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Assessing Incentive-Based Motivation on Team Productivity by an Agent Based Model Presets and Task Difficulty

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Abstract

Background: What people achieve as a team greatly influences how well an organization performs. This is most impacted by how motivated an individual is and how defined the tasks are.
Objective: This study looks into the effects of different levels of task difficulty on team productivity using Agent-Based Modeling (ABM). More specifically, we will study incentive based motivation and its effects on the productivity of a team.
Methods: McClelland's Theory of Needs views achievement, affiliation, and power motives as the key motivators of an agent's effort distribution when it comes to team-centric activities. While effort is seen as a function of the dominant motive intensity, performance is a result of the interplay between individual competency and the complexity of the task. Through heuristic learning from previous task outcomes, agents adaptively modify effort. All behavior rules are mathematically modeled, and formalized in pseudocode and concepts to improve transparency, rigor, and ease of replication.
Results: Motivational composition is really important for team productivity, no matter how hard the tasks are. One-way ANOVA showed impact of motivation profile on the time taken to complete tasks ($p < 0.05$). Achievement–power profiles were the most successful in completing difficult tasks, and achievement–affiliation profiles were the most successful in completing easier tasks. There were less differences in the middle difficulties, and with power motivation, there were still quicker times.
Conclusion: This study demonstrates the power of agent-based modeling (ABM) to examine and determine the best motivation-task systems alignment in organizational structures of emergent team dynamics. Additionally, this study reinforces the need to ensure that the complexity of the incentive systems matches the complexity of the tasks at hand.

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INTRODUCTION

In some organizations, their tasks are done by small teams, which are quite dependent on each other, to perform certain functions (Q. Liu et al., 2020). Although previous studies say motivation is important for individual performance, not many studies look at how different motivation levels in members of a team interact with the team's task performance (Cady et al., 2019; Orji & Vassileva, 2023). This paper tries to study how incentive-based motivation theory and agent-based modeling can be used to study how team productivity evolves. According to team

productivity studies, the contribution of individual team members is the most important. In the last two decades, empirical measurement of the quality of teamwork shows that the individual effort allocated to the team significantly influences the teams overall output, Setiyono & Hasni (2025). In other words, teamwork explains a portion of the increase in productivity of the team members and company.

Research has shown that composite contribution scores can demonstrate an individual's performance, which reveals how a particular team may perform, outside of the standard team metrics. Therefore, a model assessing team performance should integrate individual performance and productivity. Managers often see a teams output as a reflection of their individual ability but this team productivity is overlooked because the individual team members motivational needs are not met. The author states that motivation is a critical factor that impacts the efficiency of the team in achieving their objectives (Kanze et al., 2021).

Motivation means reason for a person's specific action. In a work or team setting, motivation can be separated into areas because of psychology such as the need for achievement, the need for affiliation, the need for power, etc.; and from behavior and performance (i.e. self-report questionnaires) to empirically and theoretically oriented studies to evidence based approaches to the respective combinations (Corpuz et al., 2022). This forms the basis of goals, choices, and the weighting of different motivational variables. In a work setting, motivational factors are used to persuade someone to do something, and it is common for people to consider the value of a motivational factor before deciding to do it or not (Y. Liu et al., 2020).

What I have gathered from this research is that incentive-based motivation refers to effort aimed at completing a given task and receiving a reward. Incentives such as bonuses and other monetary rewards are easier to incorporate into research studies as they are easier to model than other types of motivation. While other types of motivation besides monetary rewards are present, incentive-based systems can be controlled and modeled to see the possible influence of adding or removing expected rewards, or increasing or decreasing the size of a reward, or a combination of both, on the motivation to perform a certain task, as well as on the collaboration or teamwork required to accomplish a goal of the task (Aggarwal et al., 2025; Riedl & Woolley, 2017). The motivation to improve one's personal performance and to meet a standard is called achievement motivation (Brunstein & Heckhausen, 2025; Werdhiastutie et al., 2020).

People motivated by achievement tend to go towards moderately difficult requests. In other words, people motivated by achievement try to stay away from requests that are too simple or requests that are very complex and require extensive high order analytical thinking or system design with time constraints and system optimization (Houichime, 2025). Such requests allow for the effort-result linkage to be more readily apparent. It involves the desire to better one's own performance (and to meet one's own standards). People with a lot of motivation for achievement look for requests that are moderately hard with the expectation that the effort expended will yield a reward.

There are three motivational ranges. We'll start off with achievement motivation. This is motivation to improve individual performance and achieve personal goals. Achievement-oriented people prefer challenges. Here, challenges are defined as tasks that are difficult, but achievable. An example could be an analytical problem, an unfinished project module that is bound by a timeframe, or an unfinished system design that needs to be optimized to a certain performance goal. Here, motivation comes from the outcome of the task, therefore, a direct link can be established. Affiliation motivated workers prefer simple tasks as they are likely to achieve success and receive the reward, even if that reward is small. Power Motivation is the need to control or influence people. This is the reason people go for difficult goals that are more challenging to achieve but offer bigger rewards.

Each type of motivation is associated with a different level of difficulty of the tasks involved. For example, people with achievement motivation do better with tasks of medium difficulty. People with affiliation motivation do better with tasks that are not very difficult. People with power motivation tend to take on tasks that are very difficult, as long as there are high rewards involved.

The purpose of this study is to determine the impact of different motivational profiles on team production and how the profiles, in conjunction with the individual strengths of team

members, impact the overall efficiency of team production. Everyone's potential is measured according to their ability to complete a task, and how quickly they can complete a task is determined by the difficulty of the task. Here, ability refers to a characteristic that defines the processing capacity and associated skill level of a person, which in turn, defines the efficiency of task completion. One way of assessing the efficiency of a group is to examine the productivity of a team, and in this situation, team productivity refers to the sum of the results of individual team members as measured by the total time taken to complete a given task and the total amount of work done over a defined number of cycles. For the assessment of team productivity, this study utilizes Agent Based Modeling (ABM) to simulate the teamwork process. What conditions, if any, do different motivational profiles produce to impact team productivity, as evidenced by the time taken to complete tasks of varying difficulty levels? This is the question this study attempts to address.

Let us look at some more background information before we delve into the interface of the study. Team work productivity: This paper states that teamwork productivity does not solely depend on the pool of skills available, but also on the level of motivational needs of each individual member. This agrees with the other studies, which shows that the motivational needs of members of a team, as well as the effectiveness and efficiency, are strong predictor of a team's productivity.

Motivation and Incentives: This paper uses Merrick and Shafi's (2011) achievement, affiliation, and power motive as a theory of motivation. The model determines a person's motivation relative to their need for achievement, affiliation, and power.

Agent-Based Models (ABM): The introduction describes the strengths of ABMs as the ability to model complex systems, such as team dynamics at the workplace. Regarding this particular research, the ABM models the interactions of workers and contributions to a team, given the individual's motivation, ability, and the complexity of the task at hand. As for structuring ABM simulations, the ODD (Overview, Design Concepts, and Details) protocol is referenced.

This paper sets out that balancing team member motivational profiles with task challenges is important for improving productivity. This research's originality comes from the use of agent-based simulation for the first time to measure and model the interactions and determine the motivation–task configuration. Beyond contributing to theory, the results of this research inform evidence-based incentive structures, team composition, and task assignment policies. This is a way for organizations to empirically restructure productivity of teams in light of varying degrees of difficulty of the tasks.

Literature Review

Motivation in the Workplace

The studies have showed that motivation is a huge influence on personal and group performance. It is an internal state that forces someone to do something. It is also helpful in driving a person's decision and keeping them engaged to do something. Motivation helps influence how an employee organizes their tasks, how much effort an employee exerts in doing the task, and the outcome that an employee achieves in doing the task. Motivation helps people focus their energy on goal and helps people make a decision on what rewards are of value to them (Ahmad et al., 2024).

The research paper talks about incentive-based motivation, meaning motivation to perform an action is based on the expectation to receive an award after completing a task. Motivation in the workplace is often dependent on the type of incentive offered and how rewarding that incentive is to the individual. Multiple forms of motivation impact the performance of individuals in a workplace, especially in a team context. This paper focuses on three forms of motivation which include:

Achievement Motivation: People with achievement motivation are focused on self-improvement and social and personal standards. They are most likely to take on tasks that present a fair challenge to their skills. People with high achievement motivation have been researched to select goals that are of moderate difficulty with possible positive outcomes that are equal to the effort and difficulty required (Merrick & Shafi, 2011).

Affiliation Motivation: This motivation centers on wanting to build social relationships and keep social ties. Those who are motivated by affiliation tend to like easier tasks. This is

because doing tasks that are easier feels like there is a greater chance to succeed at it even if those tasks are less rewarding (Merrick & Shafi, 2011). Power Motivation: People who are motivated by power seek to obtain influence and dominance over others, as well as control over and position to higher social standing. These people tend to prefer more challenging tasks as even though there is a lesser chance to succeed at it, the possible rewards are much more greater (Merrick & Shafi, 2011).

The Role of Abilities and Team Productivity

Besides your motivation, your ability is another determining factor when it comes to your productivity. Ability is the result of one's personality, social abilities, and experience or knowledge which could also be hereditary. Ability describes one's potential to do a given work. This also determines the effectiveness of the employees in achieving the collective goals.

Workplace productivity is how much work gets done in how much time, compared to the resources used. High productivity means that resources are used effectively and efficiently, and this relies on the skills of the employees (Ofor-Douglas, 2021). Rubin (2017) noted that increasing workplace productivity involves more than just increasing output. There is also a need to develop the employees' skills and to assign work that is aligned to the employees' abilities.

The research highlights that both personal skills and motivational factors play a major role on the productivity of team work. A team member's ability to add to the output of a team is determined not just by the skills in their skillset but by the extent to which any of their motivational needs (achievement, affiliation, power) are satisfied (Y. Liu et al., 2020).

Agent-Based Models in Productivity Research

The study applies agent-based modeling (ABM) to study how motivational scenarios have varying effects on team productivity. Often, agent-based modeling is used for representations of systems in which individual agents (workers) interact among themselves and with their environment and produce emergent effects that can be analyzed and quantified. Iskandar (2024) characterize ABM as modeling techniques that help to capture individual actions and their effects on system behavior.

ABMs fit best when analyzing team dynamics because they offer a sophisticated level of detail for modeling the effects of different motivating factors on the interactions of individual agents and the subsequent performance of the team (Di Pietrantonio et al., 2019). Each agent is modeled as a worker, which has a distinct motivational profile and different capabilities, all of which affect their level of contribution to the overall productivity of the team. The motivational profile, as noted by Datseris (2024), is an important contributor to the understanding of individual incentivized motivation and how it impacts the overall productivity of a team within a work environment.

Using ABM methods, scientists can create simulations of various task difficulties and motivational profiles. Analysts can use the simulations to determine what conditions may best improve team productivity in the field. Merrick and Shafi (2011) suggest one model that demonstrates the effect of motivational profiles (achievement, affiliation, and power) of people and artificial agents on the choice of tasks and the attainment of goals. This model is what the agent-based simulation of this study is centered on.

The Impact of Task Difficulty on Motivation

Past research shows that for teams to perform well, team members' motivation, and the difficulty of the tasks, should be aligned. Tohidi (2011) points out motivated employees involve themselves in the organization, and therefore, the organization performs better. This study models how varying motivation levels, and differing task complexities impact the team's completion time for the tasks.

The authors have developed simulations based on the findings and different motivational profiles with different levels of task difficulty. Task difficulty is given a Task Difficulty Value (TDV), which is randomly assigned between the values of 1 and 100. The ABM then estimates the likelihood of completing the task given workers' motivation profiles and level of experience and difficulty of the task.

The Relationship Between Motivation and Task Completion

Past research has shown that when teams are given tasks that match the individual motivation of the team members, team performance is maximized. Motivated employees are more likely to perform at higher levels and, as a result, the organization performs better (Tohidi, 2011). The purpose of this research is to model the different motivational factors and their complexity with respect to task difficulty and measure the effect this has on the time that teams take to complete their tasks.

As per what was previously expected of (2011), the results of the study simulation show that the overall impact on team performance is substantially increased by the optimal combination of motivating factors/driver/combustion and task difficulty.

METHOD

Research Design

We will use an agent-based modeling (ABM) approach to demonstrate and assess the impact of diversified worker motivations, specifically focusing on achievement motivation, affiliation motivation, and power motivation, on productivity. The ABM approach allows each worker to be treated separately with unique motivational profiles and unique sets of skills. Each worker will perform their own simulations, and the aggregation of their individual outputs will constitute the total productivity of the team.

For this research, the ABM framework is most applicable as it can capture, observe, and measure the individual level behaviors and interactions in conjunction with the environmental variables (e.g., difficulty of the task). This study uses the ODD protocol as an example of an agent-based model framework and describes an overview, design concepts and details which will be addressed in following sections (Grimm et al., 2010).

	Elements of the original ODD protocol (Grimm et al., 2006)	Elements of the updated ODD protocol
Overview	1. Purpose 2. State variables and scales 3. Process overview and scheduling	1. Purpose 2. Entities, state variables, and scales 3. Process overview and scheduling
Design concepts	4. Design concepts • Emergence • Adaptation • Fitness • Prediction • Sensing • Interaction • Stochasticity • Collectives • Observation	4. Design concepts • Basic principles • Emergence • Adaptation • Objectives • Learning • Prediction • Sensing • Interaction • Stochasticity • Collectives • Observation
Details	5. Initilization 6. Input 7. Submodels	5. Initialization 6. Input data 7. Submodels

Figure 1. ODD Model Updated by Grimm (2010)

Agent-Based Model Framework

This model seeks to understand what motivates each individual employee to help improve a team's performance and level of productivity. This model is open to examining different employee motivation and level of difficulty of the task as variables to analyze differences in the time taken to complete a task. Each employee is assigned as an agent of the model and each employee has a type of motivation and level of ability. State variables of the model includes motivation employee types as low or high achievement motivation, affiliation motivation, or dominance motivation, and uniform ability level distributed in the range of 1 to 5. Each task is assigned a state variable of difficulty as a randomly assigned Task Difficulty Value (TDV) ranging from 1 to 5. In the simulation, assignments of employees (agents) to tasks of varying difficulty were performed in order to measure team productivity based on the time spent completing the task, which is determined by individual performance of each agent. The simulation is performed multiple times to measure team contribution and task completion time as well as to determine the impact of varying employee motivation profiles on team productivity.

Design Concepts

This model is based on the idea that each employee contributes to the productivity of the team based on their own role-specific psychological (motivational) and structural (skills) attributes. Motivational type (achievement, affiliation, or power), and the role-specific (semi) structural trait is the determinant of the efficiency that is carried out as a result of performing a particular (discrete) task. The model suggests that there is a combination of psychological and structural role traits, and there is a psychological match at a definitional level of productivity to task ease and the motivational type of the worker at task difficulty. Team productivity is regarded as an emergent property that results from the interaction of team agents, where the motivation profile of the team agents and the level of difficulty of the task cause variations in the output of the team.

Each agent is trying to do his job and to complete the simulation with the same level of motivation and ability. Because of this, motivation and ability remain constant, and thus no adaptive behavior or changes are experienced. Learning mechanisms are also excluded, with this model concentrating on the hypothesized motivational profiles and their impact on productive behavior of the teams faced with the different scenarios of the same job. After intergene's indirect interactions through the contributions to the team's cumulative output, the variables were used to measure the impact of different motivational profiles at different levels of the job's demands. To do this, task completion time and total team contribution were used after randomizing the task difficulty and employee abilities that stemmed from the uniform distribution, resulting in a variance of task completion time and total team contribution.

Details:

At the start of every simulation, a group of employees (agents) is assigned motivation profiles and ability levels, while the task difficulty is randomly assigned for each task. The simulation is carried out for a fixed number of agents and tasks, then the model goes through the cycle of task allocation and task completion. The model internally creates all characteristics, motivation profiles, ability levels, and task difficulty levels, therefore, this model doesn't use external data. Motivational parameters for agents may vary (2) as high, or (1) as low for each of the three motivation types. One of the most important submodels for Agent-Based Modeling (ABM) is used to estimate each employee's contribution to the overall productivity of the team, and the contribution is influenced by the motivation and skills combination each agent possesses.

Simulation and Computational Procedure

The simulations for this study run the agent-based model repeatedly to identify the relationship between the various motivational profiles held by the agents and team productivity. In the study simulations, there are 20 worker agents and 20 tasks. With respect to the motivational profiles, the agents are divided into 27 different combinations determined by the level of achievement motivation (Sach), affiliation motivation (Saff), and power motivation (Spow).

In order to make the statistics more robust, each simulation run is replicated 30 times. Each simulation run records the time spent by the team to finish each task. Observations were done for tasks with high and low difficulties. The worker ability parameter is randomized to assign some value between 1 and 5 to each agent for every simulation run.

This model uses a random mechanism of 5 + 2 to set a random task-difficulty-value. A task's difficulty level changes randomly because of this mechanism. The time it takes for a task to be completed is measured as the time duration of a given task to the entire team. The team contribution is calculated as the total contributed value of all the team members during the completion of the task.

For this project, agent-based modeling and simulations will be implemented using the NetLogo software. NetLogo's graphical user interface (GUI) will help the researcher to see what agents do and how they interact while completing the assigned tasks. In the GUI, the user can change the number of workers, the number of tasks, the difficulty of the tasks, and the different motivation profiles.

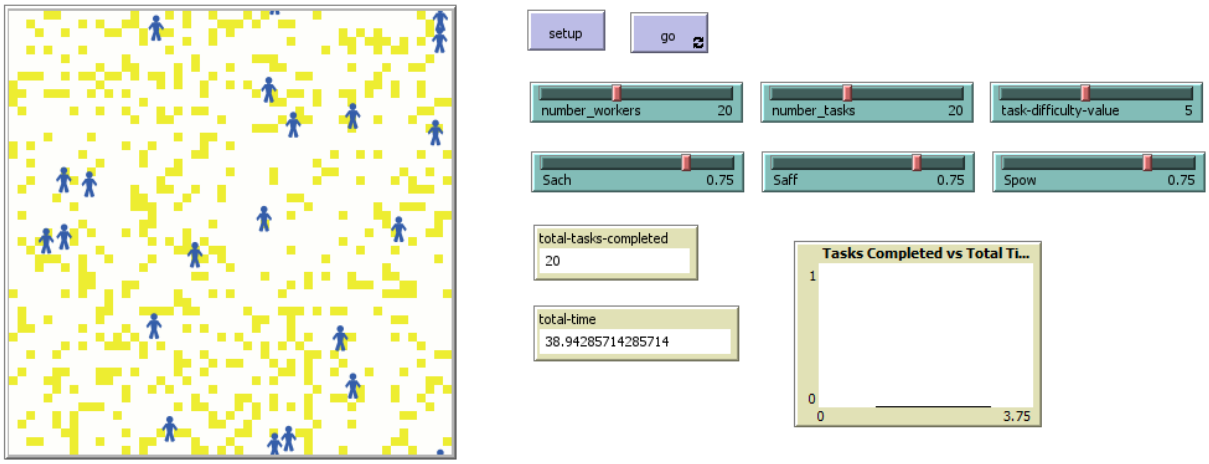

Figure 2. Shows the interface of netlogo

Simulation Analysis

We reviewed the simulation results to see which motivational profile achieved the most productivity for the different levels of difficulty of the task. In this case, the analysis is focused on the motivational profile sets, especially which combinations of high versus low achievement, affiliation, and power motivation and how this influences the time taken to complete the tasks.

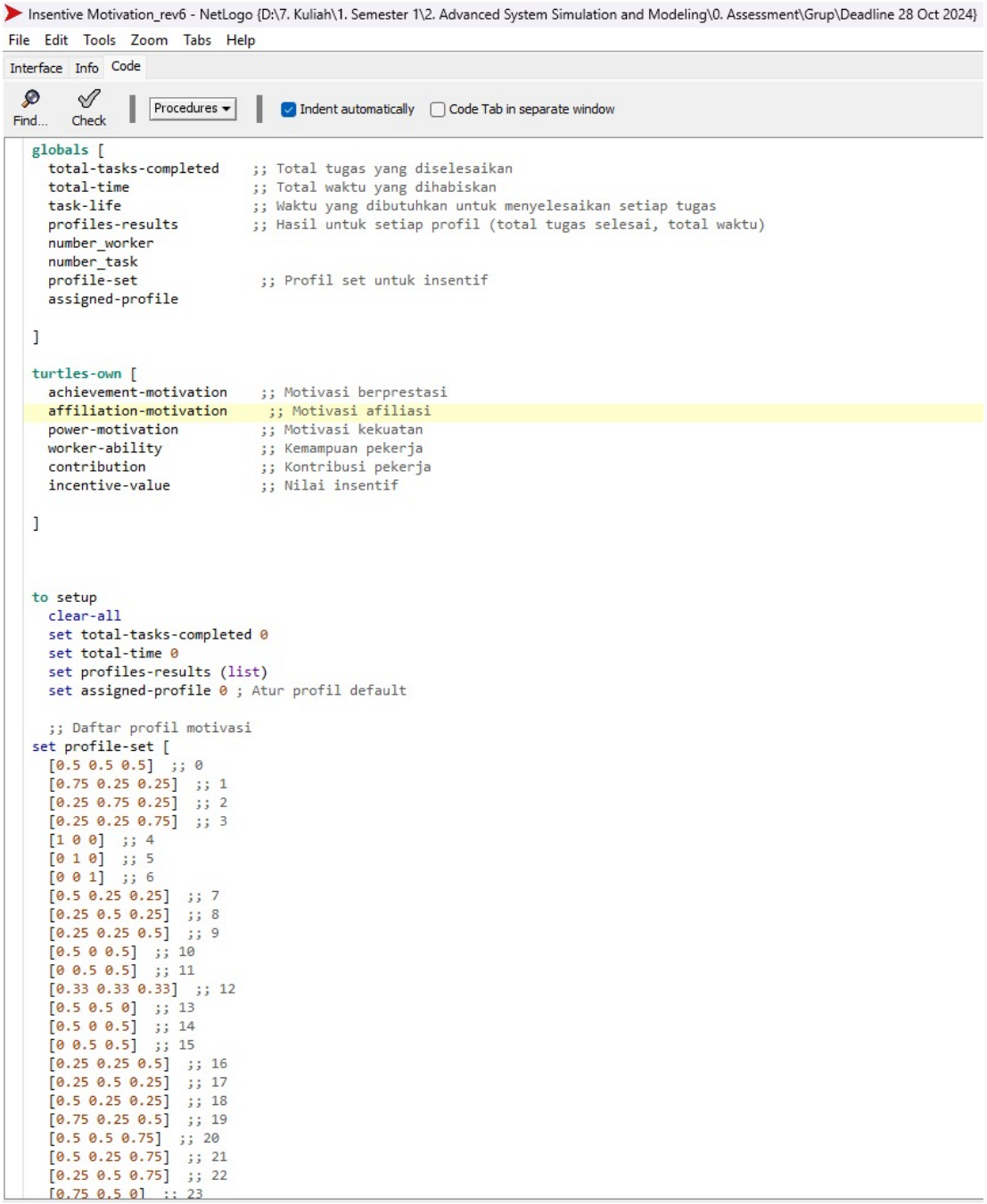

Figure 3. Shows the code to simulate profiles in netlogo.

RESULTS AND DISCUSSION

Results

High Task Difficulty

Here is what the simulation results, 20 agents are tested with 27 different sets of profile meaning each profile is a mix of everything from achievement motivation, affiliation motivation, and power motivation.

Table 1. High Task Difficulty

Profile Set	y1 (Sach)	y2 (Saff)	y3 (Spow)	Total Time
1	0.75	0.75	0.75	38.94
2	0.75	0.75	0.5	37.27
3	0.75	0.75	0.25	40.42
4	0.75	0.5	0.75	30.82
5	0.75	0.5	0.5	29.29
6	0.75	0.5	0.25	32.64
7	0.75	0.25	0.75	50.66
8	0.75	0.25	0.5	24.54
9	0.75	0.25	0.25	27.62
10	0.5	0.75	0.75	38.27
11	0.5	0.75	0.5	42.57
12	0.5	0.75	0.25	45.07
13	0.5	0.5	0.75	39.73
14	0.5	0.5	0.5	36.58
15	0.5	0.5	0.25	48.02
16	0.5	0.25	0.75	16.96
17	0.5	0.25	0.5	39.66
18	0.5	0.25	0.25	35.3
19	0.25	0.75	0.75	39.5
20	0.25	0.75	0.5	18.12
21	0.25	0.75	0.25	52.77
22	0.25	0.5	0.75	35.37
23	0.25	0.5	0.5	49.41
24	0.25	0.5	0.25	42.61
25	0.25	0.25	0.75	36.63
26	0.25	0.25	0.5	49.43
27	0.25	0.25	0.25	42.8

Based on the data, for the case of high task difficulty, the shortest average completion time was recorded for Preset 16 (16.96), while the second best time was recorded for Preset 20 (18.12). Preset 16 consists of medium achievement (SAch), low affiliation (SAff), and high power (SPow). With this configuration, performance may be enhanced, since high power (SPow) facilitates goal control and decisiveness. With regards to achievement (SAch), medium levels tend to reinforce performance standards without the excessive risk avoidance. With regards to affiliation (SAff), low levels reduced social emotional dependency and, therefore, task focus can be greater. These all hold true to the motivational theory.

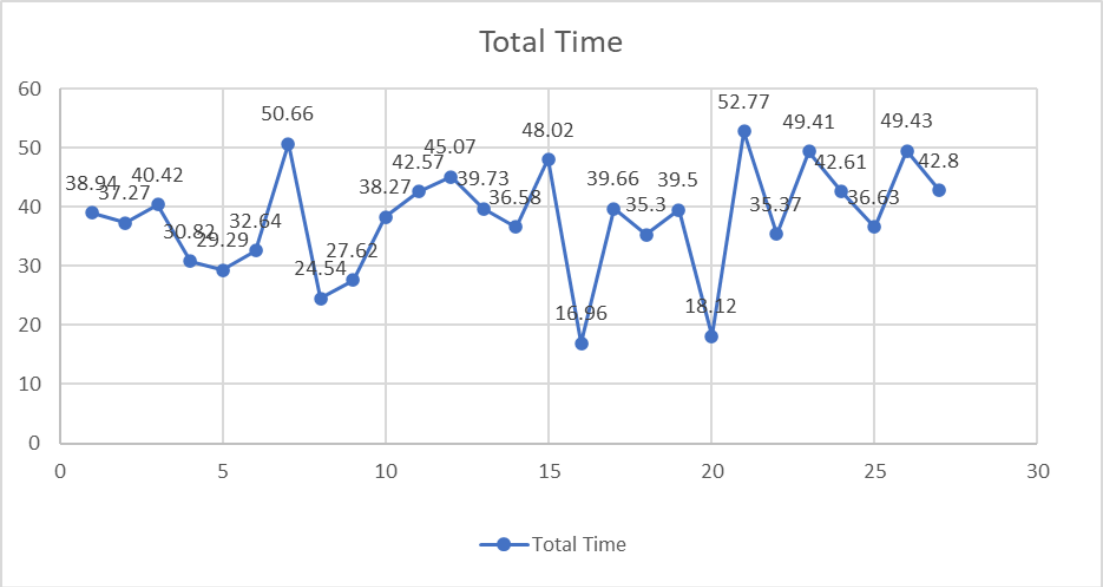

Figure 4. Result of high task difficulty

According to the Graph, there are only K results for H task difficulty. Only to presets are able to complete the task in the time below the value 20 and most presets are averaging on the value of 37.81481. This shows that people with a low amount of achievement and low power motivation, are less likely to constructively engage in high difficulty tasks, and are likely to funnel their effort into less challenging tasks instead.

People with a low drive for achievement and low drive for power motivation seem to contribute less to tasks that are high in difficulty and may redirect their effort toward completing tasks that are low in difficulty. Interestingly, in the motivational configuration study, only 2 presets were found to finish in under 20 minutes. The two presets with power motivation and achievement orientation. Meaning someone with power motivation is less likely to be frustrated or angry and achievement orientation leads to someone being persistent and decisive and putting in the effort to achieve goals. However, the presets with low power and low achievement seem to lack the driving and controlling elements that point to a deficiency in performance, which would result in prolonged task completion.

Medium Task Difficulty

Regarding medium task difficulty, this shows that most presets are capable of completing the task in a relatively short time span. However, individuals with a motivation in power are able to complete the task in an even shorter time span.

Table 2. Medium Task Difficulty.

Profile Set	y1 (Sach)	y2 (Saff)	y3 (Spow)	Total Time
1	0.75	0.75	0.75	21.94
2	0.75	0.75	0.5	17.73
3	0.75	0.75	0.25	30.36
4	0.75	0.5	0.75	45.08
5	0.75	0.5	0.5	23.76
6	0.75	0.5	0.25	35.63
7	0.75	0.25	0.75	28.04
8	0.75	0.25	0.5	31.06
9	0.75	0.25	0.25	24.56
10	0.5	0.75	0.75	23.16
11	0.5	0.75	0.5	25.69
12	0.5	0.75	0.25	22.84
13	0.5	0.5	0.75	13.2
14	0.5	0.5	0.5	19.06
15	0.5	0.5	0.25	29.58

Profile Set	y1 (Sach)	y2 (Saff)	y3 (Spow)	Total Time
16	0.5	0.25	0.75	23.06
17	0.5	0.25	0.5	22.86
18	0.5	0.25	0.25	34.66
19	0.25	0.75	0.75	24.86
20	0.25	0.75	0.5	15.65
21	0.25	0.75	0.25	29.76
22	0.25	0.5	0.75	24.92
23	0.25	0.5	0.5	17
24	0.25	0.5	0.25	31.72
25	0.25	0.25	0.75	23.36
26	0.25	0.25	0.5	25.91
27	0.25	0.25	0.25	28.17

Most presets can complete the medium task difficulty and take a longer time compared to the high task difficulty. Averaging the time of 25.689. So out of the 27 presets, 20 test agents, clearly find it a lot easier to complete the medium task difficulty.

Low Task Difficulty

Most presets have little to no issues in completing the task with a low task difficulty. They spend an average of 8.53 in time completing the task.

Table 3. Low Task Difficulty.

Profile Set	y1 (Sach)	y2 (Saff)	y3 (Spow)	Total Time
1	0.75	0.75	0.75	9.38
2	0.75	0.75	0.5	5.55
3	0.75	0.75	0.25	8.97
4	0.75	0.5	0.75	7.93
5	0.75	0.5	0.5	8.1
6	0.75	0.5	0.25	9.98
7	0.75	0.25	0.75	9.06
8	0.75	0.25	0.5	8.32
9	0.75	0.25	0.25	10.25
10	0.5	0.75	0.75	9.09
11	0.5	0.75	0.5	7.61
12	0.5	0.75	0.25	10.52
13	0.5	0.5	0.75	8.7
14	0.5	0.5	0.5	8.01
15	0.5	0.5	0.25	9.02
16	0.5	0.25	0.75	7.53
17	0.5	0.25	0.5	8.91
18	0.5	0.25	0.25	7.17
19	0.25	0.75	0.75	7.28
20	0.25	0.75	0.5	5.96
21	0.25	0.75	0.25	8.8
22	0.25	0.5	0.75	8.18
23	0.25	0.5	0.5	11.09
24	0.25	0.5	0.25	10.93
25	0.25	0.25	0.75	8.61
26	0.25	0.25	0.5	7.32
27	0.25	0.25	0.25	8.29

Table 3 shows that, with low task difficulty, most presets reached completion times of under 10 time units. This suggests that, with task simplicity, there is less of a variance in the performance of motivational profiles. This shows that, with low task difficulty, the individual differences in motivational intensity are less impactful on productivity.

Some tendencies are still noticeable. It seems most of the time, preset combinations of

moderate-to-high achievement (SAch ≥ 0.5) and moderate power motivation (SPow ≥ 0.5) are the fastest. Even in low difficult contexts, goal orientation and control effort seems to improve efficiency. On the other hand, low power motivation and low achievement are most of the time some of the slowest completion times, however slow performance seems to differ less in low challenging tasks. It still seems the power and achievement motivation are still there, even if low, to keep the task execution slower.

CONCLUSION

This study relates team productivity to the fit between motivational profiles and the difficulty of the respective task. People with high achievement–power motivation perform well with high task difficulty and those with achievement–affiliation motivational profiles perform well with low task difficulty. These results answer the research question by showing that different motivational profiles result in different productivity levels depending on the difficulty of the task. This study also shows how Agent-Based Modeling (ABM) is effective in assessing team dynamics across various simulation designs, which is a breakthrough in this field. Despite various strengths, the model is still limited due to its over-simplified behavior models and simulated rather than real organizational data. Future studies could benefit from increased external validity and robustness of the model by using real organizational data, increased time frames, and adaptive learning.

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AUTHOR CONTRIBUTION STATEMENT

Researchers rely on feedback from their collaborators and the writers of this research are no exception. As corresponding author, Andy Gunawan managed the overall development of the research framework, drafted the design of the agent-based model, managed the simulations and statistical (ANOVA) processes, and drafted the final version of the publication. Nur Fadhila contributed to the synthesis of the literature review, development of the Incentive-based Motivation and McClelland's Theory framework, specification of model parameters, data interpretation, and authored and edited the paper. Simulations were done by Anastasia Sharleen, who coded, debugged the agent-based model, created the simulations, visualized the results, and verified the simulations. Suharjito led the statistical evaluations, aided in method validation, reviewed model specifications under the ODD protocol, and offered critical and constructive feedback to improve the paper.

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