this flexibility. A study by Great Place to Work below shows a significant increase of employees' productivity while working from home. Another study by Telework Research Network also revealed that 47% of people who have the options for office flexibility are "very satisfied" with their jobs, compared to 27% of those who are office-bound. This **new normal** is inevitable especially to the new workforce generations seeking higher working satisfaction. Besides ensuring employees' productivity and happiness, the airport industry will continue to benefit from **cost saving** from office operations such as office rental, utilities, workstation cost and

travel allowance. According to Global Workplace Analytics, employers will **save** an average of \$11,000 a year per employee when employees WFH even if it is part time. This is a crucial factor for the airport and aviation sector struggling with substantial financial losses and have yet to recover to the pre-pandemic stage. It is also worth noting that some required roles such as security force and concession workers will be required to be on-site regardless of this new norm. **Balancing** both off and on-site staff will depend on the job roles and pre-determined by employers to sustain seamless connectivity among passengers and airport community.

Possible job creation/ addition: Hybrid working arrangement for airport staff not compromising the security and operations of an airport such as the management staff and business support service workers, Human Resources Specialists

Outcomes: Employees retention, increased productivity, less overhead cost, job satisfaction

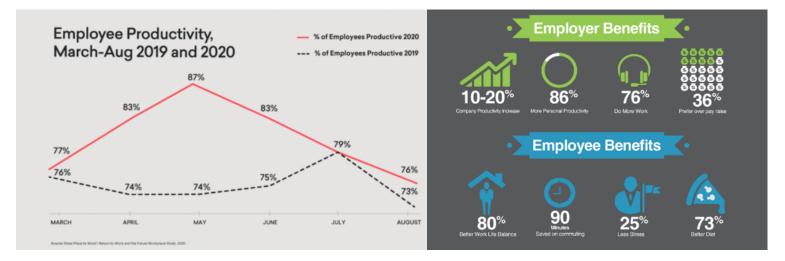


Figure shows employees' productivity increases with working remotely arrangement (left) and employers' benefits - staff retention and satisfaction with given flexibility of hybrid workplace (right)

VIII. Competency Optimization in Stiff Market Competition: Dual/ Multi Roles Airport Workers

Some major airports and airlines were forced to be temporarily closed and even declared bankruptcy, especially those small-scale airports and airline operators such as Flybe, Trans State Airlines and Compass Airlines. During the first two years of COVID-19, passengers at the world's airports were reduced by 10.2 billion affecting both airport operations and manpower availability. These two factors coupled with stiff aviation market competition will most probably lead to workers performing dual or multiple roles at the workplace.

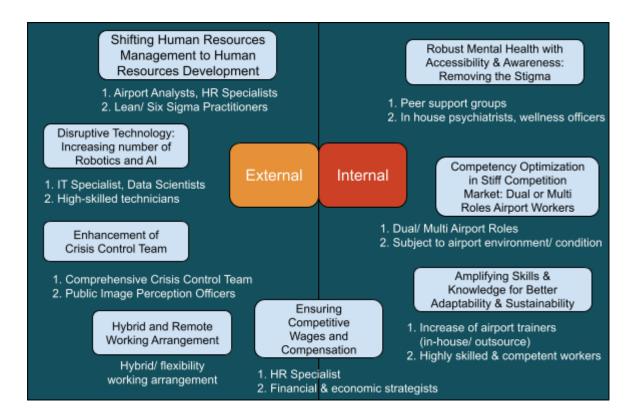
For example, as mentioned in a recent study by 4QD Strategy Consulting LLC, future airport trends will likely cause workers to take up **dual or multiple roles** such as a customer service worker serving as a duty operations officer and a technician also performing the role of an airport fire rescue officer. This is practical in a smaller airport environment and for standby or less critical roles especially when manpower is scarce and financial sustainability is crucial.

This strategy will not only help the airport workers' sustainability during challenging times, but will also contain the employer's cost when it comes to hiring skilled manpower.

Possible job creation/ addition: Dual/ Multi Airport Roles

Outcomes: Enhanced airport workers skill & competency, manpower optimization, financial sustainability

In a nutshell, here are the full view of the anticipated future airport job creations or additions:



CONCLUSION

In conclusion, the airport workforce culture and strategy have definitely changed since the outbreak of COVID-19 due to many factors such as passenger movements and airport regulations. It has shaped the workforce to be more resilient and adaptable in the dynamic world of aviation. For Malaysia Airports Holdings Berhad (MAHB) that is managing thirty nine (39) airports across Malaysia and as well as one (1) airport in Turkiye, ensuring the right number of airport workers with the right set of competencies is critical in sustaining the services and financial health of the company.

MAHB has adopted the latest technologies such as social robots, facial recognition and Airport Collaborative Decision Making (A-CDM) to stay relevant in the industry and for a more efficient passenger experience in the airport. This also accelerated MAHB's needs in adopting highly skilled IT specialists and data scientists to ensure real time data will not be compromised and that cyber-security is at the highest priority.

In terms of staff wellness, MAHB has also ventured with Naluri; a digital care solution which combines support to physical and mental health, in an effort to inculcate the healthy mind and body of its employees. This will, in return, produce highly motivated workers thus increasing the company's overall productivity.

Apart from that, MAHB is currently in the midst of optimizing its workforce through an exercise of workflow improvement and workforce management approach to ensure an optimized number of workers placed at the right jobs. This translates to cost saving and promoting financial stability in the long run.

All these improvements stated are fluid depending on the current world situation. Since an airport is localized based on its geographical location and nature of business, another airport might not be able to emulate one's business model. However, it is vital to balance both the needs of the workforce and the employer for a symbiosis relationship within an airport.

These past few years have taught the aviation industry that being stagnant is not an option and the condition of the workers are critical to produce the best airport service to the passengers. An airport or an employer choosing to not adapt to the current market needs will surely fail to sustain its business and resources, emphasizing the importance of a strong and resilient workforce.

No. Citation

- "[solved] compare and contrast human resources and human resources...: Course hero," [Solved] Compare and contrast human resources and human resources... | Course Hero. [Online]. Available: https://www.coursehero.com/tutors-problems/Human-Resource-Management/20061327-Compare-and-contrast-human-resources-and-human-resources-development/. [Accessed: 25-Oct-2022].
- 2 "Aerobot, your friendly airport digital assistant," Convergence. [Online]. Available https://convergence.malaysiaairports.com.my/inside-story/aerobot-your-friendly-airport-digital-assistant. [Accessed: 21-Oct-2022].
- 3 "Airlines / aviation / aerospace / defense average salaries in Malaysia 2022," The Complete Guide. [Online]. Available: http://www.salaryexplorer.com/salary-survey.php?
- 4 "Airport Crisis Management Needs Great Crisis Communications," Crises Control, 14-May-2021. [Online]. Available: https://www.crises-control.com/blogs/airport-crisis-management/. [Accessed: 25-Oct-2022].
- 5 "Airports Council releases report on the future of the Airports Workforce," Airports Council International North America, 05-Jul-2022. [Online]. Available: https://airportscouncil.org/press_release/airports-council-releases-report-on-the-future-of-the-airports-workforce/. [Accessed: 25-Oct-2022].
- 6 "Brussels south charleroi airport in chaos due to security guards' strike," Anadolu Ajansı, Oct-2022. [Online]. Available: https://www.aa.com.tr/en/europe/brussels-south-charleroi-airport-in-chaos-due-to-security-guards-strike/ 2714776. [Accessed: 23-Oct-2022].
- 7 "Coronavirus econ impact ICAO," ICAO, 12-Sep-2022. [Online]. Available https://www.icao.int/sustainability/Documents/Covid-19/ICAO_Coronavirus_Econ_Impact.pdf. [Accessed: 23-Oct-2022].
- g "Cyberattacks Force over a dozen us airport websites offline," The Guardian, 10-Oct-2022. [Online]. Available: https://www.theguardian.com/us-news/2022/oct/10/cyberattacks-disrupt-us-airport-websites. [Accessed: 22-Oct-2022].
- g "Defrence between human capital and human development brainly.in," Brainly, 09-Nov-2020. [Online]. Available: https://brainly.in/question/28183670. [Accessed: 23-Oct-2022].
- 10 "Disaster response," DPDHL. [Online]. Available: https://www.dpdhl.com/en/sustainability/social-impact-programs/disaster-management/disaster-response -teams.html. [Accessed: 11-Dec-2022].
- "Hong Kong Airport Staff Stage Protest Against Yuen Long Attack," The Guardian, 26-Jul-2019. [Online].
 Available:
 - $https://www.theguardian.com/world/2019/jul/26/hong-kong-airport-staff-stage-protest-against-yuen-long-attack.\ [Accessed: 26-Oct-2022].$
- "How to keeps employees engaged and productive in a WFH scenario," Easy Source, 06-May-2020. [Online]. Available: https://blog.easysourceindia.com/how-to-keeps-employees-engaged-and-productive-in-a-wfh-scenario/. [Accessed: 26-Oct-2022].
- "Improved outlook for air traffic movements in July," Malaysia Airports Holdings Berhad (MAHB) Corporate Website | Malaysia Airports Holdings Berhad (MAHB). [Online]. Available: https://www.malaysiaairports.com.my/. [Accessed: 30-Oct-2022].
- 14 "Inform deploys cloud-based AI to optimize workforce management at KLM ...," AviationPros, 07-Sep-2022. [Online]. Available: https://www.aviationpros.com/airlines/press-release/21279846/inform-deploys-cloudbased-ai-to-optimize -workforce-management-at-klm. [Accessed: 23-Oct-2022].
- "Job satisfaction: Concept and its consequences in business organization," Management Studies. [Online]. Available: https://analysisproject.blogspot.com/2012/10/job-satisfaction.html. [Accessed: 22-Oct-2022].
- "Job satisfaction & productivity: Rituals for positive work culture: Reclaim," RSS, 29-Apr-2022. [Online]. Available: https://reclaim.ai/blog/job-satisfaction-productivity#:~:text=On%20average%2C%20positive%20workplace%20satisfaction,job%20satisfaction%20in%20their%20employees. [Accessed: 29-Oct-2022].

- "Warning over pilots' mental health as planes return to Skies," The Guardian, 02-Jun-2021. [Online]. Available: https://www.theguardian.com/business/2021/jun/02/pilots-mental-health-planes-covid-airlines. [Accessed: 23-Oct-2022].
- "What is a smart airport?," Airport Urbanism | What is a Smart Airport?, 12-Mar-2019. [Online]. Available: https://airporturbanism.com/articles/what-is-a-smart-airport. [Accessed: 29-Oct-2022].
- 19 "What is the difference between HRM and HRD?" [Online]. Available: https://www.quora.com/What-is-the-difference-between-HRM-and-HRD. [Accessed: 24-Oct-2022].
- "Why HR is shifting to HD part 1: A new awareness of human development," AHDO, 10-Sep-2022. [Online].

 Available: https://www.aseanhdo.com/post/why-hr-is-shifting-to-hd-part-1-a-new-awareness-of-human-developmen t. [Accessed: 29-Oct-2022].
- 21 "Workforce definition & meaning," Merriam-Webster. [Online]. Available: https://www.merriam-webster.com/dictionary/workforce. [Accessed: 21-Oct-2022].
- "Workforce definition and meaning: Collins english dictionary," Workforce definition and meaning | Collins English Dictionary. [Online]. Available: https://www.collinsdictionary.com/us/dictionary/english/workforce. [Accessed: 21-Oct-2022].
- 23 "Workforce management market share, growth factors, forecast to 2029," Straits Research, 26-Aug-2022. [Online]. Available: https://straitsresearch.com/report/workforce-management-market. [Accessed: 27-Oct-2022].
- 24 "Workforce," Cambridge Dictionary. [Online]. Available: https://dictionary.cambridge.org/dictionary/english/workforce. [Accessed: 21-Oct-2022].
- 25 4QD Consulting Strategy LLC, "Airports Council International North America," AirportsCouncil, Jun-2022. [Online]. Available: https://airportscouncil.org/wp-content/uploads/2022/07/2022FutureofWorkforceFinal.pdf. [Accessed: 12-Dec-2022].
- A. Bond and J. Armstrong, "Andreas Lubitz poses for 'selfie' as it emerges he feared he was going blind," mirror, 28-Mar-2015. [Online]. Available: https://www.mirror.co.uk/news/world-news/germanwings-plane-crash-andreas-lubitz-5418475. [Accessed: 11-Dec-2022].
- A. Whitley and Bloomberg, "China Eastern Airlines crash may have been intentional nosedive, black-box data shows," Fortune, 18-May-2022. [Online]. Available: https://fortune.com/2022/05/18/china-eastern-airlines-crash-may-have-been-intentional-nosedive-black-box-data-shows/. [Accessed: 27-Oct-2022].
- a&s International, "Threats in airport security," The comprehensive security industry platform, 16-Jul-2008. [Online]. Available: https://www.asmag.com/showpost/6776.aspx. [Accessed: 26-Oct-2022].
- Adib Povera and Arfa Yunus, "'KLIA Glitch a wake-up call' | new straits times NST online," NewStraitsTimes, 26-Aug-2019. [Online]. Available: https://www.nst.com.my/news/nation/2019/08/516004/klia-glitch-wake-call. [Accessed: 26-Oct-2022].
- B. Pina, "Remote Work Productivity Study finds surprising reality: 2-year analysis," GPTW Greater China, 23-Feb-2021. [Online]. Available: https://www.greatplacetowork.cn/remote-work-productivity-study-finds-surprising-reality-2-year-analysis/. [Accessed: 11-Dec-2022].
- C. Admin, "Abu Dhabi Airport deploys New Workforce Management System," Airport Technology, 21-Jul-2010. [Online]. Available: https://www.airport-technology.com/uncategorized/news91159-html/. [Accessed: 29-Oct-2022].
- D. Campbell, "6 remote work productivity metrics you should be tracking," Blog :: Nozbe Personal to-do, task, project and time management application, 07-Jun-2022. [Online]. Available: https://nozbe.com/blog/remote-work-productivity-metrics-to-track/. [Accessed: 24-Oct-2022].
- D. deBara, "HR development (HRD) vs. HR Management (HRM)," RSS, 30-May-2022. [Online]. Available: https://lattice.com/library/hr-development-hrd-vs-hr-management-hrm. [Accessed: 21-Oct-2022].
- D. Liddell, "The Future of Artificial Intelligence in Airports," Teague. [Online]. Available: https://teague.com/insights/innovation/the-future-of-artificial-intelligence-in-airports. [Accessed: 28-Oct-2022].
- Emma Luxton, "Engaging your employees is good, but don't stop there," World Economic Forum, 23-Mar-2016. [Online]. Available: https://www.weforum.org/agenda/2016/03/engaging-your-employees-is-good-but-don-t-stop-there/. [Accessed: 29-Oct-2022].

- H. Auto, "Sia to gradually restore pilots' basic salaries to pre-pandemic levels by January," The Straits Times, 04-May-2022. [Online]. Available: https://www.straitstimes.com/singapore/sia-to-restore-pilots-pay-to-pre-pandemic-levels-by-next-january-as-air-travel-returns. [Accessed: 23-Oct-2022].
- H. J and S. M, "Airport robots market size, share, trends, analysis by 2030," Allied Market Research, Aug-2021. [Online]. Available: https://www.alliedmarketresearch.com/airport-robots-market-A13127#:~:text=Airport%20robots%20offer %20higher%20convenience,%2C%20security%20checks%2C%20and%20more. [Accessed: 29-Oct-2022].
- J. Mann, "Airports go blue: Ultraviolet cleaning systems," Airport Technology, 29-Jun-2022. [Online]. Available: https://www.airport-technology.com/analysis/airports-go-blue-ultraviolet-cleaning-systems/. [Accessed: 25-Oct-2022].
- 39 Jpatel, "Mental health in the workplace: Improving Mental Health in the workplace," PeopleScout, 14-Jul-2022. [Online]. Available: https://www.peoplescout.com/insights/mental-health-in-the-workplace/. [Accessed: 21-Oct-2022].
- 40 K. Gibson, "Flight attendants protest schedule havoc at airports across U.S.," CBS News, 28-Sep-2022. [Online]. Available: https://www.cbsnews.com/news/airlines-united-southwest-flight-attendants-san-francisco-international-airport-food/. [Accessed: 26-Oct-2022].
- 41 K. McLeod, "Mental health at work," NetQuote, 24-Feb-2022. [Online]. Available https://www.netquote.com/health-insurance/mental-health-at-work. [Accessed: 23-Oct-2022].
- M. Dimitrova, "ADR adopts Fully Autonomous Delivery Robot," Future Travel Experience, 28-Sep-2022. [Online]. Available: https://www.futuretravelexperience.com/2022/09/adr-adopts-fully-autonomous-delivery-robot/. [Accessed: 21-Oct-2022].
- M. Dimitrova, "Kobe Airport Launches Robot Customer Service Demonstration," Future Travel Experience, 26-Aug-2022. [Online]. Available: https://www.futuretravelexperience.com/2022/08/kobe-airport-launches-robot-customer-service-demonst ration/. [Accessed: 24-Oct-2022].
- M. Dimitrova, "Stuttgart Airport utilises 3D sensors to manage social distancing," Future Travel Experience, 12-Aug-2020. [Online]. Available: https://www.futuretravelexperience.com/2020/08/stuttgart-airport-utilises-3d-sensors-to-manage-social-distancing/#:~:text=By%20understanding%20the%20distance%20between,and%20adjust%20it%20where %20necessary. [Accessed: 22-Oct-2022].
- N. Dcruz, "Workforce management process, job responsibilities, benefits," Great Learning Blog: Free Resources what Matters to shape your Career!, 16-Jun-2022. [Online]. Available: https://www.mygreatlearning.com/blog/workforce-management/. [Accessed: 21-Oct-2022].
- N. Fearn, "Aerospace industry grounded by lost jobs and lack of staff," Financial Times, 20-Jul-2022. [Online]. Available: https://www.ft.com/content/93736968-8fcf-425f-b8e5-fcd9736d37f6. [Accessed: 23-Oct-2022].
- Railway-News, "Social Robots introduced at Istanbul's ISG Airport," News, 27-Oct-2021. [Online]. Available: https://airportindustry-news.com/social-robots-introduced-at-istanbuls-isg-airport/. [Accessed: 23-Oct-2022].
- Revfine.com, "Airport jobs: Overview of types of airport positions," Revfine.com, 14-May-2022. [Online]. Available: https://www.revfine.com/airport-jobs/#overview-airport-jobs. [Accessed: 25-Oct-2022].
- 49 S. Kakade, "What is workforce management? definition from whatis.com," SearchHRSoftware, 18-Jul-2019. [Online]. Available: https://www.techtarget.com/searchhrsoftware/definition/workforce-management. [Accessed: 24-Oct-2022].
- S. Prevost, "Airport industry: A review of ten major cyberattacks," Stormshield, 26-Jul-2022. [Online]. Available: https://www.stormshield.com/news/ten-major-cyberattacks-against-the-airport-industry/. [Accessed: 25-Oct-2022].
- S. Z. Nasir, "Workforce management: Definition, system, software, Courses & Despiration, The Engineering Projects, 16-Aug-2021. [Online]. Available: https://www.theengineeringprojects.com/2021/07/workforce-management.html. [Accessed: 24-Oct-2022].
- 52 Stechies, "Difference between HRM and HRD," STechies, 08-Jan-2020. [Online]. Available: https://www.stechies.com/difference-between-hrm-hrd/. [Accessed: 21-Oct-2022].

- T. C. C. S. Officer, "What's driving employers to remote work?," Equipe, 19-Nov-2020. [Online]. Available: https://equipe.ai/blog-post/whats-driving-employers-to-remote-work/. [Accessed: 13-Dec-2022].
- T. P. Team, "told to do by someone in Cockpit": Report says China Eastern plane crash was likely intentional,"

 ThePrint, 18-May-2022. [Online]. Available: https://theprint.in/world/told-to-do-by-someone-in-cockpit-report-says-china-eastern-plane-crash-was-like ly-intentional/960749/. [Accessed: 23-Oct-2022].
- T. Smith, "Disruptive technology: Definition, example, and how to invest," Investopedia, 21-Sep-2022. [Online]. Available: https://www.investopedia.com/terms/d/disruptive-technology.asp. [Accessed: 26-Oct-2022].