

The N-Curve Leadership Model and the Situational Reliability Leadership Matrix for Supporting Technician-to-Leader Transitions

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Abstract

Reliability and maintenance organizations routinely promote their best technicians into supervision, and many struggle in their first year or so. This conceptual paper argues that such struggles are better treated as a predictable, under-managed transition than as individual weakness. It introduces the N-Curve Leadership Model, which describes leadership effectiveness, defined through observable team and behavioral measures, as moving from a promotion peak through a performance dip driven by identity shift, cognitive overload, ambiguity expansion and peer-to-leader conflict, to adaptation and mastery. It then presents the Situational Reliability Leadership Matrix, a diagnose, assess, match, intervene and advance cycle that matches organizational support to the leader's stage, together with a weighted transition risk index. Trajectory and hazard models with assumed parameters illustrate the logic: in the base case, structured support reduces cumulative performance loss by 61 percent and the eighteen-month exit probability from 14.4 to 7.0 percent, but the benefit falls to little or nothing for leaders who experience no dip or only a shallow one, and depends on support actually changing dip depth. These outputs describe the model, not observed outcomes. The paper sets out four organizational mechanisms, a cost break-even rule for transition support and five propositions for longitudinal testing.

Keywords: leadership transition; technician-to-leader promotion; performance dip; situational leadership; succession planning; maintenance leadership; reliability management

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1. Introduction

A familiar question in reliability and maintenance organizations is how many technically exceptional supervisors and leaders fail within their first twelve to eighteen months of promotion. The pattern is well known to experienced managers. A high-performing technician or engineer is promoted on the strength of technical excellence. The person is technically brilliant and respected by peers as the go-to expert. After promotion, however, the new leader suddenly struggles: communication breaks down, conflicts multiply and priorities blur. Decisions become reactive, team morale declines and the reliability of the equipment the team maintains becomes unstable. In some cases, the new leader is removed or leaves, and the organization loses both a promising leader and a highly capable technician.

This pattern is not new. Peter and Hull (1969) described the tendency of organizations to promote people until they reach a level at which they are no longer competent, and Benson et al. (2019) found empirical evidence of this Peter Principle among sales workers, showing that firms promote the best salespeople into management even though sales performance predicts managerial performance poorly. Hill (2003) documented the difficulties of new managers, who discover that management requires a different identity and skill set from individual contribution. Charan et al. (2001) described the leadership pipeline as a series of passages, each requiring leaders to change their skills, time applications and work values, and argued that many leaders fail because they do not make these shifts.

The core argument of this paper is that the issue is rarely technical incompetence; it is leadership development and transition failure. This is a systems problem, not a people problem. Organizations follow a predictable failure pattern: they promote on technical competence, assume that leadership capability transfers naturally, provide little or no transition support and react only after performance has declined. The operational consequences are significant. In maintenance, a struggling leader is associated with lower mean time between failures and overall equipment effectiveness, longer mean time to repair, growing preventive maintenance backlogs, higher safety incident rates, burnout and regrettable attrition (Muchiri et al., 2011). These consequences extend beyond the individual to the reliability of operations.

The industry context makes the problem urgent. An aging workforce means that experienced leaders are retiring faster than replacements are developed (DeLong, 2004). Automation is expanding, with robotics-enabled operations and artificial intelligence-driven maintenance systems requiring leaders who can manage environments in which people and machines work

together (Essandoh et al., 2025). Operational complexity is increasing, so that leadership errors propagate faster and further through interdependent systems. And the leadership pipeline is fragile, because organizations promote technical excellence but fail to build leadership readiness.

This paper addresses the transition problem with two connected contributions. The first is the N-Curve Leadership Model, which describes the predictable trajectory of leadership effectiveness through a technician-to-leader transition and identifies the mechanisms that drive the performance dip. The second is the Situational Reliability Leadership Matrix, abbreviated SRLM, a stage-by-stage intervention framework that integrates the N-Curve with situational leadership theory. The paper also proposes diagnostic indicators and a transition risk index, models the effect of structured support on the transition trajectory, and sets out four organizational interventions. Section 2 reviews the literature, Section 3 describes the method, Section 4 presents the N-Curve, Section 5 the diagnostic indicators, Section 6 the SRLM, Section 7 the organizational interventions and illustrative trajectory analysis, Section 8 the discussion, and Section 9 concludes.

The paper addresses three research questions. RQ1 asks what trajectory leadership effectiveness follows through a technician-to-leader transition and which mechanisms drive the performance dip. RQ2 asks how the dip can be detected early using behavioral and operational indicators. RQ3 asks how organizational support can be matched to the leader's stage and what effect such support is likely to have on the depth and duration of the dip. These questions extend leadership pipeline research from the identification of passages to the dynamics within them (Charan et al., 2001).

The paper is one of three related conceptual contributions by the author on reliability leadership. It addresses the transition of technicians into leadership roles and the organizational support that transition requires, whereas the companion contributions address task-level leadership matching and the assessment of leadership competencies. It therefore uses situational leadership only as a principle for matching organizational support to the transitioning leader, and does not develop competency measurement (Charan et al., 2001).

2. Literature Review

2.1 Promotion and the Peter Principle

The practice of promoting the best performers into leadership is widespread because past

performance is visible and promotion is a natural reward. Yet the skills that make an excellent technician differ from those that make an effective leader. Peter and Hull (1969) proposed satirically that people rise to their level of incompetence, and Benson et al. (2019) provided rigorous evidence: among sales workers, the best salespeople were more likely to be promoted, but their sales performance was negatively correlated with the performance of the teams they subsequently managed. The firms studied effectively traded the output of their best salespeople for weaker management. Maintenance organizations face the same trade-off when they promote their best technicians without preparing them to lead. Talent matching models show that technical fit does not guarantee success in a broader role (Akhigbe et al., 2023), and engagement research on technical talent platforms shows how communication shapes whether people stay (Wikiri et al., 2022).

The leadership pipeline literature explains why the trade-off arises. Charan et al. (2001) identified a series of leadership passages, starting with the move from managing oneself to managing others, and argued that each passage requires a change in skills, in how time is spent and in what the leader values. The first passage is particularly difficult because it requires the new leader to value getting work done through others rather than doing it personally. Technical experts often find this shift hard, because their identity and sense of worth are tied to technical execution. Talent development research in global technology markets similarly finds that strong technical preparation does not by itself prepare professionals for the people dimensions of their roles (Wikiri, 2019).

2.2 Role Transitions and Identity

Research on role transitions provides theoretical grounding for the performance dip. Nicholson (1984) proposed a theory of work role transitions in which people adjust to new roles by changing themselves, changing the role or both, depending on the novelty of the role and the discretion it affords. Ashforth (2001) described role transitions as processes of disengaging from an old role identity and engaging with a new one, often passing through a liminal period in which neither identity is secure. Ibarra (1999) showed that professionals moving into new roles experiment with provisional selves, trying out new identities before settling on one. Bridges (1991) distinguished the external change of a new role from the internal transition of letting go of the old identity, passing through a neutral zone and making a new beginning.

These perspectives suggest that the performance dip is not a sign of individual weakness but a

normal feature of transition. The new leader is between identities: no longer the expert technician, not yet a confident leader. During this period, effectiveness naturally falls before it rises. Organizational socialization research supports this view, showing that newcomer adjustment depends on role clarity, self-efficacy and social acceptance, all of which organizational tactics can influence (Bauer et al., 2007). Studies of new leader assimilation find that structured processes for integrating new leaders with their teams improve outcomes (Manderscheid and Ardichvili, 2008).

2.3 Cognitive Load, Stress and the Demands of Leadership

The shift from technical execution to leadership increases demands on attention and judgment. Cognitive load theory holds that working memory is limited and that performance suffers when demands exceed capacity (Sweller, 1988). New leaders face many simultaneous demands, including people issues, planning, reporting, stakeholder management and emergencies, often without established routines for handling them. The job demands-resources model holds that strain arises when job demands exceed job resources, while resources such as support, autonomy and feedback buffer the effects of demands (Bakker and Demerouti, 2007). Karasek (1979) showed that high demands combined with low decision latitude produce strain. New leaders often experience high demands with limited resources, because they lack the skills, networks and routines that experienced leaders have built. Control room research shows how alarm loads overwhelm human attention (Karasek, 1979), and studies of decision-making in high-consequence process upsets show how unfamiliar demands degrade judgment (Ekelemu et al., 2025a). New leaders face a comparable overload of signals and decisions.

Ambiguity compounds these demands. Technical work typically has defined procedures and measurable outputs, whereas leadership involves uncertainty, competing priorities and incomplete information. Leaders must decide without clear answers and must accept that many of their outcomes depend on other people. For people whose expertise lies in solving well-defined technical problems, this shift is disorienting. Research on human error in high-risk activities shows that errors increase when people face unfamiliar demands without adequate preparation (Obriki and Arumosoye, 2020), and the same logic applies to the decisions of new leaders.

2.4 Peer-to-Leader Transitions

A distinctive challenge in technician-to-leader promotions is that new leaders often supervise their former peers, including friends and technicians older and more experienced than themselves. This shift changes relationships. Former peers may test the new leader, expect special treatment or resent the promotion. The new leader may avoid difficult conversations to preserve friendships or may overcorrect by becoming distant and directive. Leader-member exchange theory holds that leaders develop relationships of differing quality with different followers, and that high-quality relationships are associated with better outcomes (Graen and Uhl-Bien, 1995). Peer-to-leader transitions disrupt existing relationships and require them to be renegotiated on a new basis. Inclusive leadership affects project team performance in diverse settings (Amayo et al., 2023), and change management research shows that new leaders must manage resistance as well as tasks (Eyetsemitan et al., 2023).

Psychological safety is important here. Edmondson (1999) showed that team learning depends on members feeling safe to raise concerns and admit mistakes. A new leader who is insecure in the role may inadvertently reduce psychological safety, for example by reacting defensively to challenges from experienced technicians. Conversely, a leader who builds trust while establishing clear expectations can turn peer relationships into a strength. In safety-critical maintenance environments, the shift supervisor acts as an active human barrier against failures (Ekelemu et al., 2025b), so the quality of the leader's relationships with the team has direct safety implications.

2.5 Leadership Development and Succession

Leadership development research offers evidence on what helps. Day et al. (2014) reviewed twenty-five years of research and concluded that leader development is a long-term process that integrates formal programs with experience and reflection. Lacerenza et al. (2017) found in a meta-analysis that leadership training improves learning, transfer and results, particularly when it includes practice, feedback and spaced delivery. Longitudinal evidence also shows that structured management education strengthens professional development over time, which supports early investment in the leadership preparation of technical staff (Onwuzulike et al., 2024). Dragoni et al. (2009) found that developmental assignments build managerial competencies, especially for those with a strong learning orientation. Mentoring is associated with career benefits for protégés, including promotion and satisfaction (Allen et al., 2004), and Kram (1985) described the career and psychosocial functions that mentors provide. Talent

development models for distributed operations (Falemi et al., 2020) and workforce optimization during expansion (Falemi et al., 2023b) emphasize structured capability building, and industry-academia collaboration can modernize the technical learning that precedes leadership (Nwangwu et al., 2019). Professional development research (Joseph and Nwankwo, 2024) and coaching education (Ogbona et al., 2020) support continuous development across career transitions. Nurse leadership research shows how front-line leaders are prepared for crises (Ohunyon et al., 2023), how nurse-led quality improvement raises standards (Ayinde et al., 2023) and how organizational readiness for generative AI depends on management capability (Ayinde et al., 2025).

Transition-specific practices also matter. Watkins (2003) proposed that leaders in new roles should aim to reach a breakeven point at which they contribute as much value as they consume, and set out strategies for the first ninety days, including learning, securing early wins and building coalitions. Succession planning ensures that organizations prepare people for leadership roles before vacancies arise (Rothwell, 2010). Structured mentorship models for on-the-job technician development, including coaching schemes linked to promotion, provide a vehicle for preparing technicians for leadership (Amarahobu et al., 2025). Strategic recruitment and integration frameworks highlight the importance of onboarding in building workforce capacity (Akhigbe et al., 2020), and human resource development initiatives support career progression when they are deliberate (Okafor et al., 2025). Developing leadership capacity in care facilities shows that structured preparation of front-line leaders improves service outcomes (Ohunyon et al., 2025).

2.6 Situational Leadership

Situational leadership theory holds that leaders should match their behavior to the development level of followers for each task, combining direction and support in proportion to competence and commitment (Hersey and Blanchard, 1969; Blanchard et al., 1993). The four styles are directing, coaching, supporting and delegating, matched to four development levels. Empirical support is mixed, with the strongest evidence for the value of structure for less developed followers (Thompson and Vecchio, 2009), and studies suggest that agreement between leaders and followers about development level is associated with better outcomes (Thompson and Glasø, 2018). This paper applies situational logic not only to how new leaders lead their teams but to how organizations and senior leaders support new leaders through their transition.

2.7 Positioning Against Existing Transition Models

Table 1 positions the N-Curve Leadership Model and SRLM against established contributions on leadership transitions using five dimensions: a described trajectory of effectiveness, named mechanisms of the performance dip, stage-matched organizational support, an early-warning measure and links to operational reliability indicators. The leadership pipeline identifies passages (Charan et al., 2001), research on new managers describes their struggles (Hill, 2003), the first-ninety-days approach offers transition strategies (Watkins, 2003), role transition theory explains identity change (Nicholson, 1984; Ashforth, 2001) and new leader assimilation research addresses team integration (Manderscheid and Ardichvili, 2008). Each addresses part of the problem; none integrates the five dimensions for maintenance organizations.

Table 1. Comparison of leadership transition models with the N-Curve and SRLM across five dimensions

Model	Effectiveness trajectory	Named dip mechanisms	Stage-matched support	Early-warning measure	Link to reliability indicators
Leadership pipeline	No	Partial	Partial	No	No
Becoming a manager	Partial	Yes	No	No	No
First ninety days	Partial	No	Partial	No	No
Role transition theory	Partial	Yes	No	No	No
New leader assimilation	No	Partial	Partial	No	No
N-Curve and SRLM (this paper)	Yes	Yes	Yes	Yes	Yes

2.8 Research Gap

The literature explains why technical experts struggle when promoted, describes the identity and cognitive challenges of role transitions and offers evidence on leadership development, mentoring and onboarding. However, there is no stage model specific to technician-to-leader transitions in reliability and maintenance organizations that links the trajectory of effectiveness to diagnostic indicators and to stage-matched interventions. The leadership pipeline describes passages but not the shape of the transition within a passage (Charan et al., 2001). Situational leadership describes how to lead followers at different development levels but has not been applied to the development of leaders themselves. This paper fills these gaps with the N-Curve

Leadership Model and the SRLM.

3. Methodology

The study develops conceptual models and an intervention framework through a design-oriented approach (Hevner et al., 2004; Peffers et al., 2007). The knowledge base was assembled through an integrative review of research on promotion, role transitions, cognitive demands, leadership development, situational leadership and maintenance management (Torraco, 2005; Snyder, 2019). The models were also shaped by the author's professional experience leading reliability engineering, robotics and facilities maintenance teams and observing the transitions of technicians and engineers into supervisory and management roles, and by discussion of the models with reliability and maintenance practitioners in the author's consulting practice and industry presentations, which informed the wording of the stages and indicators. This feedback was informal and does not constitute validation of the model.

The N-Curve Leadership Model is a conceptual stage model. The effectiveness values associated with each stage are illustrative representations of the shape of the trajectory, not measured quantities. The diagnostic indicators were derived from the literature and practitioner experience. The trajectory analysis in Section 7 uses a simple mathematical model with illustrative parameters to show how structured support could change the depth and duration of the dip; it is not an empirical estimate. The design objectives were that the models should be understandable to practitioners, grounded in theory, diagnostically useful and linked to practical interventions.

This is a conceptual article in the sense of Jaakkola (2020) rather than a systematic review. Sources were selected purposively from research on promotion, role transitions, cognitive demands, leadership development and situational leadership, together with applied studies from a curated practitioner-research bibliography retained only where they addressed a specific element of the model. Sources were coded to elements following Webster and Watson (2002), as mapped in Table 2, without claiming exhaustive coverage.

Table 2. Evidence map linking model elements to the sources that inform them

Model element	Principal conceptual sources	Applied and contextual sources	Use in the model
Promotion and the pipeline	Peter and Hull (1969); Benson et al. (2019); Charan et al. (2001)	Wikiri (2019)	Motivates the transition problem
Identity and role transition	Nicholson (1984); Ashforth (2001); Ibarra (1999); Bridges (1991)	Not applicable	Grounds the dip and its mechanisms

Model element	Principal conceptual sources	Applied and contextual sources	Use in the model
Demands and overload	Sweller (1988); Karasek (1979); Bakker and Demerouti (2007)	Ekelemu et al. (2025a)	Explains cognitive overload and ambiguity
Support interventions	Watkins (2003); Kram (1985); Allen et al. (2004); Bauer et al. (2007)	Amarahobu et al. (2025)	Designs SRLM interventions
Stage-matched support	Blanchard et al. (1993); Thompson and Glasø (2018)	Falemi et al. (2025)	Matches support to stage
Exit risk	Cox (1972); Singer and Willett (2003)	Falemi et al. (2023a)	Links trajectories to turnover

4. The N-Curve Leadership Model

4.1 Stages of the N-Curve

The N-Curve Leadership Model describes the trajectory of a person's leadership effectiveness from technical expertise through promotion to leadership mastery. Figure 1 presents the curve with illustrative effectiveness values on a scale from 0 to 100. The curve takes its name from its shape: a rise to a peak, a fall into a trough and a second rise, which together resemble the letter N. The shape reflects the observation in role transition research that people moving into new roles pass through a period in which the old identity has been relinquished and the new one is not yet secure, and that performance during this period is typically lower than before or after (Bridges, 1991; Nicholson, 1984). Leadership effectiveness on the 0 to 100 index is defined by the leader's own observable behavior, kept separate from the team's technical performance so that the two can later be related rather than confounded. It combines multi-source ratings of leadership behaviors from the leader's manager and team, the frequency and quality of coaching conversations, the share of decisions appropriately delegated, the timeliness of planning and scheduling decisions, and the leader's conduct of safety walkthroughs. Team outcomes such as preventive maintenance compliance, mean time to repair and backlog are tracked separately as consequences of leadership (Muchiri et al., 2011). The starting value of 90 at the promotion point is an assumption. Excellence in a technical role does not establish a score on a newly defined leadership index, and research on promotion suggests that technical performance can be a poor predictor of managerial performance (Benson et al., 2019). The value represents the high expectations that typically accompany a promotion rather than measured leadership effectiveness, and empirical work should measure the starting value directly at the time of promotion.

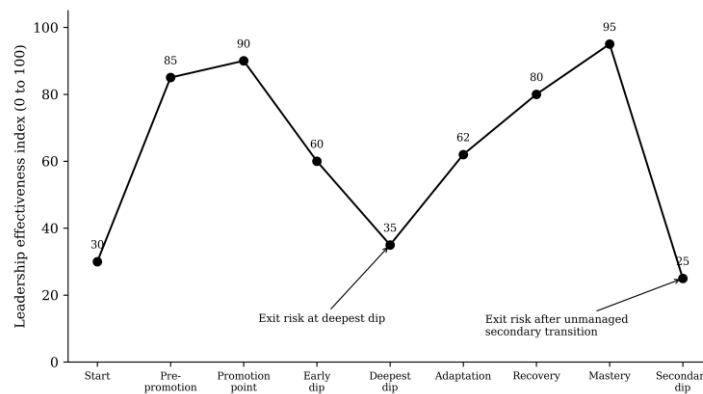


Figure 1. The N-Curve Leadership Model, showing illustrative leadership effectiveness at each stage of a technician-to-leader transition, including the risk of exit at the deepest dip and after an unmanaged secondary transition.

The trajectory begins at the start of a career, when effectiveness is low. As the person gains technical mastery, effectiveness rises steeply through the pre-promotion stage to the promotion point, where the person is a respected technical expert with high confidence. Promotion occurs at or near this peak. Immediately after promotion, effectiveness falls through an early dip to a deepest dip, as the new leader confronts unfamiliar demands. If the leader survives this period, effectiveness rises through an adaptation stage, in which awareness grows but execution remains inconsistent, to recovery and eventually to leadership mastery, marked by strategic thinking and team empowerment. Table 3 summarizes the stages.

Table 3. Stages of the N-Curve Leadership Model

Stage	Illustrative effectiveness	Characteristics
Technical expert (start to pre-promotion)	30 rising to 85	Building technical mastery; growing confidence
Promotion point	90	Peak technical credibility, just before the transition
Early dip	60	Old habits persist; new demands accumulate
Deepest dip (performance dip)	35	Identity loss, overload and conflict; highest exit risk
Adaptation	62	Growing awareness; inconsistent execution
Recovery	80	New routines and relationships established
Leadership mastery	95	Strategic thinking; team empowerment
Secondary dip (unmanaged)	25	Later transition without support; renewed exit risk

As Table 3 shows, the deepest dip is the point of greatest risk. In organizations that do not recognize the dip as predictable, a leader at this point may be judged a failure and removed, or may leave voluntarily, as the exit markers in Figure 1 indicate. The secondary dip represents a later transition, such as a further promotion or a major change in scope, which can produce a second dip if it is not managed. In the unmanaged case, the secondary dip can be even deeper, because the leader may have been promoted on the strength of mastery at the previous level and may again lack support.

4.2 Expectation Versus Reality

A central feature of the N-Curve is the gap between expectation and reality. Organizations that promote a technician at the peak of technical performance often expect that performance to continue or rise in the new role. In reality, effectiveness falls. When the dip is not anticipated, it is interpreted as evidence that the promotion was a mistake, and the organization reacts after performance has declined, often by removing the leader. This reaction converts a temporary, predictable dip into a permanent loss. The organization loses both the leader it was developing and the technician it previously had, a double loss in a context of technical workforce shortage. The proactive version of the N-Curve, which the SRLM is designed to deliver, preserves the shape of the trajectory but changes the organization's response. Preparation begins before promotion, the dip is anticipated and explained, support is provided at each stage and the leader is guided toward mastery rather than judged at the trough. This approach reflects the observation in transition research that people in a liminal period need structure and support to complete the transition (Ashforth, 2001; Bridges, 1991). It also reflects the practice of succession planning, which prepares people for roles before they enter them (Rothwell, 2010).

4.3 Mechanisms of the Performance Dip

The performance dip can be defined as the predictable decline in effectiveness that occurs when a person transitions from technical execution to leadership responsibility. Four mechanisms drive it, summarized in Table 4.

Identity shift, the first mechanism in Table 4, reflects the role transition literature. The new leader's self-worth has been built on technical execution, and the new role asks them to let go of that source of worth (Ibarra, 1999). Many new leaders cope by continuing to do technical work, which feels competent but crowds out leadership tasks and disempowers the team.

Cognitive overload reflects the expansion of demands without corresponding growth in resources (Bakker and Demerouti, 2007). Ambiguity expansion reflects the move from well-structured technical problems to ill-structured organizational ones. Peer-to-leader conflict reflects the renegotiation of relationships described by leader-member exchange theory (Graen and Uhl-Bien, 1995).

Table 4. Mechanisms driving the performance dip in technician-to-leader transitions

Mechanism	Description	Typical manifestations
A. Identity shift	Loss of identity as the expert; self-worth tied to technical execution	Emotional difficulty delegating; jumping into troubleshooting; discomfort with people work
B. Cognitive overload	Shift from solving equipment problems to solving organizational problems	Reactive firefighting; neglected planning; long hours; decision fatigue
C. Ambiguity expansion	Move from defined procedures and measurable outputs to uncertainty and competing priorities	Decision paralysis or impulsive decisions; difficulty prioritizing
D. Peer-to-leader conflict	Supervising former peers, friends and older, more experienced technicians	Avoidance of difficult conversations; perceived favoritism; challenges to authority

The mechanisms interact. Identity shift encourages the leader to retreat into technical work, which increases cognitive overload because leadership tasks accumulate. Overload makes it harder to handle ambiguity and difficult conversations, which increases conflict. Conflict in turn undermines confidence and reinforces the retreat into technical work. This reinforcing loop explains why the dip can deepen rapidly if it is not interrupted, and why interventions should address several mechanisms together.

4.4 The Secondary Dip

The N-Curve includes a secondary dip because leadership transitions recur. A supervisor who reaches mastery may be promoted to manage several teams or a whole site, or the scope of the role may change significantly, for example with the introduction of large-scale automation. Each transition involves another passage in the leadership pipeline, requiring new skills and values (Charan et al., 2001). If the organization assumes that a successful supervisor will naturally succeed at the next level, it repeats the original error, and a secondary dip follows. In the illustrative curve, the unmanaged secondary dip reaches 25, below the first trough, because the stakes and visibility are higher and the leader's expectations of themselves are greater.

Technology transitions can also trigger secondary dips. When robotics-enabled operations or

artificial intelligence-driven maintenance systems are introduced, leaders who mastered the previous environment may find that their expertise no longer applies, and they must again lead through uncertainty. The reliability leader of the near future must manage both asset performance and human performance in integrated autonomous environments.

5. Diagnostic Indicators and Transition Risk

5.1 Behavioral and Operational Indicators

Identifying the dip before it becomes a crisis requires attention to both behavior and operations. Table 5 lists indicators in each category. Safety indicators deserve particular weight, because they respond to changes in supervision before injuries occur. Near-miss reporting tends to fall when teams lose confidence in their leader (Arumosoye and Obriki, 2019), contractor safety performance depends on how consistently supervisors enforce standards (Arumosoye and Obriki, 2020), and proactive hazard recognition requires leaders who reward speaking up (Obogo et al., 2021a). Incident prevention in maintenance environments (Obogo et al., 2021b) and occupational safety in maintenance projects (Obogo et al., 2020) show the same dependence on front-line leadership, and leading safety signals provide measurable early evidence of whether that leadership is working (Obriki et al., 2025).

Table 5. Diagnostic indicators of a performance dip in a newly promoted maintenance leader

Behavioral indicators	Operational indicators
Excessive micromanagement	Increased downtime escalation
Inability to delegate	Preventive maintenance backlog growth
Emotional reactivity	Inconsistent shift execution
Decision paralysis	Rising overtime costs
Over-involvement in troubleshooting	Increased safety events
Avoidance of difficult conversations	Delayed decision-making
Technician conflict escalation	Team disengagement signals

The behavioral indicators in Table 5 map onto the mechanisms in Table 4. Micromanagement, inability to delegate and over-involvement in troubleshooting reflect identity shift; emotional reactivity and decision paralysis reflect overload and ambiguity; avoidance of difficult conversations and conflict escalation reflect peer-to-leader tensions. The operational indicators are signals that maintenance organizations already monitor. Escalations, backlog growth,

inconsistent execution across shifts and rising overtime are typical symptoms of a team whose leader is struggling (Muchiri et al., 2011). Safety events are particularly important because they carry the highest consequences; research on recurrent unsafe behaviors shows that they persist when supervision and reinforcement are weak (Obriki and Arumosoye, 2022). Inconsistent shift execution is often linked to poor handover practices, which new leaders may not yet have established (Ekelemu, 2025).

5.2 Transition Risk Index

To support systematic monitoring, the paper proposes a transition risk index for leader ℓ , computed as a weighted combination of normalized indicator scores, as shown in Equation (1). Each indicator k is scored from 0, indicating no concern, to 1, indicating severe concern, based on observation, team feedback and operational data. Weights reflect the relative importance of indicators and should give particular weight to safety events and team disengagement, which have the most serious consequences.

Indicators are scored monthly during the first eighteen months after promotion by the leader's manager or mentor, ideally with input from the leader's own self-assessment and from team pulse surveys. A rising index signals that the leader is moving toward the deepest dip or that the dip is deepening, and it triggers intensified support. Performance indicators linked to employee retention and productivity offer data that can feed the index (Falemi et al., 2023a). Enterprise risk management models that integrate human resource strategy with operational analytics provide a broader context for treating leadership transition as an operational risk (Falemi et al., 2024).

$$R_{\ell} = \frac{\sum_{k=1}^K [w_k \times x_{\ell k}]}{\sum_{k=1}^K w_k} \quad (1)$$

In Equation (1), $x_{\ell k}$ is the normalized score of indicator k for leader ℓ , w_k is its weight and K is the number of indicators. Thresholds can be set for action; for example, an index above 0.4 might trigger a structured review with the leader's mentor, and an index above 0.6 might trigger an intervention plan. The thresholds should be calibrated against experience, since the purpose is to detect the dip early enough to support the leader rather than to judge them.

6. The Situational Reliability Leadership Matrix

6.1 Purpose and Structure

The Situational Reliability Leadership Matrix integrates the N-Curve Leadership Model with

situational leadership theory to create a stage-by-stage intervention guide for reliability organizations. Its premise is that the support a transitioning leader needs from the organization and from senior leaders changes with their stage on the N-Curve, just as the support a technician needs changes with their development level. Effective organizations adjust their style to the stage: the right leadership at the right time drives reliability performance. The SRLM operates as a five-step cycle, shown in Figure 2 and described in Section 6.3, supported by a matrix that specifies, for each stage, the emotional state, leadership risk, recommended style, focus, key interventions and expected outcomes. The design draws on the situational leadership principle that the balance of direction and support should follow readiness (Blanchard et al., 1993), and on the socialization finding that newcomer adjustment depends on role clarity, self-efficacy and social acceptance, each of which can be strengthened by organizational action (Bauer et al., 2007).

6.2 The Full Matrix

Table 6 presents the full SRLM, aligning leadership style to development stage across the five principal stages of the N-Curve. The safety dimension of the role is learned progressively, and the literature supplies content for each stage. In the early stages, new leaders need structure: emergency response readiness (Arumosoye and Obriki, 2023), workforce safety training (Obriki et al., 2022) and behavioral safety programs (Obriki et al., 2023) define what they must enforce. As leaders adapt, the emphasis shifts to culture and judgment, informed by leadership models for safety culture (Obogo et al., 2023), management walkthroughs (Obriki and Arumosoye, 2019) and the use of digital safety data (Obriki and Arumosoye, 2023). At mastery, leaders shape systems, including subcontractor safety governance (Obriki and Arumosoye, 2024) and organizational learning from incidents (Arumosoye and Obriki, 2021).

Table 6 shows how the recommended style shifts across the stages. Before promotion, at the technical expert stage, the organization coaches the high-potential technician, building a foundation of leadership behaviors while they remain in their technical role, for example through shadow leadership assignments. At the promotion point, the new leader needs clarity and structure about the role, so the style combines directing and coaching. During the performance dip, the leader's competence in leadership is growing but their commitment and confidence are shaken, so the organization shifts to supporting: high support with less direction,

focused on building skills, confidence and relationships through mentorship and feedback. This shift mirrors the situational leadership prescription for capable but uncertain followers (Blanchard et al., 1993). In adaptation, support continues while responsibility is expanded through delegation and stretch goals, and at mastery the organization delegates, focusing the leader on developing others and on strategic projects.

Table 6. The Situational Reliability Leadership Matrix: aligning leadership support to N-Curve stage

Dimension	Stage 1 Technical expert	Stage 2 Promotion point	Stage 3 Performance dip	Stage 4 Adaptation	Stage 5 Leadership mastery
Emotional state	Confident and competent	Excited and motivated	Overwhelmed, self-doubt	Aware and challenged	Confident and strategic
Leadership risk	Over-reliance on technical identity	Reactive leadership	Inconsistent execution	Delegation gaps	Complacency
Recommended style	Coaching	Directing and coaching	Supporting	Supporting and delegating	Delegating
Focus	Build foundation of leadership behaviors	Provide clarity, structure and expectations	Build skills, confidence and relationships	Empower and expand responsibility	Develop others, drive strategy and improvement
Key interventions	Leadership orientation; role clarification	Structured onboarding; frequent coaching	Mentorship; skill development; feedback	Empowerment; delegation; stretch goals	Succession planning; strategic projects
Outcomes	Leadership mindset begins	Stabilize and reduce the dip	Consistent performance improvement	Stronger team, better results	Sustainable results and leadership pipeline

The emotional states in Table 6 deserve emphasis. The excitement of the promotion point gives way to being overwhelmed and doubting oneself in the dip, which is the critical moment for support. Self-efficacy theory holds that confidence is built through mastery experiences, vicarious experience and supportive persuasion (Bandura, 1977), all of which mentorship and coaching provide. The risk at mastery is complacency, which the organization counters by engaging the leader in succession planning and strategic work, preparing them for the next transition and reducing the risk of a secondary dip.

6.3 The Five-Step SRLM Cycle

The SRLM is applied through a five-step cycle, shown in Figure 2. The first step, diagnose,

identifies the leader's current stage on the N-Curve using the indicators in Table 5 and conversation with the leader. The second step, assess, measures the leader's emotional state and transition risk, using the transition risk index and direct conversation. The third step, match, selects the support style appropriate to the stage, as set out in Table 6. The fourth step, intervene, applies structured organizational support, drawing on the interventions described in Section 7. The fifth step, advance, tracks progress and adapts, returning to diagnosis as the leader moves along the curve.

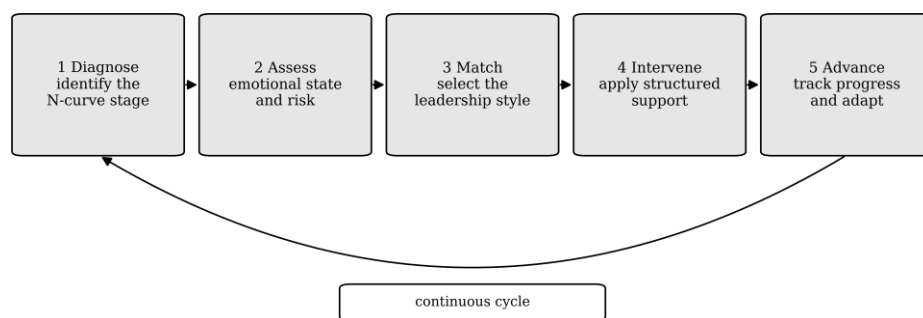


Figure 2. The five-step Situational Reliability Leadership Matrix cycle of diagnose, assess, match, intervene and advance.

The cycle is continuous. A leader is diagnosed and supported repeatedly through the transition, with support adjusted as they move from the dip to adaptation and mastery. The cycle also applies at later transitions, preventing the secondary dip. The matching logic follows situational leadership theory, but here it is applied by the organization to its leaders. In the same way that situational leadership warns against oversupervising capable followers and undersupervising developing ones, the SRLM warns against both neglecting new leaders during the dip and smothering leaders who have reached adaptation or mastery. Leadership effectiveness frameworks that link leader behavior to measurable outcomes support the use of such cycles to track progress (Falemi et al., 2025).

6.4 Illustrative Application of the Cycle

The application of the SRLM can be illustrated with a composite case of a senior maintenance technician promoted to shift supervisor in an automated distribution facility. Before promotion, at Stage 1, the technician is identified as a high-potential candidate and coached through two

shadow leadership assignments, leading a planned shutdown work package and covering for the shift supervisor during a week of leave. These experiences reveal strengths in technical planning and a tendency to take over troubleshooting rather than guide others, which becomes a focus of coaching. At the promotion point, Stage 2, the new supervisor receives a thirty-sixty-ninety day plan, a weekly coaching session with the operations manager and a clear statement of the role's priorities, which reduces ambiguity at the outset.

Around the third month, the transition risk index rises. The supervisor is spending most shifts on the floor troubleshooting, preventive maintenance backlog has grown and two experienced technicians have raised complaints about being bypassed. The diagnosis places the supervisor in Stage 3, the performance dip, with identity shift and peer-to-leader conflict as the dominant mechanisms. The matched style is supporting. The supervisor's mentor, an experienced maintenance manager, meets weekly to discuss the pull toward technical work and to rehearse difficult conversations with the experienced technicians. The supervisor attends a peer learning group with other new leaders, where they learn that their struggle is common. By the sixth month, the index has fallen, delegation has increased and the backlog has stabilized.

In Stage 4, adaptation, the supervisor is given a stretch goal of leading a reliability improvement initiative on the sortation system, with the manager in a supporting and delegating role. By the end of the first year, the supervisor reaches recovery, and by eighteen months is moving toward mastery, at which point the organization begins to involve them in succession planning for their own replacement and in mentoring the next cohort of new supervisors. The case illustrates how the cycle of diagnose, assess, match, intervene and advance adjusts support as the leader moves along the curve. Structured mentorship of the kind used for technician development provides a natural template for this support (Amarahobu et al., 2025), and attention to shift handover practices helps the new supervisor establish consistent execution across shifts (Ekelemu, 2025).

7. Organizational Interventions and Illustrative Analysis

7.1 Four Structured Mechanisms

The SRLM is supported by four structured mechanisms that help leaders through the dip, summarized in Table 7.

Structured leadership transition programs, the first mechanism in Table 7, give new leaders clarity about what to accomplish and when. Thirty-sixty-ninety day plans, adapted from the

transition literature, set expectations for learning, early wins and team building in the first three months (Watkins, 2003). Shadow leadership assignments before promotion let high-potential technicians practice leadership tasks with a safety net, consistent with evidence that developmental assignments build managerial competence (Dragoni et al., 2009). An operational coaching cadence, in which the new leader's manager reviews progress weekly in the early months, provides the directing and coaching support recommended at the promotion point.

Table 7. Four structured mechanisms to support leaders through the performance dip

Mechanism	Components	Primary mechanisms of the dip addressed
A. Structured leadership transition programs	30-60-90 day transition plans; leadership onboarding frameworks; shadow leadership assignments; operational coaching cadence	Ambiguity expansion; cognitive overload
B. Mentorship systems	Matching experienced leaders with transitioning supervisors; structured check-in cadence; peer learning groups; safe space for vulnerability	Identity shift; peer-to-leader conflict
C. Competency-based progression	Moving beyond best technician gets promoted; leadership readiness evaluation; communication and conflict management capability; systems thinking and emotional regulation	All four, by preparing before promotion
D. Reliability leadership scorecards	Team engagement metrics; PM execution and schedule compliance correlated to MTBF; MTTR and leadership stability indicators; OEE correlated to leadership maturity	Early detection; accountability for development

Mentorship systems, the second mechanism, match experienced leaders with transitioning supervisors and provide structured check-ins, peer learning groups and a safe space to discuss difficulties. Mentoring provides both career and psychosocial support (Kram, 1985) and is associated with career benefits for protégés (Allen et al., 2004). A safe space for vulnerability is especially important during the dip, when new leaders may hide their struggles for fear of being judged. Structured mentorship models already used for technician development can be extended to new leaders (Amarahobu et al., 2025).

Competency-based progression, the third mechanism, moves beyond the assumption that the best technician should be promoted. It evaluates leadership readiness, including communication and conflict management capability, systems thinking and emotional regulation, and it develops these capabilities before promotion. This approach addresses the Peter Principle directly by separating technical excellence from leadership selection (Benson et al., 2019). It also allows

organizations to offer technical career paths for excellent technicians who do not wish to lead, retaining their expertise. Comparative perspectives on technical and vocational education emphasize that workforce readiness requires both technical and broader professional capabilities (Joseph et al., 2025a).

Reliability leadership scorecards, the fourth mechanism, connect leadership development to operational outcomes. They track team engagement, preventive maintenance execution and schedule compliance correlated with mean time between failures, mean time to repair and leadership stability indicators, and overall equipment effectiveness correlated with leadership maturity. Scorecards make the effect of leadership visible and support early detection of the dip, feeding the transition risk index. Supply chain leadership models emphasize aligning operational decisions with enterprise strategy through such metrics (Akin-Oluyomi and Akhigbe, 2023).

7.2 Illustrative Trajectory Model

To illustrate how structured support might change the transition, the paper models the effectiveness of a new leader over the eighteen months after promotion using the function in Equation (2), where E_0 is effectiveness at promotion, E_m is effectiveness at mastery, τ_r is a recovery time constant, D is the magnitude of the dip and τ_d is the time at which the dip effect peaks.

$$E(t) = E_m - (E_m - E_0) e^{-(t/\tau_r)} - D \frac{t}{\tau_d} e^{(1-t/\tau_d)} \quad (2)$$

The first term describes gradual growth toward mastery, and the second describes a temporary dip that rises and then fades. Cumulative performance loss relative to effectiveness at promotion, E_p , over horizon T is given by Equation (3).

$$L = \int_0^T [\max(0, E_p - E(t))] dt \quad (3)$$

Two transitions are compared, both with effectiveness at promotion of 90 and at mastery of 95. In the unsupported transition, the dip magnitude is 52, the dip peaks at four months and the recovery time constant is nine months, reflecting a deep, slow dip with little support. In the SRLM-supported transition, the dip magnitude is 30, the dip peaks at three months and the recovery time constant is five months, reflecting preparation before promotion, early structure and mentorship during the dip. The parameters are illustrative and are chosen to reflect the qualitative claims of the transition literature rather than estimated from data (Peffer et al., 2007). Figure 3 shows the two trajectories, and Table 8 summarizes the results.

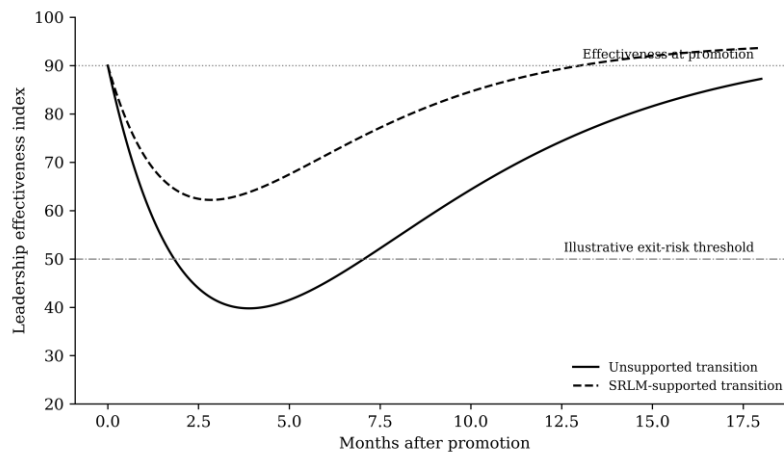


Figure 3. Illustrative leadership effectiveness trajectories over eighteen months for an unsupported transition and an SRLM-supported transition.

Table 8. Illustrative trajectory results for unsupported and SRLM-supported transitions

Measure	Unsupported transition	SRLM-supported transition
Minimum effectiveness	39.8	62.2
Time of minimum (months)	3.9	2.9
Months below exit-risk threshold of 50	5.2	0.0
Effectiveness at 18 months	87.3	93.7
Time to regain promotion-level effectiveness (months)	Not reached within 18	13.0
Cumulative performance loss (index-months)	479.8	185.7

As Table 8 shows, in the unsupported transition, effectiveness falls to about 40 at roughly four months and remains below an illustrative exit-risk threshold of 50 for more than five months. During this period, an organization that does not anticipate the dip is likely to conclude that the promotion has failed. The leader has not regained promotion-level effectiveness after eighteen months. In the supported transition, the minimum is about 62, the leader never falls below the threshold, promotion-level effectiveness is regained at about thirteen months and effectiveness reaches 94 by eighteen months. Cumulative performance loss falls from about 480 to about 186 index-months, a reduction of about 61 percent. These figures are illustrative, but they make concrete the argument that the dip is predictable, diagnosable and manageable, and that managing it protects both the leader and operational performance. The reduction in time spent below the exit-risk threshold is particularly significant, since it is during this period that

organizations lose leaders they have invested in.

7.3 Strategic Industry Implications

The N-Curve and SRLM have implications beyond individual organizations. The technical workforce is thinning, and every promoted technician who fails as a leader represents a double loss, of the leadership role and of the technician. Strategies for future-proofing skills in technical and vocational education emphasize that workforce pipelines must be built deliberately (Joseph et al., 2025c), and work-integrated learning models offer routes for building both technical and leadership capability (Joseph et al., 2025b). Industry 4.0 complexity, with autonomous systems, industrial internet of things and artificial intelligence-augmented maintenance, creates environments in which human leadership judgment becomes the constraint on performance.

Leadership pipeline fragility is a related concern. Many organizations are one retirement wave away from a reliability leadership vacuum, which makes succession planning a reliability initiative rather than a human resources formality (Rothwell, 2010). Human-machine operations add a further dimension: the reliability leader must manage both asset performance and human performance in increasingly autonomous environments. Leadership development must therefore prepare leaders for collaboration between people and intelligent systems, as well as for traditional people management (Essandoh et al., 2025). Reliability leadership similarly requires the integration of technical, human and business disciplines.

7.4 Implementation Roadmap

Organizations can introduce the N-Curve and SRLM in phases. Table 9 presents a four-phase roadmap. The sequence begins with awareness and measurement, because organizations cannot manage a dip they do not recognize, and proceeds through building support structures to embedding the approach in talent and succession systems.

Table 9. Phased roadmap for implementing the N-Curve Leadership Model and SRLM

Phase	Indicative timing	Main activities	Evidence of progress
1. Awareness and baseline	Months 1 to 3	Brief senior leaders and new leaders on the N-Curve; review recent leadership transitions and exits; define indicators and the transition risk index	Shared understanding of the dip; baseline of transition outcomes

Phase	Indicative timing	Main activities	Evidence of progress
2. Support structures	Months 3 to 9	Introduce 30-60-90 plans; establish mentorship pairs and peer learning groups; train managers in stage-matched support	All new leaders have plans and mentors; monthly risk scoring in place
3. Pre-promotion development	Months 6 to 15	Competency-based readiness evaluation; shadow leadership assignments; technical career path for non-leaders	Candidates assessed before promotion; reduced promotion of unready candidates
4. Embed and scale	Month 12 onward	Reliability leadership scorecards; link to succession planning; apply SRLM to later transitions	Fewer early exits; shorter dips; succession coverage for key roles

The roadmap in Table 9 requires commitment from senior leaders, who must accept that new leaders will experience a dip and must resist the temptation to judge them during it. It also requires investment in mentors' time, which competes with operational demands. The return on that investment is measured in retained leaders, preserved technical expertise and more stable reliability performance, which reliability leadership scorecards can make visible. Governance models that improve transparency and accountability can help sustain the program over leadership changes at senior levels (Falemi et al., 2025). Retention data, linked to operational productivity, provide a further measure of whether the program is working (Falemi et al., 2023a).

7.5 Monte Carlo Robustness of the Trajectory Analysis

The trajectory comparison in Table 8 used single parameter values. To test its robustness, a Monte Carlo analysis with 10,000 draws multiplied each of the three trajectory parameters, namely dip magnitude, dip timing and recovery time, by a factor drawn uniformly between 0.8 and 1.2, independently for the unsupported and supported transitions. Varying transition parameters in this way acknowledges that the depth and duration of adjustment differ between individuals and contexts (Bauer et al., 2007). Table 10 reports the results.

As Table 10 shows, structured support reduced cumulative performance loss by 60.0 percent on average, and by at least 41.7 percent in 95 percent of draws. The unsupported leader spent on average almost five months below the illustrative exit-risk threshold, whereas the supported leader never fell below it in any draw. The qualitative conclusion that structured, stage-matched support makes the dip shallower and keeps leaders above the illustrative exit-risk threshold is

therefore stable across plausible variation in the assumed transition dynamics, consistent with evidence that onboarding and support practices improve newcomer adjustment (Bauer et al., 2007).

Table 10. Monte Carlo robustness of transition trajectory results (10,000 draws)

Result tested	Base value	Mean across draws	90 percent interval	Additional statistic
Reduction in cumulative performance loss with SRLM support (%)	61.3	60.0	41.7 to 74.0	Not applicable
Months below exit-risk threshold, unsupported	5.2	4.9	1.6 to 7.5	Not applicable
Months below exit-risk threshold, SRLM-supported	0.0	0.0	0.0 to 0.0	Zero in 100.0 percent of draws

7.6 Linking the Trajectory to Exit Risk

Organizations care about the dip mainly because it raises the risk of losing the leader. This link can be modeled with a hazard function, the standard tool for analyzing time to an event such as job exit (Cox, 1972; Singer and Willett, 2003). The monthly hazard of exit is assumed to rise exponentially as effectiveness falls below a tolerance level E^* , as given in Equation (4), where h_0 is the baseline hazard and γ governs how strongly underperformance raises exit risk.

$$h(t) = h_0 \exp(\gamma \max(0, E^* - E(t))/10) \quad (4)$$

The probability of exit within horizon T follows from the cumulative hazard, as given in Equation (5).

$$P_{\text{exit}}(T) = 1 - \exp(-\int_0^T h(t) dt) \quad (5)$$

With an illustrative baseline hazard of 0.004 per month, a tolerance level of 60 and γ of 0.9, Table 11 reports the eighteen-month exit probabilities implied by the two trajectories in Table 8.

Table 11. Eighteen-month exit probability implied by the two transition trajectories

Transition	Minimum effectiveness	Months below tolerance level of 60	Eighteen-month exit probability (%)
Unsupported	39.8	7.9	14.4
SRLM-supported	62.2	0.0	7.0

As Table 11 shows, the unsupported trajectory roughly doubles the probability that the new

leader leaves within eighteen months, from 7.0 to 14.4 percent, under these assumptions. The baseline exit risk of the supported leader reflects ordinary turnover; the additional risk in the unsupported case arises entirely from the dip. The model makes explicit the economic logic of transition support: each avoided exit saves the cost of replacing the leader and of the second dip that a replacement would experience. Estimating h_0 and γ from organizational turnover data, as survival analysis permits (Singer and Willett, 2003), would allow organizations to price transition support against avoided exits.

The hazard function in Equation (4) is an assumption rather than a derived result. It follows the proportional hazards logic of survival analysis, in which a time-varying covariate, here the shortfall of effectiveness below a tolerance level, multiplies a baseline hazard (Cox, 1972), and the exponential form was chosen so that small shortfalls have little effect and large shortfalls a strong one. Exit is also not a single event. Voluntary resignation from the organization, voluntary return to a technical role, reassignment and dismissal have different causes and different costs, and they should be modelled as competing risks, each with its own hazard (Prentice et al., 1978; Fine and Gray, 1999). The exit probabilities of 14.4 and 7.0 percent combine these routes and follow entirely from the assumed parameters; they illustrate the structure of the argument and should be kept together with that limitation wherever they are cited. Longitudinal studies following newly promoted leaders at repeated intervals, recording effectiveness, support received, operational conditions, team composition and the type of any exit, would allow these hazards to be estimated.

7.7 Alternative Trajectories, Support Costs and the Exit Threshold

The N-Curve should not be assumed for every leader. Table 12 compares the base trajectories with three alternatives: a leader who experiences no dip, a leader with a shallow unsupported dip, and support that produces little benefit, reducing dip depth by only ten percent. Comparing a proposed trajectory with alternative patterns is necessary before any trajectory is treated as typical (Singer and Willett, 2003).

As Table 12 shows, support yields its benefit only for leaders whose dip would otherwise be deep; for leaders with no dip or a shallow one, exit risk is unchanged and the support cost is not recovered through retention, although it may still improve performance. Support is therefore justified on retention grounds when its cost is below the reduction in exit probability multiplied by the full cost of replacing a leader, which in the base case means below 7.4 percent

of replacement cost and in the low-benefit case below 3.6 percent. These figures depend on two assumptions that should be stated plainly. The exit-risk threshold of 50, and the hazard tolerance of 60, are positions on an index whose scale is defined by the observable measures in Section 4.1; they are illustrative and should be replaced by thresholds estimated from an organization's own records of when underperforming new leaders are removed or resign. Organizations can calibrate them by regressing observed exits on effectiveness histories using survival methods (Cox, 1972).

Table 12. Model outputs under alternative transition trajectories (assumed parameters)

Trajectory	Minimum effectiveness	Cumulative performance loss (index-months)	Eighteen-month exit probability (%)
No dip	90.0	0.0	7.0
Shallow unsupported dip	66.8	204.7	7.0
Unsupported (base)	39.8	479.8	14.4
Low-benefit support	44.8	408.5	10.8
SRLM-supported (base)	62.2	185.7	7.0

8. Discussion

8.1 Theoretical Implications

The N-Curve Leadership Model contributes to research on leadership transitions by describing the shape of the transition within a leadership passage. The leadership pipeline identifies the passages (Charan et al., 2001), and role transition theory explains the identity work involved (Ashforth, 2001; Ibarra, 1999), but neither specifies the trajectory of effectiveness or its predictable dip. The N-Curve connects these literatures by linking a stage model of effectiveness to four mechanisms, identity shift, cognitive overload, ambiguity expansion and peer-to-leader conflict, each grounded in established theory. The reinforcing interaction among the mechanisms offers an explanation for why dips can deepen rapidly, which could be tested empirically.

The SRLM extends situational leadership theory by applying it to the development of leaders themselves, matching organizational support to the leader's stage. This application treats the transitioning leader as a follower whose development level changes over the transition, and it suggests that the theory's core insight about matching direction and support to readiness applies

at multiple levels of an organization. The integration of transition risk monitoring with stage-matched support also links leadership development research to operational risk management, consistent with frameworks that treat human resource strategy as a component of enterprise risk (Falemi et al., 2024).

8.2 Managerial Implications

For reliability and maintenance organizations, the central implication is to stop treating leadership failure as individual weakness, since it is a systems failure. Organizations should recognize the performance dip as predictable, diagnosable and manageable, implement structured leadership transition systems including thirty-sixty-ninety day plans, mentorship and scorecards, align leadership development investment with operational reliability goals and build the leadership pipeline before the retirement wave forces reactive decisions. Each of these actions corresponds to an element of the models presented here.

Practically, organizations should begin by identifying technicians with leadership potential and preparing them before promotion through shadow assignments and coaching. They should establish mentorship systems that match new leaders with experienced ones and provide safe spaces to discuss struggles. They should use the indicators in Table 5 and the transition risk index to monitor new leaders and intensify support when risk rises. And they should communicate the N-Curve explicitly to new leaders, so that the dip is understood as normal rather than as evidence of failure. Explaining the dip in advance can itself reduce its depth by preventing the loss of confidence that turns a normal dip into a crisis (Bandura, 1977). Safety leadership research shows that visible, consistent leader behavior shapes safety culture (Obogo et al., 2019; Arumosoye and Obriki, 2024), so supporting new leaders through the dip also protects safety. Institutionalizing life-preserving practices requires leaders who are confident and consistent, which the SRLM helps to develop (Obriki and Arumosoye, 2021).

8.3 Theoretical Propositions and Research Agenda

The N-Curve and SRLM imply propositions that can be tested in reliability organizations. Table 13 states five propositions with constructs and designs. They draw on role transition theory (Ashforth, 2001), mentoring research (Allen et al., 2004) and the leadership pipeline (Charan et al., 2001).

Table 13. Testable propositions derived from the N-Curve Leadership Model and SRLM

Proposition	Constructs	Suggested test design
P1. Briefing newly promoted leaders on the N-Curve before promotion reduces the depth of the performance dip	Pre-promotion briefing; minimum effectiveness	Comparison of cohorts promoted before and after briefing is introduced
P2. Structured mentorship during the dip reduces the probability that new leaders exit within eighteen months	Mentorship intensity; exit within eighteen months	Survival analysis of promotion cohorts
P3. Competency-based progression reduces dip depth relative to promotion based on technical performance alone	Selection basis; dip depth	Matched comparison of promotion pathways
P4. The transition risk index predicts leader exit and team reliability decline three months in advance	Risk index; exit; MTTR and backlog	Prospective monitoring with predictive validity analysis
P5. Team reliability indicators follow the leader's effectiveness trajectory with a lag	Leader effectiveness; MTBF, backlog, overtime	Time-series analysis linking leader ratings and team metrics

Testing these propositions would provide the first longitudinal evidence on the shape of technician-to-leader transitions in maintenance, building on evidence that the Peter Principle has measurable costs when the best performers are promoted without preparation (Benson et al., 2019). Following the guidance that conceptual articles should state propositions precisely enough to be refuted (Jaakkola, 2020), each proposition names the constructs involved and the evidence that would count against it: a proposition is not supported if the predicted relationship is absent, or reversed, when its constructs are measured as specified. Because several constructs are newly defined in this paper, establishing valid measures of them is a precondition for testing the propositions themselves.

8.4 Limitations and Future Research

The models have limitations. The N-Curve is a conceptual model, and its effectiveness values are illustrative. Empirical research is needed to measure leadership effectiveness over transitions, to test whether the predicted dip occurs, and to estimate its typical depth and duration in reliability and maintenance contexts. The trajectory model is a simple functional form with illustrative parameters; empirical estimation using multi-source ratings of leader effectiveness over time would be valuable. The transition risk index requires validation, including tests of whether it predicts leader exit and team performance.

Future research could compare transitions across industries and organizational cultures, examine whether the four mechanisms carry different weights for different kinds of leaders,

and test the effects of specific interventions through longitudinal or quasi-experimental designs. Research could also examine the secondary dip in more detail, including transitions triggered by automation, and the role of technical career paths in retaining technicians who do not wish to lead. The interplay between leader transitions and technology transitions, which often coincide in modernizing facilities, is a particularly promising area (Akhigbe et al., 2024).

9. Conclusion

Reliability and maintenance organizations promote their best technicians into leadership and then too often lose them during a predictable period of struggle. The problem is rarely technical incompetence; it is an unmanaged transition, and therefore a systems problem rather than a people problem.

This paper has introduced the N-Curve Leadership Model, which describes the rise to a promotion peak, the fall into a performance dip driven by identity shift, cognitive overload, ambiguity expansion and peer-to-leader conflict, and the second rise through adaptation and recovery to mastery. It has presented the Situational Reliability Leadership Matrix, which matches organizational support to the leader's stage through a cycle of diagnose, assess, match, intervene and advance, supported by transition programs, mentorship, competency-based progression and reliability leadership scorecards.

The illustrative trajectory analysis showed that structured support can make the dip shallower and shorter and can keep new leaders above an illustrative exit-risk threshold, a threshold that organizations would need to estimate from their own records. Organizations that anticipate the dip, prepare leaders before promotion and support them through each stage will build a resilient leadership pipeline, retain their technical expertise and protect the reliability and safety of their operations.

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Competing interests

The author declares no competing interests.

Data availability

All parameter values and results are reported in the article. The simulation code, input files, random seeds and distribution settings that reproduce every numerical table are available from the corresponding author on reasonable request.

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