

AN IMPROVEMENT OF WORK EFFICIENCY AMONG EMPLOYEES OF
A START-UP

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A project report submitted in partial fulfilment of the requirements for the
award of the degree of Master of Business Administration

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Universiti Teknologi Malaysia

JANUARY 2022

DEDICATION

To my dearest wife and daughter whose sacrifices and encouragement made this action research possible. To my wife whom I deeply care for, who spend many nights putting our daughter to sleep while I have time to myself working on this research. To my daughter whom I dearly love who spend many Saturdays shouting for “daddy” during the online lessons. Thank you for your sacrifices.

To everyone who has also contributed to this action research, especially my MBA ODL classmates, supervisors, professors and employees from Oceania Robotics.

ACKNOWLEDGEMENT

I would like to take this opportunity to express my thanks to Universiti Teknologi Malaysia (UTM) for creating this opportunity for MBA ODL where working adults like my peers and I are able to appreciate a full time MBA course while continuing with our daily lives and work. Throughout the course and this action research, I was able to appreciate the dedication both from the professors and my peers to attend every lessons and participate actively. With the support from everyone, they have made my journey for this MBA a fun journey and this action research possible.

I would also like to thank my supervisor Dr Rafidah Othman who has carved out time amidst her busy schedule to guide me and provided many insights. Also to my classmate, Harry and Shelfiah who has been a great support and full of encouragement. Also to Dr Beni and Dr Hishan for their advice and guidance to help shared the structure, online sharing sessions, clinics to guide students to complete the action research.

Lastly, I would also like to thanks all employees from Oceania Robotics Pte Ltd for their time in participating in this action research project. They have been very helpful, sharing their honest thoughts and sincere feedbacks. Their contribution allowed for the data collection and also survey questionnaires to be completed within this short duration of time, allowing me to carry out further data analysis and intervention to help improve their work efficiency.

ABSTRACT

Employees were appraised according to time they spent at work. However with digital transformation and changes in the world, younger employees prefer a more task based job approach instead. Thus, this study is intended to find out the effect of the task based job versus time based job and which should be the recommended approach for future work force. To this end, there is no quantitative method and qualitative method to measure the performance of both approach. Especially each approach has its own advantages and variables such as cultures, technology, environmental issues and etc have to be taken into consideration. As such, this action research will look into the sample size of staff among Oceania Robotics Pte Ltd to determine how the different approaches will affect the work performance of the staff. Different methodology such as action research, SPSS, statistical analysis and etc will be carried out to further investigate. With covid-19 disrupting work, it is important to review the types of approach for work to determine the most effective way for the work force to embrace moving forward. Comparing task based job against time based job will help to ensure work remains competitive bringing economic advantage to the nation.

ABSTRAK

Pekerja dinilai mengikut masa yang mereka habiskan di tempat kerja. Namun dengan transformasi digital dan perubahan di dunia, pekerja yang lebih muda lebih suka pendekatan pekerjaan berdasarkan tugas sebaliknya. Oleh itu, kajian ini bertujuan untuk mengetahui kesan pekerjaan berdasarkan tugas berbanding pekerjaan berdasarkan masa dan yang harus menjadi pendekatan yang disarankan untuk tenaga kerja masa depan. Untuk tujuan ini, tidak ada kaedah kuantitatif dan kaedah kualitatif untuk mengukur prestasi kedua-dua pendekatan tersebut. Terutama setiap pendekatan mempunyai kelebihan dan pemboleh ubah tersendiri seperti budaya, teknologi, masalah persekitaran dan lain-lain harus diambil kira. Oleh yang demikian, kajian tindakan ini akan melihat ukuran sampel kakitangan di antara Oceania Robotics Pte Ltd untuk menentukan bagaimana pendekatan yang berbeza akan mempengaruhi prestasi kerja kakitangan. Metodologi yang berbeza seperti penyelidikan tindakan, SPSS, analisis statistik dan lain-lain akan dijalankan untuk menyiasat lebih lanjut. Dengan kerja mengganggu covid-19, adalah penting untuk mengkaji jenis pendekatan kerja untuk menentukan cara yang paling berkesan untuk tenaga kerja merangkul bergerak maju. Membandingkan pekerjaan berdasarkan tugas dengan pekerjaan berdasarkan masa akan membantu memastikan pekerjaan tetap kompetitif membawa kelebihan ekonomi kepada negara.

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p-value	Significant value	38

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CHAPTER 1: INTRODUCTION

1.0 INTRODUCTION ABOUT CASE COMPANY

Founded in July 2019, Oceania Robotics is a Singapore based robotics company that manufactures pioneering autonomous robotics solutions in the niche area of pest maintenance, ship maintenance and façade inspection. With a comprehensive product roadmap and an expert team of robot developers, the company delivers products and services that targets pest control, inspection, cleaning, painting and paint stripping of ship hull. With a full suite of robotics platforms, Oceania Robotics brings with it a number of first of its kind autonomous and modular capabilities significantly improving productivity, efficiency and safety.

Being a tropical nation with pest control issues, major port and a hub for ship maintenance, nation with high density building where frequent maintenance is required; Singapore is well positioned to be a global leader in delivering solutions for its own market as well as exporting these solutions. Contrary to the conventional sales model, Oceania Robotics offers a rental as a service strategy relieving end users of the large initial investments and maintenance overloads. Having established strong partnership with pest control companies, local shipyards, maintenance contractors, universities, and with support from governmental agencies, Oceania Robotics is very well positioned to be a global front runner in these newly emerging industries.

1.1 CASE COMPANY/ INSTITUTION INFORMATION

Oceania Robotics was co-founded in July 2019, when Madhukumar Kannan and Mohan Rajesh Elara set out to radically change the maintenance work processes in marine industry through creation of highly intriguing robots. Since then, they've been conquering the world of maintenance industry impacting marine, pest control and vertical farming domains and designing robots that breaks so many world-firsts.

Mr. Madhu is the Cofounder and Director of Oceania Robotics Pte. Ltd. He is also the Director of Brightsun Electricals, an established company whose principal activity is building and repairing of ships, tankers, and other ocean-going vessels (including conversion of ships into off-shore structures). He is responsible for the overall management and day-to-day operations of both the companies as well as the formulation of the business directions, strategies, and policies of the wider Brightsun Group. Mr. Madhu is instrumental in initiating and penetrating new markets for robotics solution in ship maintenance industry. On the operational front, he introduced a series of strategic operational measures which greatly improved the efficiency various ship maintenance processes. Mr. Madhu graduated with a Bachelor of Engineering degree from the SASTRA University and master's degree from University College Dublin.

Dr. Mohan is a Cofounder of Oceania Robotics. He is also an Assistant Professor with the Engineering Product Development Pillar at Singapore University of Technology and Design (SUTD). He received his Ph.D. and M.Sc degrees from the Nanyang Technological University, Singapore. He obtained his B.E degree from Bharathiar University, India. His research interests are in robotics with an emphasis on self-reconfigurable platforms as well as research problems related to robot ergonomics and autonomous systems. He has published more than 150 papers in leading journals, books, and conferences. He is the recipient of the SG Mark Design Award in 2016, 2017, 2018, and 2019, ASEE Best of Design in Engineering Award in 2012, Tan Kah Kee Young Inventors' Award in 2010 and A' Design award in 2018 and 2019. He is also the co-founder of Lionsbot, a global robotics company that develops and deploys a wide range of autonomous robots for professional cleaning. He is also a visiting faculty member of the International Design Institute at Zhejiang University, China. Dr. Mohan has served in various

positions of organizing and technical committees of several international competitions and conferences.

Oceania Robotics is one of the South East Asia's leading provider of ruggedized industrial maintenance robots for ship maintenance, vertical landscaping and pest control industries. We deliver a comprehensive suite of professional robotics services to niche customers across Asia. We have deep experience and a dynamic team of expert Engineers and non-technical staff delivering quality products and services.

Oceania Robotics currently has a series of products that is being commercialized or in development, targeting the three areas of pest control, marine and inspection of façade.

Pest Control

- 1) Dragonfly Robot: a robot targets female aedes mosquito by trapping and killing them. The robot is able to count and identify the types of captured mosquito. In the process, it creates a heatmap density of mosquito. Routinely operating has shown an effective removal of mosquito at a given area.
- 2) Falcon Robot: a robot that patrols a false ceiling environment to identify hotspot of rodent activities. The robot is equipped with a camera to recognize and identifies rodent droppings and scratches on the wall identifying types of rodents, its activities and hotspot at the false ceiling. The robot is also able to collect the droppings to for cleaning and lab testing purpose while dispensing rodenticide at selected areas.

Marine

- 1) Hornbill: a robot that performs end to end inspection and maintenance work in ship hull maintenance. Hornbill is able to remove paint via hydro and grit blasting, inspection work through benchmarking of paint removal, inspection of defects and painting of surfaces. The robots, through a co-bot approach, operates semi autonomously together as a fleet to remove paint at a identified area while human operators perform other more technical work.
- 2) Pleco mini: a versatile robot that can navigate vertically or horizontally across tight spaces like pipes to perform inspection work. Pleco mini looks at aiding conventional

work of inspection vertically challenging areas of pipes to perform internal and external inspection to identify defects, resulting in targeted maintenance approach to reduce manpower, time and money.

Façade inspection

- 1) Urodela: a vertically navigating robot designed for World Expo 2020 for the Singapore pavilion to automate maintenance of plants pots. The robot also ensures the environment is conducive for the plants to grow where it measures the environment variables such as air flow, PM2.5, carbon dioxide, and etc, while sharing feedback through a dashboard management.

1.1.2 EMPLOYEE AND DEMOGRAPHICS AND COMPANY ACTIVITIES

Oceania Robotics Pte Ltd has employees from various background and nationality. There are employees from 6 different countries, namely Singapore, Malaysia, India, Mexico, Vietnam and Myanmar. Most of them being 48% Chinese from Singapore, Malaysia, Vietnam and Myanmar, while another 48% from India being India and another 4% is a Mexican employee. Although all employees are from different background and nationality, communication across is manageable with English as the main medium. Among these employees, most of them are graduates from local University such as Singapore University of Technology and Design, National University of Singapore and National Technology University, some from Ngee Ann polytechnic, while the remaining are from private or overseas universities.

There are several activities that Oceania Robotics Pte Ltd does such as developing and selling their own robots as a product line, customized project as a service and renting of their robotic solutions to their customers. For example, currently the company has several pest control where the company is taking orders for the sales of these robot. The company also caters to others who may not want to commit in a long term manner or pay a big upfront cost, where instead they will choose to rent the robots instead for a monthly fee. At the side, the company also does

customize projects for various clients from research companies, defence and other government agencies to develop high level prototype and fundamental research.

1.1.3 EXTERNAL ENVIRONMENT ANALYSIS

PESTEL analysis was done to study the external environment of a robotic company such as Oceania Robotics. Through the analysis, a business plan was formulated strategically based on the informed data.

Table 1.1: The PESTEL analysis of a robotic company

Political	Lack of foreign workers due to the outbreak of Covid-19
	Economic downturn due to Covid-19 (Casadio, Chung, and Williams, 2020)
Economic	Increase of labour cost (Asean Briefing, 2020)
	Increase of material, components and production cost
Social	Decline number of birth rate globally
	Increasing population of elderly that outweighs the younger working population
Technological	New technology with smaller, higher processing and cheaper computers, components and sensors
	New technology in the market like air tag, IOT devices and etc
Environmental	Air and water pollution
Legislative	Safety standards and regulations for deployments of robots

PESTEL analysis have six variables, namely political, economic, social, technological, environmental and legislative. In table 1.1, it can be seen that there are various environmental variables for a robotic company to navigate around such as safety standards and regulations in order to successfully to do well. There are also other daily factors it needs to deal with such as

increasing cost of materials and higher labour cost to manufacture the robots. Hence understanding these variables will help to strategically plan a business plan to scale the business.

The political aspect have a significant impact on robotics company such as to limit of quote in hiring of employment pass and s-pass skilled workers. These will hinder companies to have enough human resources to scale for their research and development in the robotic company. Furthermore, with the pandemic covid-19 that affected the whole world, it has affected all business in terms of their cash flow, supply and business continuity. Thus also causing economic downturn for the whole nation as a whole, with some of the business were forced to close down causing employees to lose their job (Murugiah, 2020).

The social aspect can also be observed that the birth rate in Singapore has begun to decline (Neville, 1978). This impact is significant to any industry as it will indirectly causes a whole population to be much smaller as well as having a bigger elderly population. Hence causing less manpower for the workforce, while more elderly population needs to receive help for their day to day life. With such situations scaling across all different countries, automation and robotic solutions are highly look upon as an alternative to augment and contribute to the human workforce. Hence we believe that the effect of this to the robotic industry can be both a positive and negative.

Also, as technology is constantly developing, there are more new technology in the market that is innovating at a lightning speed. Technology such as Artificial Intelligence, Internet of Things, 3D printing and etc comes in to bring new height to what technology is capable as compared to the past. Therefore companies should always be on their toe to keep up with the latest trend, developing and improving the product for tomorrow. Furthermore, industrial 4.0 helped to accelerate the manufacturing process and allowed processes to be smarter where the ROI for manufacturing has been reduced. All these external environmental factors together with fierce competition has caused the robotic ecosystem to boom. Hence to ride on these trends, the company have to strategically plan and grow the organization as a leader in the industry.

1.1.4 INTERNAL ENVIRONEMENT ANALYSIS

Internal analysis is used to look internally for the capability and resources that is available to the organization that will allow it a competitive advantage over others. There are a few factors that can help the organization to look inwards for its strength and weakness such as management, marketing and operation.

Table 1.2 : Internal Environment Analysis of Oceania Robotics

Factors	Description
Management	Experience management team
	Well governance and well-structured organization
Marketing	Brand image and public awareness
Operation	End to end solution offerings
	User friendly and affordability of the robotic solution
	Safety and reliability of the robotic solution

In table 1.2, it can be seen that Oceania Robotics is a leader in the robotic industry and is not only performing well in terms of management but also on their marketing and operation efforts. As the company continue to develop good quality product, the brand image and public awareness of the company solution will continue improve, in turn creating more demand for their product. However, the safety and reliability of the robotic solution by the company needs to always be the company priority as it can significantly impact the company's reputation either positively or negatively.

1.1.5 SWOT ANALYSIS

After analysing the data from the external and internal environment analysis, a formulated SWOT analysis is done to further access the company’s strengths and weaknesses, opportunities and threats.

Table 1.3: SWOT Analysis of Oceania Robotics

Strengths	Weaknesses
<ol style="list-style-type: none"> 1) Good reputation in the industry with strong relationship with governmental agencies 2) Strong team of co-founders who are leading players of the robotic industry 3) Strong technical engineering team that are passionate about robotics 	<ol style="list-style-type: none"> 1) Lack of middle management in the company 2) Young company as a 2-year-old establishment 3) Lack of aggressiveness as a startup compared to competitors 4) Lack of employee engagement
Opportunities	Threats
<ol style="list-style-type: none"> 1) Robotic is a greenfield industry where every sector is looking to expand or apply robotics technology 2) Embracing new technology, new manufacturing methods to improve the products 	<ol style="list-style-type: none"> 1) Economic downturn globally 2) Fierce competition in the robotics and automation industry 3) Increased of labor cost, material cost and production cost 4) Inflation rate

Based on the SWOT analysis, it could be seen that Oceania Robotics has really good higher management team and actual technical team for product development. However when it comes to timeline to deliver project as a service and deliverables for the product to their customers, they sometime fall short due to the lack of middle management to help with project management. It could also be seen that the company is in a very good position with lots of opportunity being at a greenfield industry where opportunities are abundant. With strategic planning and improvements to employee engagement, Oceania Robotics is expected to improve on the company performance and emerge as a strong leader in the robotic ecosystem. However, there do exist several threats to the business where the company have to mitigate the risk for it accordingly.

1.2 PROBLEM STATEMENT

The problem statement of this action research is to look into improving the work efficiency among employees of Oceania Robotics. Based on the observation from the top management, particularly the CEO of the company, employees showed lack of engagement to the company work. Most do their work during the stipulated working hours but is often giving excuse for work not being delivered in the agreed time, some will complain about the heavy work load but often goes back on time without staying back overtime to get the work done, some stays back often but not for work purpose and etc. Hence the company would like to investigate ways to further improve their employees work efficiency and to ultimately deliver better results.

1.2.1 PROBLEM DIAGNOSIS

Oceania Robotics was co-founded 2 years ago by Prof Mohan and Madhu who are deeply passionate about robotics. As a young and upcoming start-up, especially in a competitive robotic ecosystem, employees are expected to adapt and inherit the spirit to drive the growth of the company. As the top management of the company, they would like to see everyone equally passionate or at least treat the job as a career instead of a regular 9 to 6 o'clock job. They are concerned as some of the employees are not as passionate as they hoped for and low in terms of engagement. The top management are very passionate and have plans to train and grow all employees together as the company continues to grow.

Through observation and discussion, some problems that are underpinning the issues were identified. One of the issues identified is the undefined work scope, which leads to employees exploring the different scope of the work without being able to deliver the actual expectation of work. There were instances where work scope was defined; however, due to complexity of the task, they will only spend working hours to resolve the work and will drag the work instead of setting a defined timeline to deliver the work. Hence the employees usually gives excuses instead of results for their failure to deliver the work. However, employees were not flexible enough to meet the change in work scope, which resulted in not being able to deliver the outcome from the changed work scope.

From observation, some employees have unsatisfactory work performance because of poor project management planning and missing project leader in the group. These issues cause the group members in it confused on the next step to be taken for the project. Hence some procrastinated or was waiting for someone else in the group to take the next action step to continue the work. Moreover, junior employees were fearful or respectful of the work hierarchy, which causes junior employees to await instructions from a senior staff instead of leading the work initiative. This waiting causes a delay or seemingly unsatisfactory work performance.

Through an informal interview, it was discovered that the lack in motivation to work causes the unsatisfactory work performance . Some reasons for the lack was because of unattractive career progression, low wages and no clear incentives in placed. These employees, however, are still partially delivering the work. They do however appear to work on time and will leave work on time as well, some do stay overtime but usually not for work related reasons, one possible reason this happened was due to the lack of disciplinary actions coupled with the lack of motivation to deliver on work.

Also, there were some genuine reasons for unsatisfactory work performance, especially from junior employees. It was found out that this is because they have inadequate knowledge in a particular field and have been spending extra time to learn. Hence they could not deliver in time. Partly, the reason they could not deliver is because of the lack of dedication to spend additional hours or outside office hours to get the work done, In some cases, junior employees were juggling between different work instructions from senior employees. Hence the lack of prioritization causes the inability to deliver work promptly.

There are a variety of issues in the study to increase work performance among employees. Some of the reasons are explicit and could be easily addressable. At the same time, some are more implicit, requiring to motivate individuals to improve their mindset.

1.3 RESEARCH QUESTIONS

Among the many problems faced by Oceania Robotics, we will be determining the problems with the few fundamental questions below:

1) What are the current work practices in Oceania Robotics?

As we learn to find ways to improve the work efficiency of the company, we will first need to understand the current work practice in place. By understanding the work practice, we will then be able to analyse the pro and con of it, what works best for the company and what doesn't work. Hence we will then be able to understand better how it correlates to the work efficiency.

2) What are the job satisfaction among employees of Oceania Robotics?

One of the question we will be asking in the action research is to find out what is their job satisfaction throughout their work in the company. Through that, we hope to understand the reason they are not satisfied which could be affecting their work efficiency. For example, perhaps due to money, long working hours or unstructured work where they are not sure of the direction causes them to feel unsatisfied, hence lowering their work efficiency.

3) How to improve work efficiency among employees of Oceania Robotics ?

What will be the best possible way to improve the work efficiency of the employees of Oceania Robotics.

1.4 RESEARCH OBJECTIVES

Based on the research questions, we have formulated a few objectives for the action research:

RO1: To identify the current work practice in Oceania Robotics

RO2: To identify current job satisfaction in Oceania Robotics

RO3: To improve work efficiency among employees of Oceania Robotics

1.5 RESEARCHER'S ROLE

We will be acting as both the observer, researcher and implementer in this action research. The study will be conducted to be thorough enough so that we can understand the underlying problems, and how to improve the work efficiency among the work employees of Oceania Robotics. Through this action research, we want to identify the current work practice of the company, how to recommend a better working style and ultimately improve the work efficiency and for employees to deliver better results. In order to analyse the results of the implementation, a before and after analysis of the intervention will be conducted.

1.6 RESEARCH ETHICS

This action research has been accepted by both UTM, AHIBS and Oceania Robotics Pte Ltd. The research does not pose any danger or risk to any participants. Furthermore, no sensitive data will be disclose, where all data will be reported anonymously and data are analysed on a meta data level. All information received will be kept confidential and strictly be for education purpose in this action research and suggestions to improve for the company.

1.7 SIGNIFICANCE OF THE RESEARCH

This action research is aimed to help the company to improve their employee's work efficiency. By improving their work efficiency, employees can expect better work deliverables, in turn helping the company grow and share more rewards such as better salary, promotion and additional benefit to all employees that should deserve it. We strongly believe the suggestion derived from this action research will also benefit the stakeholders and management of the company whereby not only from the point of theory but also practical means.

1.7.1 SIGNIFICANCE TO THEORY

In today's fast changing business environment, work organization faces fierce competitive pressure both locally and globally to perform. It is more evident during economic downtime as well as the recent Covid-19 where businesses are forced to shut down as they do not have the means to perform globally or simply do not have the cashflow to survive. Some business who are still able to make ends meet are involuntarily getting their employees to take a pay cut or to let them go. In cases like these, it is common for the company to only keep the high performers or essential employees with the highest efficiency to the business. As a result, employees who are under performing or even performing at the nominal efficiency will be left without a job. They continue to struggle getting a job or are left with limited choices to accept whatever jobs that are made available to them. In this case, the jobs are usually contract basis where it is not stable. Hence, they will then live paycheck to paycheck unable to break out of the rat race. The worst possible scenario is when they are not able to secure a new job within 6 months, their chances of getting a job will diminish greatly. This gloomy situation is evitable if we are able to provide a greater value to the company by being a high achiever and performing well in the company. Hence it is important to improve employee efficiency,

whereby indirectly also increasing their competence to bring socio economic advantage to the company as well as ensuring bright future for each employee.

There are many ways to intervene and to improve the work performance. In this action research, we reviewed the main theories to help improve work efficiency among employees of the company. By studying all the current practices of the work place and understanding what works and what doesn't, we are able to gather insights for the intervention plan for the action research. In a study by Sergio Fernandez, empowering the employees with access to job-related knowledge and skills have a positive effect on their work performance (Fernandez and Moldogaziev, 2010). National Performance Review (NPR) also assumed that the underperformance of employees is not due to laziness or incompetency but rigid system that hindered innovation (Carroll, 1995; Gore, 1993; Kettl, 1994; Thompson, 2000). Lastly, research also shows that management behaviours and practices to rewards employees accordingly yielded results (Bowen & Lawler, 1992, 1995; Kanter, 1979). Among the many studies, it also suggested that a redesigning of how work is currently being done should be rethink. Rather than a 9-to-6 routine work routine, task based routine to further empower the employees may be a more powerful aid to improve work efficiency. Therefore we plan to intervene by rethinking the current work practices, empowering employees, improve the system to encourage innovation and to reward employees accordingly in order to improve work performance of all employees.

1.7.2 SIGNIFICANCE TO PRACTICE

Oceania Robotics management team has been encouraging employees to shape the work culture of the company with the vision to be a global leader in the robotic ecosystem. We believe that all employees would like to see themselves improving in terms of career, financially and capabilities wise. We also expect that all employees would also want a better work culture with a goal where work could be balance for their individual interest in life where work is not only a job but a career for themselves.

By increasing the work efficiency of the employees of Oceania Robotics, the effect will help to company to grow and scale, increasing the revenue and profit. This increase in profit will then be able to channel additional aid to the employees with bonus, pay increment and additional work benefits. This could lead to a positive cycle where employees see their hard work benefiting the company and themselves too. Furthermore, by improving the efficiency and allowing the employee to excel in their work, it also allow them to accelerate them to deliver their work on time, where they can have less overtime and more time for their own hobby or family.

The benefit of improving work efficiency for employees of Oceania Robotics is clearly well established, however it requires the full commitment of the entire company. The key challenge is to have everyone onboard without leaving anyone behind. The management team sincerely appreciate all the efforts of the early members of the company and seek their assistance to improve their work efficiency as they hope not to leave anyone behind as the company continues to scale aggressively to be a leader in the robotic industry.

1.8 DEFINITION OF TERMS

Task based work

Task based work is description of a working management style where employee's work is monitored and tracked based on the task accomplished. Employees are evaluated based on the task they accomplished and will be able to freely plan their time as long as they accomplished task that were set out to be done. Some of the example of task based work are in the form of freelancer where they are paid based on the work they produce of the gig economy where a delivery rider is paid based on the delivery they managed to accomplish.

Time based work

Time based work is the description of work management style where employee's work is monitored based on the amount of time they fork out and spend doing the work. The longer the hours the employee work, the higher the pay they receive. Employees are evaluated not based on the work outcome but more on the time they commit and spend doing the work. Their work is not based on the amount of work they delivered within the stipulated time but rather the amount of hours they spend. Some example of time based work are the manufacturing industry where factory workers are paid by the hour or F&B industry where servers are paid an hourly wage.

REFERENCES

1. Fernandez, S., & Moldogaziev, T. (2011). Empowering public sector employees to improve performance: does it work?. *The American Review of Public Administration*, 41(1), 23-47.
2. Carroll, J. D. (1995). The rhetoric of reform and political reality in the National Performance Review. *Public Administration Review*, 55, 302-312.
3. Kettl, D. F. (1994). Appraising the NPR. *The Public Manager*, 23, 3-8.
4. Thompson, J. R. (2000). Reinvention as reform: Assess the National Performance Review. *Public Administration Review*, 60, 508-521.
5. Bowen, D. E., & Lawler, E. E., III. (1992). The empowerment of service workers: What, why, how, and when. *Sloan Management Review*, Spring, 31-39.
6. Bowen, D. E., & Lawler, E. E., III. (1995). Empowering service employees. *Sloan Management Review*, Summer, 73-84.
7. Kanter, R. M. (1979). Power failures in management circuits. *Harvard Business Review*, 57, 65-75
8. Wagenaar, A. F., Kompier, M. A., Houtman, I. L., van den Bossche, S. N., & Taris, T. W. (2015). Who gets fired, who gets re-hired: the role of workers' contract, age, health, work ability, performance, work satisfaction and employee investments. *International archives of occupational and environmental health*, 88(3), 321-334.
9. Fedderke, J. W., & Goldschmidt, M. (2015). Does massive funding support of researchers work?: Evaluating the impact of the South African research chair funding initiative. *Research Policy*, 44(2), 467-482.
10. van den Berg, T. I., Robroek, S. J., Plat, J. F., Koopmanschap, M. A., & Burdorf, A. (2011). The importance of job control for workers with decreased work ability to remain productive at work. *International archives of occupational and environmental health*, 84(6), 705-712.
11. Liu, J. A., Wang, Q., & Lu, Z. X. (2010). Job satisfaction and its modeling among township health center employees: a quantitative study in poor rural China. *BMC health services research*, 10(1), 115.
12. Cummings, A., & Oldham, G. R. (1997). Enhancing creativity: Managing work contexts for the high potential employee. *California management review*, 40(1), 22-38.
13. Posthuma, R. A., Campion, M. A., & Vargas, A. L. (2005). Predicting counterproductive performance among temporary workers: a note. *Industrial Relations: A Journal of Economy and Society*, 44(3), 550-554.
14. Probst, T. M. (2003). Exploring employee outcomes of organizational restructuring: A Solomon four-group study. *Group & Organization Management*, 28(3), 416-439.

15. Taylor, G. R. (Ed.). (2005). *Integrating quantitative and qualitative methods in research*. University press of America.
16. Weinreich, N. K. (1996). A more perfect union: Integrating quantitative and qualitative methods in social marketing research. *Social Marketing Quarterly*, 3(1), 53-58.
17. Matveev, A. V. (2002). The advantages of employing quantitative and qualitative methods in intercultural research: Practical implications from the study of the perceptions of intercultural communication competence by American and Russian managers. *Theory of communication and applied communication*, 1(6), 59-67.
18. Senen, S. H., Masharyono, M., & Edisa, N. (2020, February). The Effect of Job Characteristics to Employee's Performance: A Case Study on Employees at Interior Industry. In *3rd Global Conference On Business, Management, and Entrepreneurship (GCBME 2018)* (pp. 227-232). Atlantis Press.
19. T. (2020, March 12). WHO declares Covid-19 outbreak a pandemic. Retrieved June 1, 2020, from <https://www.straitstimes.com/singapore/who-declares-covid-19-outbreak-a-pandemic>
20. UN News (n.d.). COVID-19: Impact could cause equivalent of 195 million job losses, says ILO chief | UN News. Retrieved June 1, 2020, from <https://news.un.org/en/story/2020/04/1061322>
21. Lund, S., Ellingrud, K., Hancock, B., & Manyika, J. (n.d.). COVID-19 and jobs: Monitoring the US impact on people and places. Retrieved June 1, 2020, from <https://www.mckinsey.com/industries/public-sector/our-insights/covid-19-and-jobs-monitoring-the-us-impact-on-people-and-places>
22. International Labour Organization (2020, April 29). As job losses escalate, nearly half of global workforce at risk of losing livelihoods. Retrieved June 1, 2020, from https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_743036/lang--en/index.htm
23. Phua, R. (2020, April 23). Retrenchments and withdrawn job offers: Singapore's labour market shows signs of COVID-19 strain. Retrieved June 1, 2020, from <https://www.channelnewsasia.com/news/business/covid19-strain-labour-market-retrenchments-rescinded-job-offers-12665732>
24. Ozili, Peterson K and Arun, Thankom, Spillover of COVID-19: Impact on the Global Economy (March 27, 2020). Available at SSRN: <https://ssrn.com/abstract=3562570> or <http://dx.doi.org/10.2139/ssrn.3562570>
25. Phua, R. (2020, April 29). Singapore's total employment plunges in Q1, sharpest drop since SARS. Retrieved June 1, 2020, from <https://www.channelnewsasia.com/news/singapore/employment-unemployment-rate-q1-2020-mom-12687128>
26. The Star Online. (2020, May 03). Covid-19 spurs Singapore's biggest unemployment jump since SARS. Retrieved June 1, 2020, from

<https://www.thestar.com.my/news/regional/2020/05/03/covid-19-spurs-singapore039s-biggest-unemployment-jump-since-sars>

27. Ministry of Manpower. (n.d.). Mandatory notifications on cost-saving measures. Retrieved June 1, 2020, from <https://www.mom.gov.sg/employment-practices/retrenchment/mandatory-notifications-on-cost-saving-measures>
28. Hermes. (2020, April 30). Coronavirus: Range of cost-cutting measures by firms to affect 100,000. Retrieved June 1, 2020, from <https://www.straitstimes.com/singapore/manpower/range-of-cost-cutting-measures-by-firms-to-affect-100000>
29. Neville, W. (1978). The birth rate in Singapore. *Population studies*, 32(1), 113-133.
30. Judge, T. A., Thoresen, C. J., Bono, J. E., & Patton, G. K. (2001). The job satisfaction–job performance relationship: A qualitative and quantitative review. *Psychological bulletin*, 127(3), 376.
31. Bowling, N. A. (2007). Is the job satisfaction–job performance relationship spurious? A meta-analytic examination. *Journal of Vocational Behavior*, 71(2), 167-185.
32. *Think Task, Not Time*. Harvard Business Review. (2014, July 23). <https://hbr.org/2007/03/think-task-not-time>.
33. O'Malley, M. (1992). Time, work and task orientation: a critique of American historiography. *Time & Society*, 1(3), 341-358.
34. Tarro, L., Llauradó, E., Ulldemolins, G., Hermoso, P., & Solà, R. (2020). Effectiveness of workplace interventions for improving absenteeism, productivity, and work ability of employees: A systematic review and meta-analysis of randomized controlled trials. *International journal of environmental research and public health*, 17(6), 1901.
35. Bethune, R., Sasirekha, G., Sahu, A., Cawthorn, S., & Pullyblank, A. (2011). Use of briefings and debriefings as a tool in improving team work, efficiency, and communication in the operating theatre. *Postgraduate medical journal*, 87(1027), 331-334.
36. Zhang, X., Azhar, S., Nadeem, A., & Khalfan, M. (2018). Using Building Information Modelling to achieve Lean principles by improving efficiency of work teams. *International Journal of Construction Management*, 18(4), 293-300.
37. McCusker, K., & Gunaydin, S. (2015). Research using qualitative, quantitative or mixed methods and choice based on the research. *Perfusion*, 30(7), 537-542.

38. Chyung, S. Y., Barkin, J. R., & Shamsy, J. A. (2018). Evidence-based survey design: The use of negatively worded items in surveys. *Performance Improvement*, 57(3), 16-25.
40. Colquitt, L., & Wesson, O. B. (2009). Improving Performance and Commitment in the workplace. *Florida: McGraw-Hill Irwin*, 2.
41. Grant, A. (2019). Productivity isn't about time management. it's about attention management. *The New York Times*, March, 28.
42. Skehan, P. (1996). A framework for the implementation of task-based instruction. *Applied linguistics*, 17(1), 38-62.
43. . A Task-Based Resource Optimized Approach to Project Planning.
44. *Time Management won't save you*. Harvard Business Review. (2021, August 27). Retrieved January 11, 2022, from <https://hbr.org/2021/06/time-management-wont-save-you>
45. *It's task management, not time management*. Speckyboy Design Magazine. (2021, July 6). Retrieved January 11, 2022, from <https://speckyboy.com/task-management/>