The Influence Of Project Managers' Decision-Making Styles On Schedule Variance In Building Construction Projects

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ABSTRACT

This research focus to assess the relationship between project managers decision making styles and schedule variance in building construction projects in Sri Lanka. Timely completion of construction projects is one of the major performance indicators, yet delays are a long-standing issue in Sri Lankan construction projects. Though there are many causal factors, decision-making styles of project managers have not been studied yet, creating a significant knowledge gap with regard to their influence on project schedule variance. This study attempts to analyze the relationship between project managers' decision-making styles: directive, analytical, conceptual, and behavioural and schedule variance in Sri Lankan building construction projects. A mixed-methods research approach was adopted. Primary data were gathered by holding semi-structured interviews with nine industry practitioners and a questionnaire survey of 50 respondents covering key project roles. To analyze the data code based content analysis and descriptive statistical tools (percentage count, mean, weighted average etc.) were used and to examine the relationship between decision-making styles and schedule variance Pearson correlation was conducted. Results revealed that decision making styles play a significant role in influencing project schedules. However, it was found that directive and behavioural styles are most prevalent and successful styles in the Sri Lankan context. The data revealed both positive and negative influences of managerial decision-making styles on schedule performance. These results contribute to the link between leadership and project performance and make a theoretical and practical contribution by revealing decision-making as a key influence to minimize schedule variance.

KEYWORDS: *Project Manager, Decision Making styes, Schedule Variance, Building Construction Projects, Correlation analysis, Behavioural and directive styles.*

INTRODUCTION

The construction industry is a vital sector of any country's economic output; the industry plays a crucial role in contributing to national targets for physical, economic, and social needs (Kalambayi et al.,2021). However, the success of a construction project depends on the cooperation between the parties involved to the project like the building owners, contractors and project managers (Rauzana, Anita, 2016). Project managers must make prompt and wise decisions since construction projects are marked by uncertainty, changing stakeholder expectations, and frequent scope revisions (Saed et al., n.d.). since their decision-making approaches can affect project performance metrics, such as cost, quality, schedule variation (Zavadskas et al., 2010) etc. Cost control is basic to managerial accounting. Schedule control is more recent. Integration of schedule and cost control has been a natural objective of project-control systems since the late 1970s (Castro-Lacouture et al., n.d.; Robert Carr, n.d.). Schedule variance is the difference between the earned value of work performed and that which was scheduled. It provides a clear idea whether a project is ahead, on track, or behind schedule. A positive Schedule Variance indicates the project is ahead of schedule, while a negative Schedule Variance means the project is behind (Robert Carr, n.d.; Boom & Bucket, 2023). Therefore , Project managers as leaders in construction projects have a significant role to play to ensure for their team a sense of purpose, shared vision, and incentivize action (Prabhakar et al., 2016) and specially to make sure minimal schedule variance within the construction period.

Existing research focused on general decision making and leadership skills and on external factors like material delay, resource shortages (Shanian & Savadogo, 2006). However, the impact of these styles on schedule variance is not well understood. There is a lack of empirical research on their impact on schedule variance in construction project. Therefore, there is a gap of understanding the real relationship between the decision-making styles and the schedule variance in construction projects. Hence, this research aims to bridge the gap by investigating the relationship between project managers' decision-making styles and schedule variance in construction projects. By examining how different decision-making approaches impact on overall schedule of the project, this study aims to provide awareness that will help improve decision-making frameworks in construction management, ultimately improving project efficiency and reducing delays. To fill

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this gap aim to assess The Relationship Between Project Managers' Decision-Making Styles, Schedule Variance in Construction Projects.

LITERATURE REVIEW.

Decision-making is an integral part of the management process within every organisation and at every level (Davis et al., 1990; Esa et al., 2014). It is a process required from project managers at every step to avoid serious buffering in a project schedule (Esa et al., 2014). In the case of construction projects, decisions are often based on schedules drawn up at the early planning stage (Castro-Lacouture et al., n.d.), and decision making becomes even more crucial in construction projects with complexity, uncertainty and dynamic site conditions are common (Belout & Gauvreau, 2004). According to Saed et al. (n.d.), understanding how project managers approach decision-making becomes a necessary step in mitigating risks related to schedule variance. Therefore, project managers are often required to respond to evolving conditions, deal with multiple stakeholders, and resolve problems that can delay project progress. Poor decisions such as mistaken procurement lead times or underestimating resource needs can provide significant schedule variance (Oyewobi et al., 2016).

Classification of decision-making styles.

Researchers have proposed varying conceptualizations of decision making styles, ranging from quite simple to very complex (Loo, n.d.; Oyewobi et al., 2016) as shown on the Table 2-1.

Table 0-1 Classification of decision making styles.

Classification	Source
The Scott and Bruce (1995) Five-Style Model **Rational (**Decision makers seek comprehensive information searches and evaluate alternatives logically**)** **Intuitive (**Decision-makers rely on instinct and hunches using situational awareness rather than systematic analysis**)** **Dependent (**Seeking opinions and advice to justify decisions**)** **Avoidant (**People procrastinate and avoid decisiveness**)** **Spontaneous (**Make quick decisions **)**	[1] [2] [3] [4] [5] [6] [7] [8]
Some approaches equate decision-making style to the amount of information obtained and number of alternatives considered **Decisive** (values action, quickness, effectiveness, consistency) **Flexible** (interest in speed, change plans) **Systemic** (integrative and hierarchic nature, frame problems broadly)	[2] [3] [6]
Analytic, Behavioral, Conceptual, and Directive	[3] [4] [9]
The concept of heuristics	[10] [11]
Avoidant, Dependent, Confident, Anxious, Vigilant, Spontaneous, Intuitive, Brooding, and Respected	[12]
[1]Gambetti & Giusberti, 2019 [2] Kurban & Yaşar, 2017 [3] Loo, n.d. [4] Oyewobi et al., 2016 [5] Strang et al., 2023 [6] Thunholm, 2004 [7] Scott & Bruce, 1995 [8] Strang et al., 2023) [9] Rowe and Mason.,1987 [10] Tversky and Kahneman.,1974 [11] Nicholas and Steyn, 2020 [12] Mohd et al., 2019 [13] Esa et al., 2014	

From the above classifications, based on both practical suitability and theoretical alignment with the construction management context, the author selects: directive, analytical, conceptual, and behavioural styles. These four styles capture fully the diverse cognitive and social approaches managers frequently display when confronted with time-sensitive, complex, and resource-limited situations (Kurban and Yasar, 2017) and in terms of cognitive complexity and values orientation (Rowe and Mason, 1987).

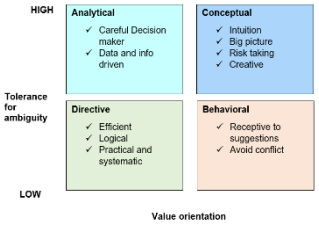

Figure 0-1 Selected 4 decision Making styles

Understanding schedule variance in construction.

Scheduling is pivotal to construction project success (Derbe et al., 2020). Developing a solid construction project schedule (CPS) is one of the main determinants of project success(Derbe et al., 2020). Time and cost management are among the most conspicuous elements of project management(Chin & Hamid, 2015). Effective time management is paramount for construction projects(Chin & Hamid, 2015) and entails planning, monitoring, control, estimating, scheduling, and schedule control (Borges, 2018; Chin & Hamid, 2015).

Despite its importance, the state of time management in the construction industry, at least in some settings, is said to be mostly low, which leads to issues such as late completion and time overrun (Borges, 2018; Przywara & Rak, 2021; Solís-Carcaño et al., 2015) Delays are described as insidious, which more often than not lead to time overrun, cost overrun, disputes, and even project abandonment(Chin & Hamid, 2015).

Schedule variance indicates the deviation between the planned schedule and actual progress or completion time(Adepu et al., 2023; Borges, 2018). It can be influenced by various variables, from schedule reliability and choice of CPS methods to project complexity, schedule risks and their predictability, project financing, team coordination, availability of materials, and uncontrollable events such as weather (Castro-Lacouture et al., n.d.).

Earned Value Method (EVM) metrics are a few methods that can be applied to monitor and analyse time and cost deviations, for instanc Forecasting schedule variance is a meaningful field, and methodologies are required to help project managers in this estimation Calculation of delay claims is often aimed at determining each party's liability and measuring the effects, which requires a number of delay analysis techniques, time deviations from the schedule (T/S)(Robert Carr, n.d.; Shehu et al., 2023) (Rauzana, 2016; Yoon & Brett-MacLean, 2019)

RESEARCH METHODOLOGY

The author adopted a mixed-methods approach in this research, allowing qualitative and quantitative evidence in the scope. The study employed a deductive approach, combining theory-driven insights with empirical data. A comprehensive literature review initially explored the various decision-making styles identified from existing research. From the wide range of styles managers frequently use, the author selected: directive, analytical, conceptual, and behavioural for further investigation.

Under phase I, semi-structured interviews were conducted with identified managerial-level professionals in building construction projects to collect qualitative data, as interviews are suitable for eliciting facts, knowledge and opinions from selected respondents (Yang et al., 2014). The questions were focused on decision-making styles in use and their influence on project timelines and contextual factors affecting decision-making. The qualitative data were then analysed using code-based analysis to identify themes and patterns based on the responses.

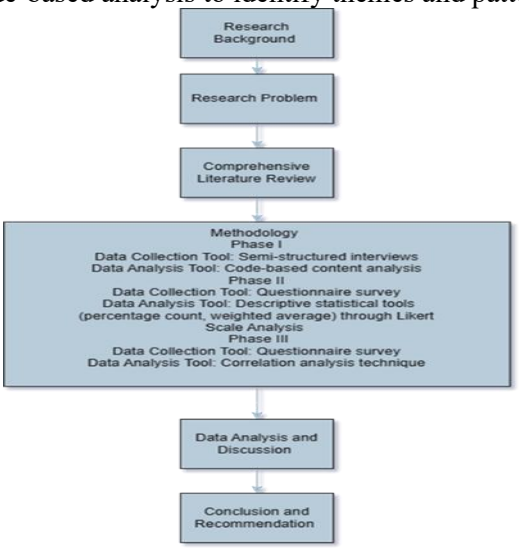

Figure 0-2 Research process

The author administered a questionnaire survey under phase II, incorporating the literature review and phase I findings. Questionnaire surveys are a standard method for evaluating concepts by gathering information through standardised questions. The questionnaire was distributed among a broader group of construction

professionals, incorporating a Likert scale to gauge the frequency and perception of each decision-making style and how it influences schedule variance. The collected data were then analysed using descriptive statistical measures to summarise central tendencies, variability, and overall response patterns.

Likert Scale analysis is one of the tools used to quantify people's attitudes, opinions, or habits, which indicate the level of agreement on a scale for statements (Awang et al., n.d.). The scale typically provides options such as "Very High," "High," "Moderate," "Low," and "Very Low" to record a range of responses (Nemoto & Beglar, n.d).

$$Weighted\ mean = \frac{\sum_{i=1}^{n} \omega_i \cdot x_i}{\sum_{i=1}^{n} \omega_i}$$

In here,
ω=Frequency of responses
x =Rating of each factor (Gammanage & Gunarathna, 2022)
Correlation analysis technique in the excel used to establish the relationship between the decision making styles and the schedule variance(Selvanathan et al., n.d.).

Scale of correlation coefficient	Value
$0< r \leq 0.19$	Very Low Correlation
$0.2 \leq r \leq 0.39$	Low Correlation
$0.4 \leq r \leq 0.59$	Moderate Correlation
$0.6 \leq r \leq 0.79$	High Correlation
$0.8 \leq r \leq 1.0$	Very High Correlation

Figure 3-3 The table of correlation coefficient

DATA COLLECTION AND ANALYSIS

Below charts, figures and tables show how analysed the collected data from the Semi structured interviews and from the questionnaire survey. From the interviews found which decision-making styles are mostly use in the industry, which is the best decision-making styles for Sri Lankan context, how decision-making styles impact on the schedule variance. From the questionnaire survey found that frequently using decision making styles and whether that decision making styles change on the phases like information.

Table 0-2 Demographic data of the interviwers

Role in the Industry	Experience in the industry	Experience as a Project Manger	Experience as Managerial Level Profettional in the
Project Manger	32	12	32
Architect	5	2	2
Project Manger	7	6	5
Project Manger	30	17	22
Project Manger	33	4	19
Project Manger	5	1	1
Project Manger	25	16	20
Quantity survey	19	17	17
Project Manger	28	25	18

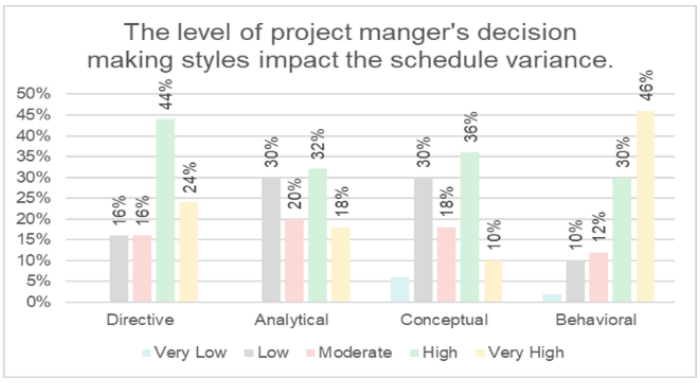

Figure 0-4 To what level decision making styles impact the schedule variance.

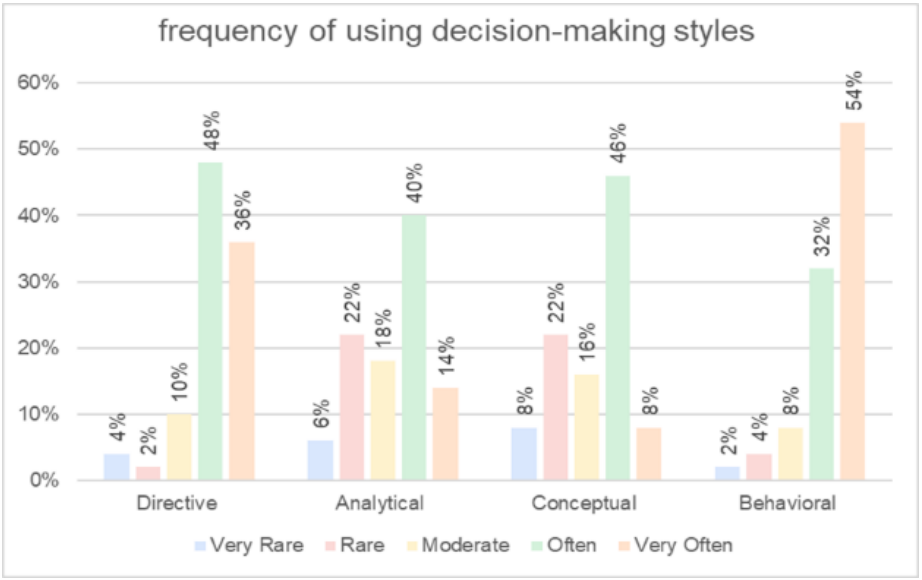

Figure 0-5 Frequency of using decision-making styles in building construction projects

Below Tables show how interviews show the impct on sheduel varive due to the decision making styles.

Table 0-3 Positive impact on schedule variance due to the decision making style

	Directive	Analytical	Conceptual	Behavioral
R1	Allows rapid decision-making in critical moments, helping to keep the project on track during urgent situations.	Ensures decisions are well thought out and backed by data, which helps prevent mistakes that could cause future delays.	Encourages forward-thinking and innovative approaches, helping anticipate and mitigate long-term scheduling risks.	Promotes team collaboration and strong communication, leading to a more committed workforce and fewer misunderstandings, which keeps the schedule on track.

R2	Helps keep the project on track by making fast decisions, especially useful during site changes or urgent design issues	Ensure that decisions are well thought out, minimizing errors and rework, which stabilizes the project timeline	Allows for innovative solutions that can preempt future delays and make the overall project smoother in the long term	Improves team collaboration and communication, which helps in resolving on-site problems quickly and avoiding misunderstandings
R3	Strong Leadership in High-Pressure Situations	Accurate planning through data	Creative problem solving	Reduces miscommunication
R4	Fast decision-making based on experience leads to fewer delays; especially beneficial in solving urgent site issues; has a high positive impact on schedule variance.	Thorough analysis helps avoid mistakes and rework; improves accuracy of plans and reduces risks.	Brings innovation and long-term solutions; enhances coordination among stakeholders (used mainly by client-side project managers and consultants).	Improves team morale, collaboration, and reduces conflicts; creates a supportive working environment.
R5	Helps in making quick decisions under urgent or unexpected conditions (e.g., land ownership dispute in Galle project), which prevents project standstill.	Enables evaluation of technical problems (e.g., sand shortage) and supports sound alternatives like re-scheduling tasks.	Aids in project-wide strategic planning and aligns decisions with long-term objectives.	Encourages teamwork when dealing with unexpected on-site issues, although not regularly used.
R6	Enables fast action when urgent decisions are required (e.g., design change or government policy shift), which avoids schedule pauses.	Helps in maintaining accuracy and alignment with schedules through evidence-based planning.	Ensures alignment with project vision and goals, aiding in strategic decision-making.	Sometimes improves coordination and team engagement, especially in collaborative tasks.
R7	This type is required where the project requres quick and fast decisions are required in urgent situations. In these moments, the project manager shall use his experience and shold be able to get some risks in calculated manner	This type is especially useful for initial project planning and perticularly for Macro level planning & decision making. The analytical data shall be useful for fine-tuning and mitigation of variances during the progress.	This type can be useful specially for initial planning stage. In modern projects this type is not frequently used. But this may useful according to the situations.	This type is very important since the experiance of the whole management team can be brought into account. Very useful for handling long duration projects, but, I do not think this is useful when urgent decision making is required.
R8	Enables fast solutions to contractor-side issues and external disruptions like weather (e.g., delivering apartments quickly despite rain)	Helpful in continuously delayed projects; decisions based on analyzed data bring accuracy	Can be used to strategize during delays; helps bring long-term solutions with proper framework	Reduces disputes, improves collaboration, and helps in concurrent problem-solving (e.g., delays from both parties)

R9	Can get rapid decision without delay			This improves team members knowledge about project sheduels.

Table 0-4 Negative impact on schedule variance due to the decision-making styles

	Directive	Analytical	Conceptual	Behavioral
R1	May overlook key details due to the focus on speed, which can result in issues that later disrupt the schedule	Decision-making can become too slow, causing bottlenecks when quick action is required.	Might divert attention from immediate project needs, focusing more on vision than on pressing site issues.	Could slow down decision-making if too much emphasis is placed on team consensus, potentially delaying progress when quick decisions are needed.
R2	Sometimes decisions are made too quickly without fully analyzing design complexities, which can lead to mistakes that require fixing later.	Decision-making can be too slow, especially when waiting for all data, which can delay interior work start dates.	May overlook practical constraints in pursuit of big ideas, potentially causing delays in approvals or implementation.	Can lead to over-consultation and indecision, delaying timelines when too many opinions are factored in.
R3	May make decisions too quickly without fully considering all variables or stakeholder input, leading to missteps or rework.	Decision-making can be too slow, especially in time-sensitive situations, causing delays.	Long-term focus may delay urgent, shortterm decision-making needed to stay on schedule	Trying to satisfy everyone could result in compromises that extend timelines.
R4	Sometimes leads to ignoring alternatives or stakeholder input, but overall, it tends to have more positive than negative impact.	Slow decision-making can delay progress; over-analysis may create bottlenecks.	If overused without practical grounding, it can create confusion or unrealistic expectations.	Too much focus on consensus may slow decisions and dilute accountability.
R5	While fast, it may lead to costly decisions (e.g., shifting tasks during sand delay results in additional expenses).	Can delay decisions if overused in time-sensitive scenarios	May not be practical alone; if not grounded in current site reality, it could misalign progress.	Rarely used, but in sudden team-led decisions, lack of strong authority might cause delays.
R6	Hasty decisions might increase workload or costs (e.g., sudden column addition for variation causes delay).	May delay actions due to time spent collecting and analyzing data.	If too focused on the concept, can ignore practical issues leading to schedule overruns.	Team-dependent and influenced by personal attitudes, which can disrupt schedule flow if conflict arises.

R7	In this type, it is very inportant to focus on the situation. If the decision maker is not capable to consider the whole project and the impact to be imposed on the each and every activity, the situation may be more difficult.	Due to the heavy dependent on the statistics data, it is very important to gather with the sufficintly accurate data. Due to the required urgency of decision making, the accuracy of the outcomes may low and may leads to enhance the variance.	Since this is more dependent on the skilfulness of the PM, this is very personel dependent. May lose the attention on most important facts.	Like above, this type is more dependent on the team attitudes. This may take long time to come up with a decisions.
R8	May lead to resistance from experienced professionals if their ideas are ignored; causes delay due to lack of collaboration	Can delay decisions due to time required for data collection and analysis	May result in unfocused or slow decisions; teams might take multiple days to finalize	Similar to conceptual; can delay actions if team lacks focus or decision-making clarity
R9	Team members may feel their contributions are unimportant	slow decision making can delay project shedule	lack of practical in real situations	sometimes it gets difficult to manage conflicting perspectives

Table 0-5 Best decision-making style for Sri Lankan construction context

	Which is best for Sri Lankan building construction projects.
R1	The Behavioral style fits best for building construction projects in Sri Lanka. This is because the success of a project largely depends on team collaboration and mutual understanding among all stakeholders.
R2	A combination of directive and behavioral styles is best for Sri Lanka's construction sector. Quick decisions are often needed on-site, but effective communication and collaboration are equally critical to keep projects on schedule
R3	Combination or situational decisionmaking approach is well-suited for construction projects in Sri Lanka, where each project may come with unique challenges and diverse stakeholders.
R4	In practice, a combination or situational approach is the most suitable for Sri Lankan building construction projects. In large, highly structured projects with the involvement of all three parties (client, consultant, contractor), all four styles are needed and usually applied.
R5	Directive style most suitable for Sri Lankan construction because many projects require fast decisions by top-level managers. Highly practical during issues like ownership conflicts or material delays. However, overuse may ignore cost implications.
R6	In Sri Lankan context, all four decision-making styles are essential and should be applied situationally.
R7	Combined with Directive Style is the KEY. The projects in Sri Lanka have some additional constrains like "Cost Constrains", "Insufficient skilled work forces", "Client's influences", etc, and those things may be some additional pressure on PM team. Therefore, specially projects in Sri Lanka requre lots of micor level attention is required. Therefore, Derective Style will be the key type. However, it is required to use the Behevioral Type in force as the main supportive stayle.
R8	All four styles must be used as per the PM team, Project Type and the situation.
R9	Directive and Behavioral styles. If use both high efficiency of decision making. Employees get clear directions without having confusions.

According to the majority, behavioural patterns are the best, but some confirm that directive is the key decision-making style, and, combined with directive, others can be used situationally. This study conducted a correlation analysis to establish the relationship among the variables, which was determined based on Figure 4.1

Table 0-6 Corelation Table

Frequancy of project mangers use of decision making style with the level of Impact on the sheduel variance		
Style	Correlation coefficient	Value
Directive	0.325113051	Low
Analytical	0.505118572	Moderate
Conceptual	0.665739505	High
Behavioral	0.678027879	High

Correlation analysis indicated that the different decision-making styles influence schedule variance in building construction projects to varying degrees.

These findings highlight that strategic, inclusive, and collaborative styles of decision-making are more effective in managing project schedules than task-oriented styles.

DISCUSSION

A study in Sri Lankan building construction projects, involving interviews with nine experts and a survey of 50 practitioners, examined how project managers' decision-making styles, Directive, Analytical, Conceptual, and Behavioural styles, impact schedule variance. Directive and Behavioural styles dominate due to their fit for fast-paced, teamwork-driven environments, while Analytical and Conceptual styles are less used due to time constraints. All styles influence project schedules, with Behavioural and Directive boosting efficiency and coordination, and Analytical and Conceptual aiding long-term planning, sometimes causing delays. Behavioural and Conceptual styles strongly correlate with reduced schedule variance, followed by Analytical and Directive styles. Positive effects include enhanced efficiency, communication, and strategic planning, while adverse effects involve hasty decisions, misunderstandings, over-analysis, and impractical planning, with styles varying by project phase.

CONCLUSION

A study on decision-making styles (DMS), directive, analytical, conceptual, and behavioral in Sri Lankan construction projects, revealed their significant impact on schedule variance. directive and behavioral styles were most frequently used and effective, enhancing team coordination and timely project completion, while analytical and conceptual styles supported planning but risked delays. The suitability of DMS, particularly Behavioral and Directive, depends on project size, complexity, and team dynamics, with Behavioral showing the strongest correlation with reduced schedule variance. Poor decision-making was linked to delays, rework, and cost overruns, while effective DMS improved efficiency and communication. Recommendations include training managers in adaptive DMS, using tools like Earned Value Management, applying phase-specific strategies, and raising awareness of potential negative effects like rushed decisions or over-analysis. Future research should expand surveys, explore DMS interactions with leadership styles or biases, and incorporate objective measures for broader insights.

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