Title of Proposal: Causes of Innovation Engineering Management Failure in Workforce Development Within the Nevada System of Higher Education

Presented by

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Introduction

The State of Nevada workforce development (WFD) and innovation engineering management (IEM) combined to form an integral part of society. Course program developers must apply knowledge of WFD and IEM in tandem with academia, government, and industry to continuously create innovative programming (Hicks et al., 2000; Sublett & Tovar, 2021). WFD programs and IEM are not interchangeable because each requires specific domain knowledge (DM) (Atwell et al., 2022; Macdonald et al., 2022). Weise (2021) concluded in her findings the intersection of IEM and WFD creates effective programming. However, IEM and engineering management (EM) overlap in skills development, creating confusion between professional engineers and non-engineers who are executives and instructors in private and public sectors (American Society for Engineering Education, 2019; NSHE, 2021a; Solis, 2021a).

Weise (2021) observed that EM and IEM combined are complex within infrastructure and industrial technology WFD programs. WFD is used to create successful programs that industry and government can utilize by fully comprehending infrastructure and industrial technology fields by utilizing experts when the infrastructure and industrial technology field is deficient in DM. IEM relies upon innovation processes in EM, thus creating multi-tiered T-shaped professionals for various industries and governments with a multilinear trajectory.

While EM is strictly a linear trajectory, EM managers do not focus on multilinear concepts outside of EM (Elia et al., 2021; Uzundis et al., 2021). The Research Affairs Council (2020) attempted to reconcile the NSHE science and technology plan to address IEM, EM, and the lack of DM in WFD programs in The State of Nevada. IEM and EM programs are an integral part of WFD, the first misalignment occurs when unqualified professionals conduct training programs or provide advice on curriculum development in EM and IEM intersecting through

WFD, which contributes to the second misalignment and budget shortfalls (Bodell, 2020; Duffy, 2020; Education Commission of the States, 2021; Levesque 2019; Munson, 2020b; NSHE, 2021c; Research Affairs Council, 2020; Schoenmann, 2020; Solis, 2021a).

According to Weise (2021), human capital management chains are constantly disengaged. Workplaces do not have strong candidates because employers hire subpar candidates to fill roles to meet quotas. If employers want workers they do not want to train; they need to fund workforce alignment programs at the federal and state levels at which they aim to hire (Billing et al., 2021; Devos & Ellwager, 2017; Levesque, 2019; Nieminen, 2018; Weise, 2021).

Recent studies by Agrawal et al. (2020a) conducted on the future of work needs surveyed 1,145 participants, while Billing et al. (2021) surveyed 700 participants beyond hiring demonstrating that organizations are experiencing a skills gap that affects 345 million workers globally. When building an efficient WFD system, the common theme is a robust, diversified labor market that aligns business, education, governments, and labor around various strategic community WFD initiatives (Hicks et al., 2000). The evolution of EM, innovation, and WFD programs in the 21st century is ever-changing. A workforce study conducted by Deloitte (2018) presented data that stated 2.4 million positions might go unfilled between the years 2018-2028 due to the skills gap, with an economic impact loss of $2.5 trillion.

The first premise is risk mitigation in academia, government, and industry are higher than necessary because WFD and IEM programs do not have the necessary IEM DM experts (Deloitte, 2018; Levesque, 2019; McKinsey & Company, 2021; Research Affairs Council, 2020; Uzundis et al., 2021). The academia, government, and industry economic approach to solving the lack of IEM DM is that education of those over 18 year of age should be a government rather than a private matter. The societal issues are not having enough workers within the in-demand

field within high growth industries. The second premise will be determining a viable solution to address the skills gap when education is viewed from a private matter which affects government, private sectors, and the public. The linear focus within the intersection of WFD, IEM, and DM in innovation has always been a one size fits all approach. The linear focus in the private sector has been how can I get the best talent at the cheapest price. The linear focus within government has been how do we scale up and blend the economic impact so that everyone benefits by proxy of WFD programs.

Another interconnected issue is the fragmentated state of workforce (WF) systems and higher education programs (Research Affairs Council, 2020). What is not being leveraged is how learners can remain relevant in workforce economics of the future (Weise, 2021). The foundational issue is not whether expert knowledge management systems are needed or underutilized in Nevada System of Higher Education (NSHE) when creating WFD programs because they are not (Schoenmann, 2020). NSHE system currently possesses respective scholars in WFD with curriculum specialties in business and K-14 specific DM (NSHE, 2021a; NSHE, 2021b; NSHE, 2021c; Conneely & Uy, 2009; Research Affairs Council, 2020).

WFD program developers create interconnected conditions; the root problem of misalignment remains if course content area, course developer and leadership training are not addressed by an expert familiar with IEM DM. Professionals analyzing the current state of America from an academic, economic impact and skills gap perspective suggests WFD is part of the college education, when the issue stems from high school through college education (Schoenmann, 2020; Weise, 2021). The issue is a lack of expertise in IEM roles when creating and combining WFD programs within NSHE; not whether education pays because scholars have demonstrated through research over time individuals are able to obtain jobs with minimal

education at best (Weise, 2021). The creation of a skills gap verification system is flawed due to user input; WFD employees are trained to use a system that, in theory, is self-explanatory, yet end users (community members) are not finding the new system viable in the WF. The process for matching skills does not work correctly (Weise, 2021).

Innovation needs to be complemented by other core competencies. NSHE employees lack specific DM in IEM; without expert DM in IEM, scholars are not able to adequately address innovation, nor are they able to fully engage in IEM alignment initiatives that are needed to create successful WFD programs (Education Commission of the States, 2021a; Morell, 2018; Schoenmann, 2020). Schoenmann (2020) and the Nevada State Legislative, (2022) collectively further explained how the impact of budget cuts and funding misalignment would create additional challenges in the fiscal years of 2021- 2023 for NSHE. Satell (2017) also arrived at the same conclusion through observation, mapping innovation using four categories such as breakthrough innovation, sustaining innovation, primary research, and disruptive innovation; usually forcing the organization's leadership team to have a singular focus on innovation as opposed to a multi-linear focus driven by core competencies specifically.

A survey conducted by Nieminen (2018) which surveyed 2,240 executives, 95% from various industries, regions, and functional specialties locally and globally were challenged with the ideology of two issues (a) not having access to influential innovation scholars who can guide the organization through the entire influential technology innovation process or (b) having limited to no knowledge at all about innovation Capozzi et al. (2010). However, according to research conducted by McKinsey and Company (2021) and Nieminen (2018), 94% of all executives concur with the findings of having limited resources or non-skilled professionals when starting innovation projects using the current workforce at their institutions due to a lack of

expert DM in IEM. However, there is limited quantitative research on the topic of innovation (Nieminen, 2018).

Innovation is challenging to measure because the right questions have not been asked, and the questions themselves are unmeasured (Deloitte, 2018; Hicks et al., 2000; Levesque, 2019; McKinsey & Company, 2021; Research Affairs Council, 2020). For example, no one has verified the skills gaps or the alignment gap concerning program development or training exists (Center for Employability Outcomes; 2016; Department of Labor 2021a; 2021b; Devos & Ellwager, 2017; Education Commission of the States, 2021a, 2021b; Hicks et al., 2000). What has been measured is the need for WFD programs to include effective training in IEM; what needs to be measured is the lack of expert DM in IEM (Beck & Harter, 2021; Boggs et al., 2004; Burton et al., 2011; Education Commission of the States, 2021a, 2021b; Hamel & Zanini, 2016; Hicks et al., 2010; Niu, 2016; Vandal, 2010).

According to Capozzi et al. (2010) and Levesque (2019), for executive leadership teams taking part in designing and implementing accountability assessments of how IEM and WFD affect economics domestically and globally, as demonstrated by all executives, the critical elements not fully explored was the role of engineering concerning the innovation process assessments in return for federal assistance. The phenomenon of influential technology innovation emergence, as described by Bessant and Rush (1995), Fogg (2009), and Waite and McKinney (2018), concluded that there are many aspects that determine engineering management and innovation. One of those aspects will be using experts in IEM to assist with WFD program design. However, as Kapur et al. (2017), Lindkvist Haziri and Sundin (2019), and Mather et al. (2018) shared, practitioners, researchers and scholars need to incorporate various controls during the engineering process concerning IEM and WFD designs.

According to McKinsey and Company (2021), 80% of executives stated that current business models are at risk of being disrupted soon. Another 84% of executives stated that innovation is essential to their growth strategy. Brookings Institute (2017) found that middle markets organizations presented revenues ranging from $10 million and $1 billion; 44% of middle-market executives stated they lacked candidates with the right skills, stating this was a direct hurdle to hiring from industry and WFD programs. One would conclude that 56% of middle market executives hire the right employees. However, this was not the case, after conducting further analysis from the Brookings Institute (2017) listed below.

Among middle-market organizations, 45% do not have an ongoing training system, while 61% of middle-market organizations do not have systems in place for career advancement. An astounding 70% of all middle-market organizations do not partner with educational or training institutions, and a mere 30% of all middle-market firms ranging from $10 million and $1 billion in revenue, respectively, actually partner with educational or training organizations (Brookings Institute, 2017). The Accenture 2015 U.S. Innovation Survey shared a similar story: 84% of executives considered their future success to be very or highly dependent on innovation. Even back in 2010, the McKinsey Global Survey revealed that only 4% of executives have not defined innovation as a strategic priority and have no plans to do so in the future (Accenture, 2016; Capozzi et al., 2010; Nieminen, 2018).

NSHE is unable to access experts in IEM while strategically addressing the multifaceted alignment of the organization's goal for sustainable innovation in WFD programs (Education Commission of the States, 2021a; Kapur et al., 2017; Kossaï et al., 2019). The issue currently exists within the literature presented by Abrell et al. (2018), McFarlane et al. (2011), and Stezano

(2018), which suggested scholars have focused on the characteristic of innovations and not specifically on IEM.

Statement of the Problem

The problem to be addressed in this study was the lack of expertise in IEM roles when creating WFD programs within NSHE which leads to an increased skills gap that has been well documented on various industry levels concerning initial alignment proposals in federal and state WFD programs (Deliotte, 2018; Education Commission of the States, 2021a; Hicks et al., 2000; Levesque, 2019; Leigh & Kraft, 2017). The inability to apply expert knowledge in IEM roles when creating WFD programs within NHSE leads to an increased skills gap; over 2.4 million positions may go unfilled between the years 2018-2028 due to the skills gap, with an economic impact loss of $2.5 trillion globally (Al-Haqan et al., 2020; Avramchuk, 2020; Deliotte, 2018; Maxwell & Gallagher, 2020).

Although more resources were spent on infrastructure, technology and innovation continued declining, demonstrating a continued misalignment within the role EM has on innovation. Twenty-first century, practitioners have noticed a steady pace of innovation failures within various industry environments (Munson, 2020a). Recently, Munson (2020a) shared that the state of Nevada received a $13.8 million grant for WFD programs. Although the increased failure rate of innovation sometimes involves sophisticated processes and growing data-driven technology, scholars in Nevada have yet to comprehend the various roles engineering fully contributes to innovation.

Nieminen (2018) and Stezano (2018) agreed on one fundamental premise: innovation and engineering are interrelated concerning interchangeable roles during the process. If research on the inability to apply expert knowledge in innovation, EM or IEM roles when creating WFD

programs within NSHE is not explored further, industry professionals may continue to experience an increase in innovation failure within IEM, which involves people, process, and attitudes (Education Commission of the States, 2021a). It is important to note why the research question presented: How strong is the correlation, if any, between employee analysis of skills gap alignment and the role of innovation engineering management is critical to Nevada's WFD programs within NSHE.

Background

The guiding theoretical framework is transformational innovation engineering (Burton et al., 2011) which guided my goals of the study by aligning economic and WFD within the NSHE system to that of industry. The researcher also used the transformational innovation engineering framework to explore the Peter Principle further, as Lazear (2004) discussed, to uncover correlations as to what effect, if any, does the inability to apply expert knowledge in IEM has on state outcomes concerning the skills gap. The transformational innovation engineering framework (TIE) coupled with the Peter Principle allowed the researcher to demonstrate how leadership teams, employees, and training organizations are often promoted to a certain level of incompetence which further exacerbates issues with workforce economics alignment and the skills gaps. With over 2.4 million positions that may go unfilled between the years 2018-2028 due to the ongoing skills gap issue locally, nationally, and globally, with a dire economic impact loss of $2.5 trillion (Deloitte, 2018; DeVos & Ellwanger, 2017). Lazear (2004) explored the foundational issues of misalignment within the promotion process within the organization.

However, the TIE framework has never been fully implemented within WFD organizations (Hartwig & Peters, 2021). Lamare (2020) suggested that as states began to recover from the COVID-19 pandemic with more than 48 million individuals unemployed with a minimum of $200 billion in lost revenue purpurates the foundational issues of misalignment during the engineering process, which often contributes to failed innovation projects (Lazear, 2004).

The researcher also used the TIE framework to demonstrate the importance of *T-shaped* professionals who are multidisciplinary and interconnected workforce individuals with a wealth of knowledge transference systems and are an integral part of a thriving WFD environment. TIE allows T-shaped individuals to participate in EM, innovation role alignment phases, integration,

and implementation when interacting with others and applying knowledge and education to multiple areas (Farias et al. 2021, 2021; Lazear, 2004; Ovans, 2014).

Further examination by Farias et al. (2021), Thomson (2021), Zhang et al. (2021), and Cheng et al. (2020) concerning the TIE framework and future implications and implementations of the Peter Principle during the years (1976-2023) provided credibility to the ideological perspective. Regardless of the industry, all individuals/employees and processes will inevitably take part in EM or EI methodology and alignment tasks that need to be thoroughly evaluated and adequately aligned to that of the individual performing the task.

The significance of this research study is in addressing the lack of expertise in IEM roles when creating WFD programs within NSHE. Currently, the executives, instructors, and supervisors of WFD programs within NSHE institutions do not possess a background in innovation, engineering management, or even innovation engineering management. However, they do possess backgrounds as K-12 administrators or higher education administrators with a background in curriculum development, design, or WFD (NSHE, 2017; NSHE, 2021a; NSHE, 2021b). Competing priorities of IEM requires specific IEM experts in WFD. Due to the lack of experts in IEM in WFD programs this leads to an increased skills gap that has been well documented on various industry levels concerning initial alignment proposals in federal and state WFD programs (Deliotte, 2018; Education Commission of the States, 2021a; Hicks et al., 2000; Levesque, 2019; Leigh & Kraft, 2017). The rationale behind the approach demonstrates the prior and current interdisciplinary issue with an updated solution to the issue at hand in many industries, which all frequently encounter some degree of engineering.

Research consistently falls short from the perspective of interdisciplinary transference, in which most engineers and leadership teams do not remain in the same field. Nevertheless,

the level of expertise crosses into other fields with no precise road mapping of how to generate the prior successes in the new organization in a new or emerging field. Case in point would be Virgin Galactic's founder Richard Brandson and team, which successfully launched the first consumer-facing space tourism plane into outer space; the industry as a whole is in the pre-production stage of emergence (Davidian, 2020; Levesque, 2019; Office of the Governor Michelle Lujan Grisham New Mexico, 2021). The research will serve as a guide to allow practitioners to further study how to close the skills gap, which contributes to over 2.4 million positions that will go unfilled between the years 2018-2028, with an economic impact loss of $2.5 trillion (Al-Haqan et al., 2020; Avramchuk, 2020; Deliotte, 2018; Maxwell & Gallagher, 2020).

If the leadership team within the NSHE system continues not to address the lack of expert knowledge in the domain of IEM in WFD programs, the Governor may disband the independent authority that will focus on making Nevadans job-ready. The finding of the committee will be presented during the August 1, 2022, legislative session. Possible changes may arise during the 2023 legislative session (Girnus, 2021; Hackbarth, 2021; Office of the Governor Steve Sisolak Nevada, 2021; Ovans, 2014). If NSHE is to prepare for the new economy and participate in high growth and high-wage job sectors as the Governor and NSHE leaders state, the focus needs to be fully comprehending IEM failures in WFD within NSHE to enable a viable future for all Nevadans. Former Governor Steve Sisolak of Nevada stated we need to recognize that our community colleges will play an even more prominent role in WFD" (Lazear, 2004; Office of the Governor Steve Sisolak Nevada, 2021; Ovans, 2014).

The purpose of this quantitative correlational research study is to investigate the relationships involved in the inability to apply specific knowledge within IEM roles when

creating WFD programs within NSHE, a phenomenon that leads to an increased skills gap. These relationships include personal values and roles of engineering concerning the role of EI, EM, leadership styles, and employee and process alignment. A Gallup poll conducted by Beck and Harter (2021) found that organizations failed to select the candidate with the right talent 82% of the time. Which will suggest that a mere 18% of the candidates are correctly chosen, perpetuating the current issue of misalignment of WFD engineering-related infrastructure and industrial technology programs involving IEM, EM, and EI hiring tasks and final work assignment. If 82% of hired candidates are a mismatch within their current roles, according to Beck and Harter (2021), leadership teams and course content developers in WFD programs are exacerbating the concept of *promoting to the level of incompetence*; a term referred to as the Peter Principle.

While only 35% (8,330,000) of U.S. managers are engaged in their jobs, this leaves 65% (15,470,000) not engaged (Beck & Harter, 2021). Further analysis by McKinsey & Company of the workforce and economic development demonstrated a continued misalignment trend during the COVID-19 pandemic (DeSalvo et al., 2021; De Smet et al., 2020; McKinsey & Company, 2022a; Holzer, 2021). An estimated 19 million workers have quit their jobs as of April 2021, and this trend looks set to continue (De Smet et al., 2021). Workers wanted to change jobs, employers wanted to hire these workers, and leadership in WFD programs within community colleges did not know how to meet the industry demand of employers and workers (Barley & Sullivan, 2022; De Smet et al., 2021). However, none of these arguments presented by the respective parties resolved or involved the role of WFD programs. The Peter Principle could be observed occurring in real-time. Suppose individuals were already out of alignment in their old job by being skills deficient. In that case, it is unclear how they will fit into the new roles without

support from community colleges, employers or industry, and governments. Current research by scholars such as Beck and Harter (2021) pointed us in another direction, stating that only 18% of candidates are chosen for the right jobs. While 82% will continually be misaligned, suggesting tens of millions of participants within government, industry and community college ecosystems seeking employment will be misaligned within the workforce continuously.

This literature review explores several areas concerning the lack of expertise in IEM roles when creating WFD programs, as follows: such as (a) The roles of IEM, EM and EI, (b) Collaborative tacit knowledge intersection of IEM, EM and EI shift in WFD programs, and (c) Employee and leadership perspectives towards the intersection of workforce development, innovation engineering management, and engineering management.

Theoretical Framework

The theoretical framework of transformational innovation engineering TIE (Burton et al., 2011) guided the goals of this study, which investigated the alignment between economic and WFD within the NSHE system and industry. The TIE framework was further used to explore the Peter Principle further, as discussed by Lazear (2004), to uncover correlations between the inability to apply expert knowledge in IEM and outcomes concerning the skills gap in Nevada. The TIE framework, coupled with the Peter Principle, facilitates the demonstration of how leadership teams, employees, and training organizations are often promoted to the level of incompetence, further exacerbating issues with workforce economics alignment and the skills gaps.

Scholars have recognized during 2022-2028, 2.4 million positions may go unfilled due to the ongoing skills gap issue locally, nationally, and globally, with a consequent dire economic impact loss of $2.5 trillion (Deloitte, 2018; DeVos & Ellwanger, 2017). The COVID-19

pandemic has greatly exacerbated the skills gaps by increasing the rate of dislocated workers according to the Department of Labor COVID-19 Dislocated Workers Grant (DWG), which awarded a total of $398,952,785, of which $77,916,401 was spent on recovery training programs for dislocated worker (U.S. Department of Labor Employment and Training Administration, 2021a; U.S. Department of Labor Employment and Training Administration, 2021b). Lazear (2004) explored the foundational issues of misalignment within the promotion process within the organization.

However, the TIE framework has never been fully implemented within WFD organizations (Hartwig & Peters, 2021). Lamare (2020) suggested that as states began to recover from the COVID-19 pandemic with more than 48 million individuals unemployed with a minimum of $200 billion in lost revenue, this will perpetuate the foundational issues of misalignment during the engineering process, which often contributes to failed innovation projects (Lazear, 2004). The researcher has also used the TIE framework to demonstrate the importance of T-shaped professionals who are multidisciplinary and interconnected workforce individuals with a wealth of knowledge transference systems and are an integral part of a thriving WFD environment. TIE allows T-shaped individuals to take part in EM, innovation role alignment phases, integration, and implementation when interacting with others and applying knowledge and education to multiple areas (Farias et al. 2021; Lazear, 2004; Ovans, 2014).

Further examination by Cheng et al. (2020), Farias et al. (2021), Thomson (2021), and Zhang et al. (2021), concerning the TIE framework and future implications and implementations of the Peter Principle during the period 1976-2023 provides credibility to the ideological perspective. Regardless of the industry, all individuals/employees and processes will inevitably

take part in EM or EI methodology and alignment tasks that need to be thoroughly evaluated and adequately aligned to that of the individual performing the task.

The Roles of Innovation Engineering Management, Engineering Management and Engineering Innovation

The role of innovation engineering management, engineering management and engineering innovation, which consists of three distinct and separate paradigms which contribute to the overall cohesiveness of WFD programs. The role of IEM in WFD programs is to address comprehension and implementation dynamics of IEM practices and their impact on subject matter experts (SME) (David et al., 2022). EM's role in WFD programs is to address development and integration of various designs to allow a transdisciplinary approach to engineers, designers and researchers to grasp the comprehension of the competitive nature in academia, government, and industry concerning the everchanging environment and flexibility of emerging business processes and technology integration of diverse ecosystems (Liu et al., 2022; Urbinati et al., 2022). The role of EI in WFD programs aims to address the lack of ability, design, education, ethics, and the effects on society and sustainability (Wallisch & Paetzold, 2022). The roles of IEM, EM and EI in WFD pathways continuously change and evolve and must be tangible to the targeted audiences (Stahl, 2022).

Many professionals have deployed and measured innovation as a creative endeavor; unbridling hidden potential to envision new ideas (King et al., 2019). What has not been measured is the correlation between employee analysis of skills gap alignment and the role of IEM. Innovation is intentional, meaning that it is measurable by introducing change into a viable stable system. Practitioners in IEM and EI are recognizing the unmet demand (Bar Am et al., 2020; King et al., 2019). IEM practitioners apply creative resources to design measurable and

appropriate solutions. IEM Practitioners employ design philosophy a system of overlapping spaces as opposed to a set of processes to navigate through (Gahan et al., 2021; García-Fernández et al., 2022). Elements contributing to the problem are personal values, roles of engineering during engineering innovation, leadership styles, employee and process alignment or management teams, employees, and processes not fully aligned to IEM roles within the workforce development initiatives when undertaking innovation projects (Thayer et al., 2018).

Current NSHE institutions infrastructure and industrial technology programs within the NSHE system, offers few to no-programs specifically aligned to IEM, EM, and EI WFD programs (Office of the Governor Steve Sisolak Nevada, 2021; Weise, 2021). The governor of Nevada and the state legislatures have been attempting to allocate additional funding, however, with the lack of qualified IEM, EM, and EI experts, the governor and state legislatures do not have a clear idea as to which programs are better suited for the financial funding (Solis, 2021b).

To further illustrate the intricate issues of why a working relationship with IEM, EM and EI are important involves comprehending how the Nevada leadership and NSHE teams do not have the working knowledge to complete certain task concerning alignment (Office of the Governor Steve Sisolak Nevada, 2021; Solis, 2021b). These teams often seek out leaders who can guide them or research solutions that have been proven to work in the same field, the difference is some professionals are active or passive learners. However, by no means are they IEM, EM and EI workforce professional experts, due to the newness of IEM, EM and EI being deployed in additional industry areas. In 2011 the former governor of Nevada, Brain Sandoval, NSHE, and industry attempted to create alignment in Nevada's workforce and WFD programs the endeavor failed (Office of the Governor Steve Sisolak Nevada, 2021; Solis, 2021b). The former governor of Nevada, Steve Sisolak was undertaking the same attempt using the same

approach as the previous predecessor, excluding the roles of IEM, EM and EI in the workforce; regional development agencies alignment does not work without comprehending how IEM, EM and EI are integrated in what the leadership teams in the State of Nevada is attempting to accomplish. (Solis, 2021b). By not having these experts, time and resources are being wasted (Office of the Governor Steve Sisolak Nevada, 2021).

The dynamics within the role of IEM experts in Nevada NSHE system according to David et al. (2022) will allow relevant scholars to provide sound advice to Nevada WFD program directors and Nevada WF boards. The NSHE system has proven that they do have professionals that are learning from other professionals, apart from the experts in IEM, EM and EI WFD fields (Education Commission of the States, 2020; Office of the Governor Steve Sisolak Nevada, 2021). As Wallisch and Paetzold (2022) demonstrated, the role of EI in WFD programs aims to address the lack of ability, design, education, ethics, and the effects on society and sustainability; the NSHE system has made several attempts to address the lack of ability and education and the effects on society and sustainability and have failed, however, making progress in other areas concerning EI (Education Commission of the States, 2021a, 2021b; Office of the Governor Steve Sisolak Nevada, 2021; Timko, 2022).

Employees and Leadership Perspectives Towards the Intersection of Workforce Development, Innovation Engineering Management, and Engineering Management

According to Peter and Hull (1919) and Lazear (2004) leadership is more than a function predicated on the individuals communication styles and well they get along with others during various stages of conflict as alluded to by Ovans (2014) which stated managers and leadership ideologies are not perfect which is why practitioners, researchers and scholars Ovans (2014) and Benson et al. (2018) of Harvard Business Review have taken an interest in exploring various

reasons of why leadership alignment, employee attitudes and value systems fail concerning the roles of engineering management within the context of the innovation process; which further improves the argument for creating more T-shaped professionals, which inadvertently specifically targets the Peter Principle paradigm. T-shaped professionals are trained and exposed continuously earlier on in their careers through formal and informal on the job training initiatives to explore root causes of failure as not to encounter the issue twice within the same environment (American Society for Engineering Education, 2017). T-shaped professionals are multidisciplinary and interconnected workforce leadership individuals with a wealth of knowledge transference systems, and are an integral part of a successful workforce development environment because of the engineering management and innovation role alignment phases, integration, and implementation when interacting with others and applying knowledge and education to multiple areas (Farias et al. 2021); Lazear, 2004; Ovans, 2014).

Practitioners, researchers and scholars such as Benson et al. (2019), Chan (2018), Farias et al. (2021), Master Class (2021), Thomson (2020) continued to explore and expound on the notion that the Peter Principle from 1975-2023 is still relevant 47 years later while systemically applied in today's workforce development economies. The research findings of the practitioners, researchers and scholars demonstrated the lack of leadership knowledge transference, leadership attitudes and processes concerning the role of engineering management within the innovation process, (Benson et al., 2019). It is important to mention women and minorities were excluded from the 1973 study because they were often not promoted despite competence, therefore limiting the opportunity to reach their incompetence (Ovans, 2014). Farias et al. (2021), Master Class (2021), and Hartwig and Peters (2021) conducted follow-up observations and research concerning the Peter Principle and future implications concerning implementations of the Peter

Principle presented during (1976-2023). Brilon (2015), Faria and Mixon (2020), Fiedor (2015), and Hartwig and Peters (2021) demonstrated managers are overwhelmed by anxiety and depression which contributes to a lack of ambition and desire to succeed thus alluding to the fact of limited leadership styles.

Lack of sharing knowledge and lack of process alignment as discussed by scholars entails some degree of all employees at various levels in the organization withholding or not possessing certain knowledge to complete a task or the knowledge being requested, however, not provided to the employee (Balcerzyk, 2021; Johnston and Mason 2021; Ovans, 2014; Sensuse et al., 2021; Van Goethem and Easton, 2021; Van Greunen et al., 2021). The lack of knowledge sharing directly contributes to the overarching premise concerning the lack of process alignment if employees are in any stage of protection mode concerning their job roles. Solis (2021b) explained that not only was there a lack of knowledge from the government and industry, NSHE academia stopped fighting to be included in industry while industry and government dictated what WFD programs should be. Consequently, by not treating academia, government, and industry as extended employee organization as a continuous cycle to create and reinforce alignment we have individual's in apposition who are incompetent due to the lack of organizational sharing (Solis, 2021).

Johnston and Mason (2021) and Van Goethem and Easton (2021) viewed the lack of sharing knowledge from an indigenous methodologies (IM) perspective which is based on a lack of consideration and lack of integration, this is important because IM emphasizes the context of unequal relationships between dominate and non-dominate cultural attitudes, beliefs and norms. According to Solis (2021) and McKinsey and Company (2022b) explained the unequal relationship in NSHE, the governor's office and industry during pre and post COVID-19.

Scholars introduced throughout this research paper have discovered, when there is a deficiency of representation, employee will withhold knowledge as a form of self-preservation to protect their individual identity. If an employee engages in this premise they directly contribute to the lack of process alignment (Balcerzyk, 2021; Johnston and Mason, 2021; Ovans, 2014; Sensuse et al., 2021; Van Goethem & Easton, 2021; Van Greunen et al., 2021).

Ovans (2014) and Hartwig and Peters (2021) concluded a decade later when considering improving the practice of leadership and management alignment they needed to explore managerial incompetence from the standpoint of subordinates' perspectives. This approach is useful in today's environment because managers are employees (subordinate to another individual) as well and are often separated from the body of knowledge when asking for employee perceptions apart from leadership roles. Ovans (2014) observed many managers and leadership individuals removed themselves from the subordinate category by any means necessary to avoid the bad boss/leadership category to be seen as a good potential manager with a high degree of leadership characteristics. According to Solis (2021b) the leadership being displayed in the NHSE system, Governor's Office and Industry is a separation of the body of knowledge which is the lack of an IEM, EM and EI experts absent from the entire conversation during the years of 2011- 2023.

From 1980 to 2023, scholars from Harvard Business School professor John Gabarro and professor John Knotter recognized and provided a blue print on *Managing Your Boss* which remains relevant today when employees/subordinates are in a consistent mode of self-protection, thus limiting knowledge transfer, leadership styles, processes and people are at best adversarial and convoluted (Birkinshaw et al, 2021; Gabarro & Kotter, 1980; Li et al., 2021). The premise shared by Fast et al. (2014), Nayar (2014), Ovans (2014), Schlesinger and Kiefer (2014) is that

subordinates have a responsibility to help their boss when assisting them. By further analyzing the Peter Principle practitioners can further explore the dynamics of the diffusions of technology theory, which accounts for servant leadership and how Maslow's hierarchy of needs aligns to the updated paradigm shift from the prior UTUAT model which does not address bias theory within outdated organizational psychology leadership styles, guidance and employee acceptance. Additionally, practitioners, researchers and scholars will explore the context of the catalyst for innovation which often creates various aspects of the development theory versus competitive advantage theory.

Employee and leadership professionals previewing the intersection of WFD, IEM and EM according to Birkinshaw et al. (2021), Li et al. (2021), Wang et al. (2021), and Wiese (2021) observed perceptions of innovation fraud which constituted allocating funds differently that were meant to be spent on WFD, IEM and EM programming direct activities as opposes to indirect activities. As Weise (2021) exhibited, current WFD system not only lack critical IEM and EM programs, they are underprepared to address critical infrastructure needs that will prepare individuals for jobs that do not exists. Firms or individuals with the perceived perception of innovation fraud participating or receiving state grants have an increased rate of not recruiting subject matter experts (SME) which greatly affects the employee morale on leadership capabilities when undertaking any form of IEM, EM training (Li et al., 2021; Wang et al., 2021).

Birkinshaw et al. (2021) analyzed the shift to virtual working on managerial behaviors in which many WFD programs had to adjust. One of the critical exposure moments discovered by Birkinshaw et al. (2021) research was that managers became task orientated as opposed to relationship orientated which contributes to a harmful morale atmosphere through narrow controlling. Birkinshaw et al. (2021) finding were crucial because during the last 150 years there

have been several paradigms of co-evolution of innovation on management, technology from the cogent prominence on task and normative importance on individuals management practices. Mintzberg conducted a seminal analysis on management tasks and characterized the work of managers as unrelenting due to brevity, variety and discontinuity, while Kasule, et al. (2015) focused on innovation competence, which detailed 50% or greater of all employment will involve a subject matter experts (SME) while requiring higher education (Birkinshaw et al., 2021; Kasule et al., 2015; Muskat et al., 2021).

Proposed solution

The proposed implementation of IEM, EM and EI roles within the NSHE system is to serve as a diverse and integrated WFD hub by offering programs focused on various engineering and innovation disciplines as opposed to creative disciplines disguised as innovation (Klingebiel, 2022; Lavanga & Drosner, 2020). The prior NSHE system in WF once served as an academic hub for learning and attracting students to a variety of fields excluding IEM and EI because these fields were new at the time (Education Commission of the States, 2021a, 2021b). I have discovered through the interpretation analysis of the literature review practitioner's did not fully comprehend the future roles these specialties will contribute in society leaving the vast majority of none IEM, EM and EI experts confused between innovation, engineering and creativity prematurely classifying all of the respective disciplines as one discipline in WFD programming and WIOA interpretation on the federal, state and local levels (Collins & Spindle- Jackson, 2022; Cunningham, 2022; Timko, 2022).

After several catastrophic global WF events such as The Great Recession of 2008-2010 and COVID-19 2019-2023 WF and WFD programs have not been able to fully recover

and address the need of the workforce community (Collins & Spindle-Jackson, 2022; Mehta & Andrews, 2022; Wiese, 2021). A continuous shift in IEM, EM and EI were taking place and NSHE did little to nothing to adequately prepare for a robust WFD system that will heavily rely on IEM, EM and EI initiatives through federal, state and local government programs. Federal, state, and local officials attempted to create coordinated efforts to assist WFD programs from hemorrhaging WF participants, however, they did very little to comprehend the effect of IEM, EM and EI WF programs (Collins & Spindle-Jackson, 2022; Education Commission of the States, 2021a, 2021b; Office of the Governor Steve Sisolak Nevada, 2021).

Federal, state and local WF systems did not adequately prepare for how WFD and its programs were changing globally to be inclusive of IEM, EM and EI. The framework of transformational innovation engineering is represented throughout Nevada's system of higher education, governments, and respective industries such as infrastructure and industrial technology programs, which also suggests from my interpretation of the literature of WFD programs, that some degree of engineering and innovation will be utilized to continuously transform industries, economies, and WFD programs and their ecosystems (Collins & Spindle-Jackson, 2022; Wallisch & Paetzold, 2022).

When practitioners talk about the continuous shift after the catastrophic global WF events such as The Great Recession of 2010 and COVID-19 2019 it has been noted that a great deal of talent became absent from organizations, which exacerbated the Peter principal, during the TIE framework. The role of innovation engineering management, engineering management, and engineering innovation, which consists of three distinct paradigms which contribute to the overall cohesiveness of WFD programs works in tandem to democratize the

various shift in innovation through the roles of IEM, EM, and EI. Practitioners, researchers, and scholars in academia, government and industry have witnessed firsthand the impact of (a) not utilizing IEM, EM, and EI experts and (b) applying the roles of IEM, EM, and EI in WFD programs (Collins & Spindle-Jackson, 2022; Weise, 2021).

McKinsey & Company (2022a) published a study on April 4th, 2022 which demonstrated how the most vulnerable populations as defined by Collins and Spindle-Jackson (2022), and Weise (2021) contributes to future workforce education and how these vulnerable populations were affected during COVID-19. Not only did the vulnerable population lose future earning potential, this also translated into decreased productivity globally. By 2040 pandemic related learning delays (PRLD) are projected to be $1.6 trillion worldwide. Scholars have estimated between the years 2023-2028, 2.4 million positions may go unfilled due to the ongoing skills gap issue locally, nationally, and globally, with a consequent dire economic impact loss of $2.5 trillion (Deloitte, 2018; DeVos & Ellwanger, 2017). These estimates combined will create $4.1 trillion economic loss globally and further exacerbates the skills gap locally, nationally, and globally (Collins & Spindle-Jackson, 2022; Deloitte, 2018; McKinsey & Company, 2021).

Collaborative Tacit Knowledge Intersection of Innovation Engineering Management, Engineering Management and Engineering Innovation shift in WFD programs

Collaborative Tacit Knowledge intersection of IEM, EM and EI shift in WFD programs. The current shift in WFD concerning collaborative tacit knowledge intersection of IEM, EM and EI implementation demonstrates the difficulties practitioners, researchers and scholars often encounter when collecting, comprehending, and selecting participants and program necessities within community colleges, government and industry. The end users of community colleges, government and industry are different, however, requiring a certain level of collaborative tacit

knowledge. (Chan & Luk, 2022; Haller, 2022; Vargas-Hernández, 2022; Wallisch & Paetzold, 2022).

The organizations observed by Berseck and Zu Knyphausen-Aufseß (2018), Capozzi et al. (2010), Nieminen (2018), and Stezano (2018) considered the competitive advantage as resources and products and not the development of theory, practice, and innovation. According to Berseck and Zu Knyphausen-Aufseß (2018) if firms were better able to embrace the path of new competences and the role of engineering concerning how technology innovation affects the organization, firms will be more adept at positioning the human capacity and the frameworks for innovation using a fishbone analysis (Coccia, 2017; 2020; Roffe,1999; Yordanova 2018). Transference of knowledge is important because traditional information is passed down through interviewing, the current information is being passed down through data analysis and machine learning; the greater the complexity to access information, the greater the specialized individual must be to analyze and disseminate the information creating an even more sophisticated demand for highly skilled technology workers, which will necessitate the need for a more considerable increase in innovative methods to comprehend technology (Abrell et al., 2018; Bessant & Rush, 1995; Ferreira et al., 2019).

Workforce, workforce development programs, and leadership strategies are consistently evolving to meet the demands of industry at face value. However, this approach has led to various misalignment issues in WF and WFD programs which at-risk, dislocated, and underserved population count on to gain or enhance existing skills to be compatible for future career opportunities to make viable economic change (Solis, 2021a; 2021b; Wiese, 2021).The infrastructure investment gap as of 2021 is $5.6 trillion, by 2039 if America's leadership teams on the federal, state and local levels do not align infrastructure investment to that of the WF and

WFD programs serving underserved and at-risk populations with respective experts, this will cost Americans $2.24 trillion in exports over the next 20 years as of 2022, 78% or 7.6 trillion of disposable household income, $10 trillion in GDP, and $23 trillion in business productivity, all losses American communities cannot afford (American Society of Civil Engineers, 2021; Fair, 2021; Wolf, 2021; 2021 Report Card for America's Infrastructure, 2021).

Realign all parts of WFD programs in Nevada to the State Plan for better accountability of regional supportive plans, establish a board or committee through legislative oversight of NSHE to ensure all educational programs are aligned to the regional needs with a score card to measure output of outcomes. Utilize NPWR system to drive disaggregate decisions by county, income, and industry to determine the best multi-actor innovation policy mix. Analysis of the NPWR data demonstrated that the NSHE system does train engineers in various disciplines, however, they are not training IEM engineers. The retention incentive of $4 million to retain talent is not enough to sustain an entry level to mid-career professional.

Conclusion

Governor Lombardo and his administration has partnered with various agencies such as The Department of Employment & Training & rehabilitation, The Nevada Department of Education, while attending round tables in the private and public business sectors to better understand the challenges such as the degree of correlation, if any, between employee analysis of skills gap alignment and the role of innovation engineering management. By utilizing NPWR data driven solutions and partnerships between industry, government and academia we are on the right path to correcting and creating more robust alignment concerning WFD program initiatives.

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