ROLE OF FEEDBACK ON INNOVATIVE OUTCOMES: MODERATING ROLE OF RESOURCE-CONSTRAINED ENVIRONMENTS

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Abstract

Emerging economies necessitate innovative new products to be developed using limited resources. This encourages scholars to explore factors that enhance innovative outcomes in environments with different levels of resource constraints. Extending the theory of feedback at workplaces to the context of innovation and new product development, we explore the effects of supportive and constructive feedback on innovative outcomes during new product development. We examine the moderating effect of resource-constrained environments on the relationship between feedback and innovative outcomes. To test our hypotheses, we conducted two studies to collect data from 191 executives in the first study and 92 engineers in the second study as they create innovative outcomes within low and high levels of resource-constrained environments along with different levels of supportive and constructive feedback. Both studies highlight that supportive and constructive feedbacks were valuable in enhancing innovative outcomes. Furthermore, our findings suggest that resource-constrained environment moderates these relationships. Our study adds to the existing literature by highlighting ways by which innovative outcomes in new product development could be enhanced in resource-constrained environments in emerging economies.

Index Terms – Supportive feedback, constructive feedback, innovative outcomes, resource constraints, emerging economies, product development

I. INTRODUCTION

In the era of ever-increasing global and market pressures, effectively innovating with resources at hand has important implications for innovators, entrepreneurs, and organizations [1]. One stream of scholars suggests that resource scarcity negatively influences innovative outcomes, as innovation requires significant investments in raw materials, technology, and human resources [2-4]. In contrast, another stream of scholars advocate that resource-constrained environments encourage innovation and creativity [5-7] through other processes such as frugal engineering, improvisation, bricolage, and jugaad [8]. Hence, both high and low levels of resource-constrained environments provide conditions that could facilitate or hinder innovative outcomes. However, limited studies have investigated how individuals (i.e., engineers working on innovation projects) could be fostered in their journeys to produce innovative outcomes in various resource-constrained settings [9-11]. Our research focuses on addressing this gap in the literature.

One such factor that can influence individuals working on innovation projects is receiving feedback from supervisors and peers. Feedback is found to be crucial for innovators and engineers during new product development as it reduces some of the uncertainty associated with innovation [12-14]. Feedback is defined as information provided by external agents regarding aspects of task performance [15, 16]. Historically, scholars believed that feedback consistently improved positive outcomes [17]. However, many recent studies have challenged this notion and suggested that the effect of feedback depends on the fit between the type of feedback and the context [14, 17, 18]. Hence, feedback might have positive, negative, or no significant effect on the outcomes depending on the type of feedback and the context [19]. Therefore, it is important to explore the effectiveness of different types of feedbacks in new settings [17].

Prior studies have identified two mechanisms, i.e., enhancing motivation and improving learning, by which feedback could influence an individual's behavior and performance [17, 20]. Drawing on these two mechanisms, scholars have identified and explored the influence of supportive and constructive feedback on an individual's performance [13, 21]. Supportive feedback is an expression of emotional and moral support by others to the engineers or innovator/s [22-26]. In turn, constructive feedback involves helpful ideas, information, and opinions that are useful to improve task performance [23, 24, 27]. Prior research have explored the effect of different types of feedback, such as constructive and destructive feedback or positive and negative feedback on employee morale, well-being, job satisfaction, self-efficacy, citizenship behavior, and task performance [14, 27-30]. However, limited studies explored the effects of both supportive and constructive feedback on innovation outcomes among engineers in new product development settings. Our study focuses on this important gap in the extant literature by empirically exploring this research problem.

Resource constraints in environments determine the objective and focus of the innovator [1, 8, 31]. For example, as engineers operating in a high resource-constrained environment have limited resources, they have to emphasize on bootstrapping and improvising with the resource at hand to attain the best possible outcomes. In contrast, a resource-rich context enables innovators to focus on the objective without worrying about the availability of resources or identifying alternate resources. The impact of such environments is more pronounced in emerging economies due to weak formal institutions and labor laws, which add further strain on engineers [32-34]. As feedback effectiveness depends on the fit between feedback and context [17], the contextual differences due to different levels of resource constraints in the environment are likely to moderate the relationship between feedback and innovation outcomes. Therefore, we compare the effectiveness of supportive and constructive feedback on innovative outcomes in low and high levels of resource-constrained environments, enhancing the existing literature further.

To test our hypotheses, we conducted two studies to gather data from 191 executives in the first study and 92 engineers in the second study as they created innovative outcomes in either a low or high resource-constrained environment, which was allocated randomly. During the two studies, the executives and engineers were either provided supportive, constructive, or no feedback randomly. Our study found that both supportive and constructive feedback positively drive innovation outcomes. However, constructive feedback is more effective in resource-constrained environments as compared to environments where resources are plenty and more readily available. Our findings also indicated that supportive feedback is more beneficial in low resource-constrained environments than environments with high resource constraints.

Findings from our research contribute to the existing literature in multiple ways. First, contributing to the debate about the impact of resource constraints in the environment on innovation, our research did not find any significant direct effect of resource-constrained environments on innovative outcomes. Thus, resource-constrained environments can both encourage and hinder innovative outcomes under different conditions. Second, our findings highlight the contingent effect of resource-constrained environments on relationship between feedback and innovative outcomes. Therefore, our research indicates the importance of resource constraints in the environment while determining the effectiveness of other constructs that drive innovation. Third, supportive and constructive feedback positively influence innovative outcomes adding to the literature on the antecedents of innovation. Finally, our findings suggest that R&D departments can improve engineer's innovative outcomes by encouraging a culture of supportive and/or constructive feedback depending on the level of resource constraints in their environments during the development of new products or services.

II. THEORY AND HYPOTHESIS DEVELOPMENT

A. Resource Constraints and Innovation

Traditionally, resource constraints are seen as obstacles for innovation and new product development [2-4, 35, 36]. There is no doubt that resources are important for innovation. Prior studies have also found a positive impact of slack resources [37-41], R&D investments on resources and technology [3, 42], and resource deployment [4, 43] on innovative outcomes. Innovation requires investments in technology, experimentation, data collection, and testing of products and services [2-4]. All these activities require materials, capital, and human resources, and hence, it is fair to assume that resource-scarce environments might lead to poor innovative performance and product development. Thus, if resources are abundant, the innovator could focus on the new product development goals and combine the necessary resources to achieve the objectives. Therefore, proponents of this stream of the research argue that resource scarcity negatively influences innovative outcomes.

Another stream of research in the field shows a contrasting approach of "less is more" and "making do with available resources" towards innovation. Many studies and examples highlight that individuals and organizations develop innovative and creative outcomes in highly resource-constrained environments [5-7]. Several studies in new product development also emphasize that products and services designed and produced in a resource-constrained environment are found to be highly innovative and successful in market places [10, 44]. Prior research at both individual and organizational levels suggests that resource constraints may facilitate, rather than inhibit, innovation [5, 10, 45, 46]. Mishina, Pollock and Porac [47] also suggest that the presence of abundant slack resources may make executives complacent and inefficient. Hence, the scholars arguing the philosophy of "less is more" suggest than humans become more creative and innovative in resource-constrained environments as it makes them more focused and pressurizes them to identify unexpected alternate ideas [45, 46]. Therefore, innovators are more likely to find innovative outcomes in resource-constrained than in resource-rich environments.

As discussed above, resource-constrained environments in some situations encourage innovation, and in other situations, impede innovative outcomes. Resource-poor environments certainly create a need for tinkering, bootstrapping, and other creative behaviors for solving problems. Gibbert, Hoegl and Valikangas [46] suggest that resource constraints neither independently drive nor prevent innovative outcomes, but they either enable or limit other factors to enhance innovative outcomes. Hence, the important question is to understand the impact of resource-constrained environments on factors that encourage innovative outcomes. Such knowledge will help to increase innovative outcomes in an organization.

B. Feedback Theories in Organizational Contexts

In organizational settings, feedback is defined as information provided by external agents such as coworkers, supervisors, and customers, which is intended to improve task outcomes [17, 25]. Feedback can vary along a number of dimensions such as amount, frequency, specificity, timing and sign [12, 48, 49]. Feedback literature draws on many theoretical perspectives [17, 18]. One of the most influential theories in the field is "the law of effect" by Thorndike [50], which suggests that feedback facilitates learning and thereby enhances performance by reinforcement and punishment [51]. However, control theory postulates that feedback influence performance by motivating individuals to engage in self-regulating behaviors directed towards reducing discrepancies between current performance and target performance [52, 53]. In contrast, scholars proposing goal-setting theory argue that people are motivated to achieve the goal rather than eliminate the discrepancy, which improves performance. Drawing on [20], Kluger and DeNisi [17] proposed Feedback Intervention Theory (FIT), which suggested that feedback may influence performance either via changing motivation or learning. Hence, in this study, we use the underlying mechanism of motivation and learning to explain the relationship between supportive and constructive feedback on innovative outcomes.

Drawing on motivational mechanisms, supportive feedback influence individual motivation, which in turn drives their behavior and outcomes [18]. Supportive feedback includes cues that enhance motivation and confidence of the innovator about their ability to complete a given task [22-26]. For instance, receiving encouragement from supervisors or peers to “keep at it” or “we all faced similar issues” is a classic example of support and supportive feedback. Such supportive feedback enhances internal work motivation, which leads to is improved work effectiveness [54], reducing absenteeism and employee turnover [55]. On the other hand, constructive feedback draws on learning mechanisms by enhancing the innovator’s knowledge, information, and providing them new ideas to improve the task successfully [23, 24, 27]. For example, sharing new information or relevant technical knowledge with a colleague that can help your colleague with their ongoing project is constructive feedback. Constructive feedback provides informational cues that facilitate error correction, helps the innovator to learn and complete the task effectively [56, 57]. Therefore, in this study, we use motivational and learning mechanisms to understand the impact of supportive and constructive feedback on innovation outcomes, respectively.

C. Effects of Feedback on Innovative Outcomes

1) Supportive feedback and innovative outcomes:

Supportive feedback focuses on providing the individual with encouraging and empathetic messages about their task and performance [22-26]. The purpose of supportive feedback is to increase the individual's belief in their own capability and motivate them to complete the task successfully [21]. Supportive feedback informs the individuals that they are making progress, and their outcomes might be good [25, 58]. Supportive comments from coaches and peers boost experiences and outcomes in exercise and sports contexts [59]. Drawing analogy from sports and exercising, we suggest that supportive feedback from supervisors and peers would increase motivation and confidence to generate innovative outcomes. Prior studies have also highlighted that supportive comments enhance the ability to recall and increase memory recognition [60], which could help in innovative outcomes [61]. Supportive feedback is also found to improve the mood and positive task experience [60, 62], leading to higher engagement in innovative solutions [15, 16]. Therefore, we propose that supportive feedback enhances innovative outcomes.

Hypothesis 1: Supportive feedback positively influences innovative outcomes.

2) Constructive feedback and innovative outcomes:

Constructive feedback focuses on providing helpful ideas, information, reviews, and opinions that help the innovators to learn and improve task performance [14, 25, 63]. It is informational and provides direction or suggestions that might lead to enhanced innovative outcomes [25, 64]. Constructive feedback also focuses on advising new or improved ways of doing things [16, 23, 24], acquiring new knowledge leading to advance innovative outcomes. It also encourages innovators to move out of their comfort zone and view both the problem and solution using a new lens. Constructive suggestions focus on highlighting ways to improve currently ongoing development work on a new product, service, or process [23, 24, 27], which might lead to novel outcomes. Constructive feedback may also remind innovators about the fundamental assumptions they made, as well as other facts and/or concepts they might have ignored [64]. In innovative projects, constructive feedback inspires out of box thinking which might lead to an effective outcome. In many cases, constructive feedback helps to identify existing issues with the current products that the innovator might have overlooked and might suggest ways to mitigate them [14, 23, 25, 63], thereby increasing the effectiveness of innovative outcomes. Additionally, learning from constructive feedback might also provide new ideas to approach the problems in a new way and develop innovative solutions that they did not think earlier [65, 66]. Therefore, we propose that constructive feedback enhances innovative outcomes.

Hypothesis 2: Constructive feedback positively influences innovative outcomes

3) *Feedback and innovative outcomes: Moderating effect of resource constraints:*

Supportive feedback drives innovative outcomes by providing individuals with encouraging messages and motivating them to perform the innovative task effectively [14, 23]. The resource-constrained environment is characterized by the limited availability of resources, and thus, requires innovators to bootstrap and improvise with the resources available at hand [5, 6, 9]. In such situations, supportive feedback increases individuals' confidence in their ability [22, 61, 67] to combine available resources in a new and unique way to provide alternate solutions. It also helps in reassuring individuals that it is possible to develop new products with minimal resources and that they are capable of doing so [61, 67]. Supportive feedback might also enhance the innovator's confidence to explore alternate resources that are readily available but traditionally not used in the task [16, 23]. Finally, in an environment with high resource constraints, supportive feedback engages the innovators and motivates them to think out of the box and introduce a completely new (non-traditional) solution to the problem. In contrast, innovators operating in a low resource-constrained environment can access all resources readily for their task, and do not have to explore non-traditional ways to combine resources, identify alternate resources or solutions. In such situations, supporting feedback encourages innovators to focus on the goal and use traditional resources and methods to achieve the outcomes. Hence, in environments with high availability of resources where innovators are not necessarily forced to look for alternate resources or combine resources in a new way, supportive feedback is less likely to encourage new ways to achieve the innovative outcomes. Therefore, we propose that supportive feedback is more effective in the high resource-constrained environment than in the low resource-constrained environment.

Hypothesis 3: Resource-constrained environment positively moderates the relationship between supportive feedback and innovative outcomes, such that supportive feedback is much more effective in high resource-constrained environments than in low resource-constrained environments.

Constructive feedback provides useful ideas, suggestions, and direction, enhancing innovator's knowledge to improve the performance of the task [24, 27]. In a resource-constrained environment, constructive feedback could provide novel ideas to combine existing resources in new ways to achieve an innovative outcome [14, 27]. It can also offer suggestions to use the alternate resource as the traditional resource needed for the innovative task are limited [14]. The constructive advice could also help the innovator leverage the past experience of the mentor, supervisor, and peer, leading to a reduction in task uncertainty which is generally high in the context of innovation and new product development [12]. Such advice could also help conserve resources by learning from past experience than reinventing the wheel. Thus, constructive feedback allows for reducing the scope of failure through feedback on actual content and idea testing. Finally, constructive feedback may also provide different directions to view the problem and explore its solution [24]. However, in resource-rich environments, the above benefits of constructive feedback may not be useful as the innovators could access the needed resources readily. Therefore, we propose that constructive feedback is more effective in the high resource-constrained environment than in the low resource-constrained environment.

> *Hypothesis 4: Resource-constrained environment positively moderates the relationship between constructive feedback and innovative outcomes such that constructive feedback is much more effective in high resource-constrained environments than in low resource-constrained environments.*

III. OVERVIEW OF METHODOLOGY

To test our hypotheses, we conducted two experimental studies. Experimental studies offer abilities to control the confounding variables, minimize the issues due to reverse-causality, and help establish a causal relationship between independent and dependent variables [68, 69]. Additionally, the experimental research method has limited problems due to self-reporting bias [70], attribution bias [71], and retrospective bias [72, 73]. These biases are common in data collected using perceptual measures from the participants through a survey or an interview [74]. Hence, experimental methods are considered robust and provide strong validity in testing a causal hypothesis. Many scholars have also advocated the use of experimental methods in exploring causal mechanisms [68, 69, 74]. Moreover, we collected data from executives and engineers working full-time in organizations. This approach of asking executives or relevant participants to participate in scenario and task-based experiments has been extensively used in management research due to their high internal validity [75-78].

Both our experimental studies explore the effect of supportive and constructive feedback on innovative outcomes in low and high resource-constrained environments. All experimental scenarios and their respective measures were face-validated by four academic scholars and refined further based on their inputs before conducting the final experiments. Each experimental study used a different research design as well as different measures of dependent, independent, and moderating variables. Moreover, data were collected using different methods across the two experiments. Using two experimental studies to test the same set of relationships using different mechanisms enhances reliability, validity, and generalizability of our findings. Details of the experimental studies are provided below.

A. Study 1 – Sample & Procedures

We collected data from 191 executives attending a training program on innovation and new product development organized by one of the reputed business schools in India. The participants were from different technology-based firms with work experience ranging from one to ten years. The youngest participant in this sample was 23 years old, and the oldest participant was 30 years old. About 84% of the participants were male. All participants had a graduate degree. About 78% of the participants indicated that they possessed work experience on innovation and product development projects.

Although we are hypothesizing for two types of feedback mechanisms, we created a control group of no feedback to be able to compare the results of two feedback mechanisms with control condition of no feedback. As there were two levels of resource-constrained environments and three types of feedback, we collected data in six groups (2 resource constraints conditions * 3 feedback conditions) using full factorial design. Each participant was randomly allocated to one of the six groups. We conducted the experiment six times separately (once for each group). Two supervisors supervised the experiment and they remained consistent across all groups. Participants were randomly allocated to one of these groups. Each group was provided with one resource constraint condition and one feedback condition. Hence, all participants belonging to a particular group received same feedback and resource constraint conditions. The task was to design and develop a prototype of a new product that could solve an existing problem – to prevent people from the rain. Total time of 90 minutes was provided during the experiment to complete the task along with clear instructions, such as there are no right or wrong solutions for the task, do not discuss or communicate with other participants, and to provide their answers as honestly as possible. Throughout the task, the supervisors had multiple one-on-one interactions with each participant and provided individual feedback comments orally. All participants received the feedback comments at equal intervals throughout the task.

Prior studies have suggested the use of expected power, effect size, and significance level to calculate sample size [79]. Using one-way independent ANOVA for six groups, a significance level of 0.05, an effect size of 0.5 Cohen's d (medium), and power of 0.9, we required a minimum sample size of 12 in each of the six groups. Alternatively, using a t-test across two independent groups for each dichotomous variable with a significance level of 0.05, an effect size of 0.5, and power of 0.9, suggests sample size to be greater than 172 (i.e., 86 in each group). Therefore, for both the studies, we targeted a minimum total sample size of 172 with at least 25 samples in each of the six groups.

B. Study 1 – Measures

1) Dependent variables: Innovative outcomes were the main dependent variable in this study. We measured innovative outcomes from the mentor's score on innovation in the prototype using a rating scale from 1 to 10. Many previous studies have used the mentor (training supervisor) rating to measure various constructs, including innovation outcomes [80-82]. To establish inter-rater reliability, we also collected one peer review for each of the prototype. Innovative outcomes rated by the mentor and rated by the peer participant indicating high inter-rater reliability (ICC = 0.77, p < 0.001), increasing the reliability and validity of our findings[1].

2) Independent variables: Feedback mechanism (supportive, constructive) was our key independent variable. To provide the participants with supportive feedback, the mentor (supervisor) regularly provided specific supportive comments throughout the task duration, such as “This is great progress, well done!”, “Nice going! Keep up the good work”, and “Keep going and keep it up”. The group of participants receiving constructive feedback were continuously provided with specific constructive feedback comments by the mentor throughout the task duration, such as “Think harder and go beyond the usual or most obvious ideas”, “Think more on how to uniquely use or combine the given material with others”, and “Think about situations where the material could substitute other materials in products around you”. The detailed list of supportive and constructive feedback comments is provided in Appendix I. The control group of no feedback received neither supportive nor constructive feedback by the mentor.

3) Moderating variable: The level of resource constraints in the environment was the moderator in our study. High level and low level of resource constraints were used in the experiment. The participants operating in high resource-constrained environments were provided with limited tools and materials - five sheets of newspaper, two large plastic bags, five meters of masking tape, and a whiteboard marker. The participants were clearly instructed that they cannot use any resource or material other than what has been provided to them. In contrast, participants

[1] Using peer-participant rating on innovative outcomes as the dependent variable (instead of mentor rating), we find the results consistent.

in low resource-constrained environments were instructed that there is a generous supply of all the above materials. Additionally, they were also provided with other tools, such as glue, staplers, and were free to use any other resources they can think of or find.

4) Control variables: As the time provided to all participants was 90 minutes, the time as a resource was controlled. Also, since each participant in the study had a graduate (bachelors) degree, the education levels in the sample were controlled for. We also controlled for age, gender and, work experience effects as they might influence innovative outcomes.

[Insert Table 1 about here]

C. Study 1 - Analysis and Results

Means, standard deviations, and correlations for all study variables appear in Table 1. The average age of the participants was 26.42 years, with a standard deviation of 2.31 years. Almost 84% of our participants were male. The average work experience of the participants was 5.48 years. As supportive and constructive feedback were mutually exclusive (participants only received one of them), Table 1 shows a correlation of 0.00 between them. Our finding also indicates a very high correlation (r = 0.75) between age and work experience. Therefore, in our final analysis, we include only age and excluded work experience to remove any multicollinearity[2]. The maximum value of the variance inflation factor (VIF) was well below the acceptance limit of 10, indicating no issue due to multicollinearity [32]. The innovative outcome was found to have a positive correlation to both supportive and constructive feedback.

[Insert Table 2 and Table 3 about here]

[2] We also included work experience in our analysis, and the findings remain constant.

We used hierarchical regression analyses to test our hypothesis. Table 2 reports the results from our analyses. Consistent with prior research that recommends using expert ratings in such studies to evaluate the innovativeness of ideas [74, 80, 81, 83], we used the dependent variable of innovative outcome (mentor rated) in all models (Model 1 to Model 3). In Model 1, we included control variables (age and gender). Both the age and gender of the participants did not influence innovative outcomes. Model 2 includes independent variables (supportive and constructive feedback) and moderator (level of resource constraints in the environment) along with control variables. The findings indicate that a resource-constrained environment does not influence innovative outcomes directly. This finding supports our assertion that resource constraints in the environment both enables and hinders innovative outcomes. Supporting our hypothesis 1 and hypothesis 2, Model 2 highlights that both supportive ($\beta = 0.28$, $p < 0.001$) and constructive ($\beta = 0.54$, $p < 0.001$) feedback positively drive innovative outcomes. Model 3 includes both interaction terms between the resource-constrained environment and feedbacks (supportive and constructive) along with variables included in Model 2. Our findings from Model 3 suggest that the interaction term between supportive feedback and the resource-constrained environment has a weak negative effect ($\beta = -0.27$, $p < 0.1$) on innovative outcomes. Therefore, supportive feedback is more beneficial in environments with low resource constraints than high resource-constrained environments. Thus, hypothesis 3 is not supported. Supporting our hypothesis 4, the interaction term between constructive feedback and resource-constrained environment shows a significant positive ($\beta = 0.42$, $p < 0.001$) impact on the innovative outcome. Hence, these findings highlight that constructive feedback is more beneficial in the high resource-constrained environment than environments with low resource constraints.

We also tested our hypothesis using Analysis of Variance (ANOVA) (see Table 3), and the results were found to be consistent. As compared to no feedback, both supportive and constructive feedback was found to be beneficial. Constructive feedback had a stronger positive impact on innovative outcomes in high resource constraint ($\mu = 7.44$) than low resource constraint ($\mu = 6.41$) environments. However, supportive feedback was found to drive innovative outcomes more in environments with low resource constraints ($\mu = 6.91$) than high resource constraints ($\mu = 5.61$). Figure 1 graphically depicts the results of ANOVA.

[Insert Figure 1 about here]

D. Study 2 - Sample and Procedures

To validate our findings further, we developed an online experiment and collected data from engineers in India using online professional groups for engineers. Engineers were invited to participate in a research study about new product development. They were clearly instructed that there are no right or wrong answers to any of the questions, and as we are trying to understand how engineers think and act differently in different situations. Hence, they were requested to provide honest responses.

As per our objective, this study also explores the effects of three kinds of feedback mechanisms (supportive, constructive, no feedback), at high and low levels of resource constraints on product development outcomes and performance. Hence, we created experimental groups and each engineer was allocated to one of the six groups randomly. The three feedback conditions were supportive, constructive, or no feedback, and the two resource constraint conditions were extremely high and extremely low. The instructions for a high resource-constrained environment explicitly instructed engineers regarding the severe limitations of all resources such as capital, cash, labour, work hours, and access to other tools and materials. Similarly, low resource constraint condition was explained to participants. Each engineer was randomly allocated a feedback condition and a resource constraint condition. The participant received specific instructions about their resource constraint condition at the start of the experiment and feedback comments throughout the entire duration of the experiment.

Our experiment provided three different scenarios of raw materials for product development to each participant. We asked our participants to develop as many new product ideas as they could from three basic raw materials, such as newspapers (scenario 1), a liquid chemical compound like silicone (scenario 2), and metal wire (scenario 3). The engineers were asked to think innovatively and describe each of their new product ideas for each scenario in great detail. The detailed descriptions of the task are given in Appendix II.

The final sample included 267 responses to scenarios from 92 engineers, who volunteered to participate in our study. We had to remove 11 responses to scenarios as they were incomplete. As in study 1, our sample size was adequate to highlight medium to high effect size with a statistical power of 0.9. In their professional careers, these engineers performed a variety of technical and engineering tasks in research, product development, and product design, in their respective organizations in their full-time technical roles. The youngest participating engineer was 22 years old, while the oldest was 53 years. About 70% of the respondents were male. Respondents had different work experience – 15% had work experience below three years while 48% had work experience between 3 to 6 years, 29% between 6 to 10 years, and about 8% had more than 10 years of work experience. All participants had educational qualifications of at-least a bachelor's degree in engineering.

E. Study 2 – Measures

1) Dependent Variables: We used *product idea quantity*, that is the number of new product ideas generated in each of the three materials, and *product idea quality*, that is the degree of innovativeness of ideas, as our key dependent variables. Prior studies have used such measures to measure innovative outcomes [74]. As participants were asked to generate as many new product ideas as possible in three scenarios, we measured the idea quantity for each scenario. We had two expert raters independently score the quantity (number of ideas) generated as well as the quality of their product idea in the study. Prior research suggests that using expert raters to measure the quality of new product ideas to evaluate it on the basis of originality [74, 84, 85]. The quality was operationalized on using the originality of ideas scale developed by Gielnik, Frese, Graf and Kampschulte [86] in their study of creativity in the idea/opportunity identification process. The scale ranged from 1 (common, mundane, or boring product ideas) to 10 (rare, unusual, ingenious, imaginative, or surprising product ideas). The overall interrater reliability of the product idea quality was found to be acceptable (ICC = 0.92, $p < 0.001$), which is consistent with the earlier research using raters to evaluate new ideas [74, 83, 87, 88].

2) Independent Variables: Feedback served as our independent variable. We randomly allocated participants with one of the three feedback conditions, i.e., supportive, constructive, no feedback. Therefore, each participant was presented with specific instructions and allocated feedback condition. The details are given in Appendix II.

3) Moderator: Our main moderating variable was resource constraints, which was allocated randomly to each participant, at one of the two levels - extremely high and low. Prior studies have suggested that both resources at hand and resource recombination are critical components for defining resource constraints [9]. We manipulated this variable by providing specific details regarding the availability of resources, either being extremely scarce or very easily available as well as multiple types of resources being made available together for furthering possibilities of resource recombination. Participants operating in high resource-constrained environments were provided with only one dominant resource and cannot use any other resources. While, participant operating in low resource constraints were provided with the same dominant resource and additionally, they could use other resources as well. Thus, engineers operating in low resource-constrained environments have more resources and more opportunities for resource recombination than engineers operating in high resource-constrained environments (see Appendix II).

4) Control Variables: After the experimental task, we recorded demographic details of each participant. We asked questions to record their age, gender, work experience, and education level. We also controlled for Effort using two different measures in our analyses using the recommendations of Kier and McMullen [74]. Effort 1 was the number of words written by the participant while describing their new product ideas and Effort 2 was the total amount of time the participant spent on completing the task, measured in seconds. We also controlled for task scenario.

[Insert Table 4 about here]

F. Study 2 – Analysis and Results

Table 4 presents means, standard deviation, and correlation of all the variables included in the study. The average age was 29.73 years, and about 85% of respondents had more than three years of work experience. About 30% of the respondents were women, and all participants had bachelors or higher degree qualifications in engineering. On average, participants used 153 words to describe all of their innovative ideas for each scenario and took an average of 1820 seconds to complete the task. The respondents suggested an average of 3.14 ideas per scenario and average innovativeness of the ideas was 4.85. We only found three data-points that slightly exceeded standard deviation criteria, indicating the presence of natural outliers. Therefore, we capped the variables at their 99th percentile values [89] and addressed the outlier issue rather than removing them completely leading to loss in natural variation[3]. We found high correlation ($r = 0.58$, $p < 0.001$) between age and work experience of the respondent. The correlation between the two dependent variables, i.e., number of product ideas generated, and the innovativeness of ideas were also high ($r = 0.66$, $p < 0.001$). Both dependent variables had positive correlations with supportive and constructive feedback, encouraging our further analyses. We also checked for multicollinearity by calculating the variance inflation factor (VIF) for all our models, and none of the VIF values exceeded 3, which is much below the accepted value of 10 [90].

[Insert Table 5 and Table 6 about here]

Table 5 highlights the results of the hierarchical regression analyses in study 2 used to test the hypothesis. Model 4 to Model 6 include results for the quantity of new product ideas as dependent variable and Model 7 to Model 9 use the quality of new product ideas as the dependent variable. Model 4 and Model 7 includes all the control variables to the model. Model 4 indicate that age ($\beta = 0.21$, $p < 0.01$), work experience ($\beta = 0.19$, $p < 0.05$), and effort 1 ($\beta = 0.19$, $p < 0.001$) were found to positively influence quantity of new product ideas but only age ($\beta = 0.22$, $p < 0.01$) and effort 2 ($\beta = 0.17$, $p < 0.01$) were found to positively influence the quality of product idea. We also found women on an average generated more quantity of new product ideas, but there was no

[3] We also removed the outliers completely and the results were consistent with our results.

difference across gender groups with regards to product idea quality. We found no significant difference in the quantity and quality of product ideas across three different scenarios in the task.

Model 5 and Model 8 adds moderator (resource-constrained environment) and independent variables (supportive and constructive feedback) along with control variables. Both Model 5 and Model 8 clearly highlight that there was no significant direct effect of resource-constrained environments on quantity or quality of new product idea. However, Model 5 indicates supportive feedback ($\beta = 0.17$, $p < 0.05$) and constructive feedback ($\beta = 0.30$, $p < 0.001$) positively drives quantity of new product ideas. Similarly, Model 8 shows that supportive feedback ($\beta = 0.29$, $p < 0.001$) and constructive feedback ($\beta = 0.42$, $p < 0.001$) were found to have a significant positive impact on quality of new product idea. Thus, supporting out hypothesis 1 and hypothesis 2.

Model 6 and Model 9 adds both the interaction terms to other variables included in Model 5 and Model 8 respectively. Findings from both Model 6 and Model 9 highlight that the interaction term between supportive feedback and resource-constrained environment is negative. These findings suggest that supportive feedback is more beneficial in improving quantity (Model 6: $\beta = -0.21$, $p < 0.1$) and quality (Model 9: $\beta = -0.18$, $p < 0.1$) of new product ideas in environments with low resource constraint than high resource constraint. Hence, our hypothesis 3 is not supported. However, supporting our hypothesis 4, our results highlighted that constructive feedback enhanced the new product ideas quantity (Model 6: $\beta = 0.33$, $p < 0.001$) and quality (Model 9: $\beta = 0.26$, $p < 0.05$) more in high resource-constrained environments than low resource-constrained environments. Thus, individuals and firm in resource-constrained environments could beneficent significantly by using constructive feedback.

[Insert Figure 2 and Figure 3 about here]

Table 6 replicates our findings using ANOVA. Both supportive and constructive feedback enhance quality and quantity of new product ideas. However, supportive feedback is more valuable in improving new product ideas when the resource constraint is low (Quantity: $\mu = 4.07$; Quality: $\mu = 5.67$) than when it is high (Quantity: $\mu = 2.50$; Quality: $\mu = 4.71$). In contrast, constructive feedback is more effective in improving new product ideas when the resource constraint is high (Quantity: $\mu = 4.96$; Quality: $\mu = 6.38$) than when it is low (Quantity: $\mu = 2.74$; Quality: $\mu = 4.81$). Figure 2 and Figure 3 graphically present the findings of ANOVA table for quantity and quality of new product ideas respectively.

IV. DISCUSSIONS AND CONCLUSIONS

Prior studies suggest that resources are important for innovation [2-4], but many innovators also innovate in resource-constrained environments [5-7, 36]. Therefore, it is important to explore factors that drive innovative outcomes at different levels of resource constraints. Our research adds to this stream of literature by exploring the effects of supportive and constructive feedback on innovative outcomes in low and high resource-constrained environments. We tested our hypotheses using two experimental studies. Both studies consistently indicated that supportive and constructive feedback positively influence innovative outcomes.

Our research also highlighted that resource-constrained environments do not directly influence innovative outcomes but moderate the impact of other factors, such as feedback, on innovative outcomes. In this vein, constructive feedback was found to have a higher positive impact on innovative outcomes in high resource-constrained environments than low resource-constrained environments. Hence, constructive feedback helps engineers to develop new ideas in resource-constrained environments to combine existing resources in new ways [14, 27]. Constructive feedback from peers and mentors might also enhance the knowledge and learning of engineers to substitute limited traditional resources with alternate resources during new product development [14]. Engineers also leverage expertise and experience of their supervisors and other experts via constructive feedback to mitigate the risk significantly and reduce wastage of resources in an innovation process enhancing their innovation outcomes. Therefore, constructive feedback increases innovative outcomes in resource-constrained environments.

However, in contrast to our expectations, we found resource-constrained environments negatively moderated the relationship between supportive feedback and innovative outcomes. Hence, supportive feedback is less effective in environments with high than low resource constraints. One of the possible reasons for this effect could be that entrepreneurs, innovators, and engineers working in a highly resource-constrained environment might get motivated to work hard and engage in the innovative task but may not have adequate resources to complete the task. Moreover, over time their motivation and engagement also reduce as they realize that their ideas may not be materialized due to lack of resources. In contrast, supportive feedback enhancing motivation and engagement in a resource-abundant environment might encourage innovators more to experiment and try new ideas without worrying about the limitations of resources. Thus, supportive feedback might be more helpful if the minimum levels of essential resources are available. Next, we discuss and highlight how our research contributes to and advances extant theory and practice.

A. Research Implications

Our research contributes to the existing literature in multiple ways. First, our findings contribute to the debate about the impact of resource-constrained environments on innovation and new product development. Prior studies indicate an inconsistent finding between resource-constrained environment and innovation. One stream advocate that the availability of resources positively influences innovative outcomes [2-4]. In contrast, another stream of studies has found that innovators working in resource-constrained environments are more likely to innovate rather than innovators working in resource-rich environments [5-7, 36]. Therefore, resource-constrained environments can both encourage and hinder innovative outcomes. Consistent with this argument, both our studies highlighted no significant direct influence on innovation outcomes.

Second, our findings extend the scholarly discussions by suggesting resource-constrained environments as an important contingent factor influencing the impact of other important factors on innovative outcomes. Our research indicates that resource-constrained environments positively moderate the relationship between constructive feedback and innovation outcomes, and it negatively moderates the relationship between supportive feedback and innovative outcome. Prior studies have also indicated the moderating role of resource constraints in the environment [91, 92]. Hence, although individuals and firms should use both supportive and constructive feedback as they drive innovative outcomes positively, they should emphasize more on constructive feedback while operating in resource-constrained contexts and focus on supportive feedback in resource-rich environments.

Third, our research contributes to the stream of literature identifying factors of innovative outcomes, especially in resource-constrained environments [5, 9, 31, 36, 93]. Our findings add to this stream of literature by identifying that both supportive and constructive feedback improve innovative outcomes. Although we did not find any study examining the relationship between these two types of feedback on innovative outcomes, prior studies have highlighted the importance of other types of feedback, such as constructive and destructive feedback [27], positive and negative feedback [14], and multi-source feedback [21], on crucial job outcomes like creativity, and task performance. Finally, our research contributes back to the feedback literature by extending the importance of feedback on innovative outcomes and highlighting that environmental factors influence the benefits of feedback.

B. Managerial Implications

Apart from theoretical contributions, our research offers important insights and implications for engineers, R&D managers, other professionals working towards enhancing innovative outcomes in their organizations. Our research confirms the importance of high-quality supportive and constructive feedback on engineers' ability to improve their innovative outcomes in both low and high resource-constrained environments. Hence, organizations should look to develop a culture of providing and seeking supportive and constructive feedback which could lead to higher creativity, out of box thinking, and innovativeness among their engineers and other employees. Organizations could also enhance feedback culture by providing adequate training programs and incentives to encourage supervisors and peers to provide supportive and constructive feedback to their subordinates and colleagues. Firms also need to develop managerial practices and routines in their product development divisions to allow for such feedback to flow effectively.

Although both supportive and constructive feedback increase innovative outcomes, they also require time, effort, experience, and expertise. Hence, feedback could also be seen as an important resource for the organizations to use effectively to benefit most from it, especially in resource-poor environments. Our findings suggested that constructive feedback has greater benefits in environments with high resource constraints than in low resource-constrained environments. In contrast, supportive feedback is likely to increase innovative outcomes more for engineers operating in resource-rich environments than contexts where limited resources are available to engineers. Hence, firms operating in resource-constrained environments should emphasize more on developing a culture of constructive feedback. In cases where constructive feedback is valuable and a rare resource due to limited availability of expertise, the firms should conduct training to share knowledge and expertise from internal and external experts. Once the engineers gain some knowledge and expertise, the organizations could incentivize them to provide constructive feedback to their colleagues by providing team bonuses, recognition and appreciation for such behaviours. Using these mechanisms, organizations could leverage the benefits of feedback effectively.

C. Limitations and Future Research

In this paper, our research findings were consistent across two studies that consisted of different samples, tasks, and measures of dependent, independent, and moderating variables. Despite the strengths of our manuscript, there are limitations that should be noted and addressed in future research. First, although we took adequate care in controlling many possible confounding factors, it is however difficult to completely eliminate all extraneous effects. For example, we were unable to control for the order of feedback comments provided to participants during study 1 due to high cognitive loads on supervisors during the study. However, we controlled for the order of feedback comments in our study 2 and we found that the results were consistent. Second, although experimental studies provide robust test for causality, mixed-method approach would help in enriching the findings. Hence, future studies should validate the findings and its implications in organizational context using qualitative approaches. Third, our research measures the immediate effects of supportive and constructive feedback on innovative outcomes, indicating their impact in short run. However, future studies should explore the long-term effects of feedback and examine if supportive and constructive feedback also reduce mortality rate of new and innovative ideas over time. Fourth, as our findings are based on samples from an emerging economy, hence, future studies should test these relationships in the contexts of developed countries.

Moreover, our research did not explore the effectiveness of using supportive and constructive feedback together and we encourage future studies to explore this research gap. Future studies should also explore other factors that can drive innovative outcomes in environments with varying levels of resource constraints. Our findings indicate that environmental factors, such as resource constraints, influence the impact of feedback. Future studies should identify other factors that can influence (moderate) the impact of feedback on innovation. We also encourage future research to investigate the impact of supportive and constructive feedback on other important constructs in innovation and R&D management.

D. Conclusion

In conclusion, our research suggests that both supportive and constructive feedback enhances innovative outcomes. However, impact of constructive feedback is higher in resource-constrained environments whereas influence of supportive feedback is more in low resource-constrained environments. In carrying out this research, we have extended the literature exploring innovation in resource-rich and resource-poor environments. Our research also contributes to extant literature of feedback extending its application in different resource-constrained environments. We hope that our manuscript would encourage researchers to further explore ways to enhance innovation and innovative outcomes in resource-constrained environments.

V. REFERENCES

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Table 1. Study 1 – Means, standard deviations, and correlations

	Variables	Mean	SD	1	2	3	4	5	6
1	Age	26.42	2.31	1.00					
2	Gender (Male = 1; Female = 0)	0.84	0.37	-0.06	1.00				
3	Work Experience	5.48	2.45	0.75***	-0.05	1.00			
4	Resource Constraint (High = 1; Low = 0)	0.51	0.50	-0.01	-0.06	0.01	1.00		
5	Supportive Feedback (Yes = 1; 0 = No)	0.52	0.50	-0.12	0.09	-0.12	-0.03	1.00	
6	Constructive Feedback (Yes = 1; 0 = No)	0.52	0.50	0.09	-0.06	0.08	-0.05	0.00	1.00
7	Innovative Outcome	6.19	1.43	-0.07	0.09	-0.09	-0.10	0.33***	0.54***

†p < 0.1; * p < 0.05; *** p < 0.01; *** p < 0.001; N = 191

Table 2. Study 1 – Hierarchical Regression Analyses for Innovative Outcomes

	Innovative Outcomes (Mentor Rated)		
Variables	**Model 1**	**Model 2**	**Model 3**
Age	-0.07	-0.1	-0.07
Gender (Male = 1; Female = 0)	0.08	0.1	0.06
Resource Constraint (High =1; Low = 0)		-0.08	-0.15
Supportive Feedback (1 = Yes; 0 = No)		0.28***	0.43***
Constructive Feedback (1 = Yes; 0 = No)		0.54***	0.30**
Supportive Feedback * Resource Constraints			-0.22†
Constructive Feedback * Resource Constraints			0.37**
R^2	0.01	0.23	0.33
Adjusted R^2	0.00	0.21	0.31
F	1.162	10.94***	13.06***

†p < 0.1; * p < 0.05; *** p < 0.01; *** p < 0.001; N = 191

Table 3. Study 1 – ANOVA Table for Innovative Outcomes (Mentor Score)

		Feedback				
		No Feedback	**Supportive**	**Constructive**	**Total**	**F**
Resource Constraints	**High**	5.13 (1.31) N=32	5.61 (1.09) N=33	7.44 (1.08) N=32	6.05 (1.52) N=97	35.26***
	Low	5.57 (1.2) N=28	6.91 (1.30) N=32	6.41 (1.16) N=34	6.33 (1.32) N=94	9.03***
	Total	5.33 (1.271) N=60	6.25 (1.36) N=65	6.91 (1.22) N=66		
	F	1.87 (0.177)	19.09***	13.85***		

* p < 0.05; *** p < 0.01; *** p < 0.001; N = 191

Note: ANOVA presents mean and standard deviation in ( ) along with sample N for each of the six groups

Table 4. Study 2 – Means, standard deviations, and correlations

	Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10
1.	Age	29.73	4.95	1									
2.	Gender	0.70	0.46	-0.10	1								
3.	Work Experience	2.35	0.93	0.58***	0.09	1							
4.	Education	3.17	0.99	-0.22***	-0.01	-0.08	1						
5.	Effort 1	153.2	176.80	0.00	-0.04	0.04	0.10	1					
6.	Effort 2	1820.1	430.50	-0.02	-0.01	0.01	0.10†	0.06	1				
7.	Resource Constraint	0.50	0.50	0.12†	-0.03	0.07	0.01	0.09	0.01	1			
8.	Supportive Feedback	0.53	0.50	0.19*	0.00	0.12	0.08	0.01	0.22**	0.00	1		
9.	Constructive Feedback	0.51	0.50	0.15*	0.06	0.16*	0.07	0.02	0.02	0.05	0	1	
10.	New product ideas - Quantity	3.14	2.44	0.34***	-0.15*	0.31***	-0.07	0.20***	0.07	0.04	0.15*	0.23***	1
11.	New product ideas - Quality	4.85	2.11	0.24***	0.00	0.18**	0.00	0.01	0.16**	0.05	0.12*	0.27***	0.66***

† denotes $p < 0.1$; * denotes $p < 0.05$; ** denotes $p < 0.01$; *** denotes $p < 0.001$; N = 267

Table 5. Study 2 - Hierarchical Regression Analyses

	New product ideas - Quantity			New product ideas - Quality		
Variables	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**
Age	0.21**	0.19**	0.16*	0.22**	0.17*	0.15*
Gender (Male = 1; Female =0)	-0.13*	-0.15**	-0.14**	0.02	0.01	0.01
Work Experience	0.19**	0.17*	0.13*	0.05	0.03	0
Education	-0.03	-0.05	-0.12*	0.03	0	-0.05
Effort 1	0.19**	0.19**	0.19***	0	0	0
Effort 2	0.07	0.07	0.05	0.17**	0.15*	0.13*
Task Scenario	-0.02	-0.02	-0.02	0.03	0.03	0.03
Resource Constraint (High =1; Low = 0)		-0.03	-0.07		0.01	-0.02
Supportive Feedback (Yes = 1; 0= No)		0.17*	0.32***		0.29***	0.41***
Constructive Feedback (Yes = 1; 0= No)		0.30***	0.11		0.42***	0.27**
Supportive Feedback * Resource Constraints			-0.21*			-0.18†
Constructive Feedback * Resource Constraints			0.33**			0.26*
F	9.05***	9.11***	10.99***	3.61**	7.17***	7.84***
R^2	0.20	0.26	0.34	0.09	0.22	0.27
Adjusted R^2	0.18	0.23	0.31	0.06	0.19	0.24

† denotes $p < 0.1$; * denotes $p < 0.05$; ** denotes $p < 0.01$; *** denotes $p < 0.001$; N = 267

Table 6. Study 2 -– ANOVA Table for new product ideas (Quantity & Quality)

		Feedback				
		No Feedback	**Supportive**	**Constructive**	**Total**	**F**
Resource Constraint	**High**	Quantity: 2.05 (1.23) Quality: 3.6 (2.06) N=42	Quantity: 2.50 (1.19) Quality: 4.71 (1.87) N=48	Quantity: 4.96 (4.29) Quality: 6.38 (1.95) N=48	Quantity: 3.21 (2.98) Quality: 4.95 (2.25) N=138	Quantity: 15.43*** Quality: 23.14***
	Low	Quantity: 2.2 (1.2) Quality: 3.67 (1.61) N=45	Quantity: 4.07 (2.11) Quality: 5.67 (1.95) N=51	Quantity: 2.74 (0.99) Quality: 4.81 (1.76) N=42	Quantity: 3.05 (1.74) Quality: 4.75 (1.96) N=138	Quantity: 18.68*** Quality: 15.07***
	Total	Quantity: 2.13 (1.21) Quality: 3.63 (1.83) N=87	Quantity: 3.33 (1.89) Quality: 5.2 (1.96) N=99	Quantity: 3.92 (3.38) Quality: 5.64 (2.01) N=90		
	F	Quantity: 0.34 Quality: 0.03	Quantity: 20.62*** Quality: 6.24*	Quantity: 10.70** Quality: 15.80***		

† denotes p < 0.1; * denotes p < 0.05; ** denotes p < 0.01; *** denotes p < 0.001; N = 267

Note: ANOVA presents mean and standard deviation in ( ) along with sample N for each of the six groups

Figure 1. Study 1 - Moderating effect of resource constraints on feedback and innovative outcomes

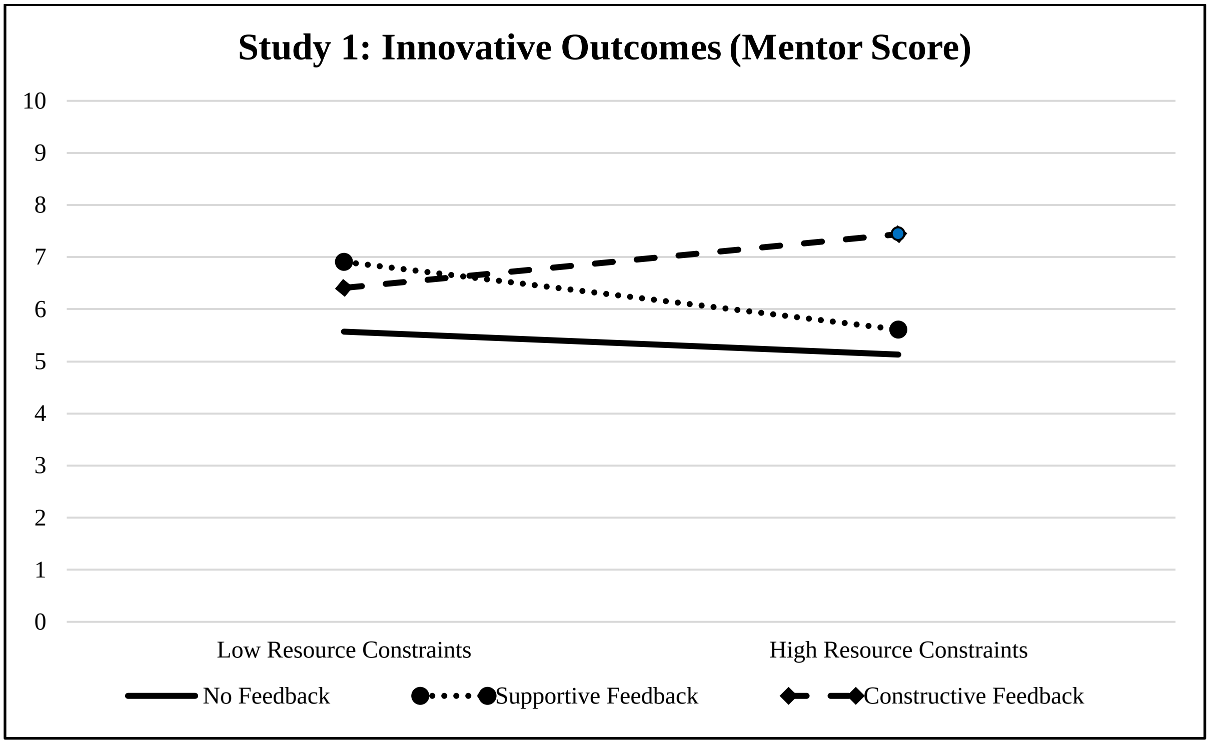


Figure 2. Study 2 - Moderating effect of resource constraints on feedback and quantity of new product ideas

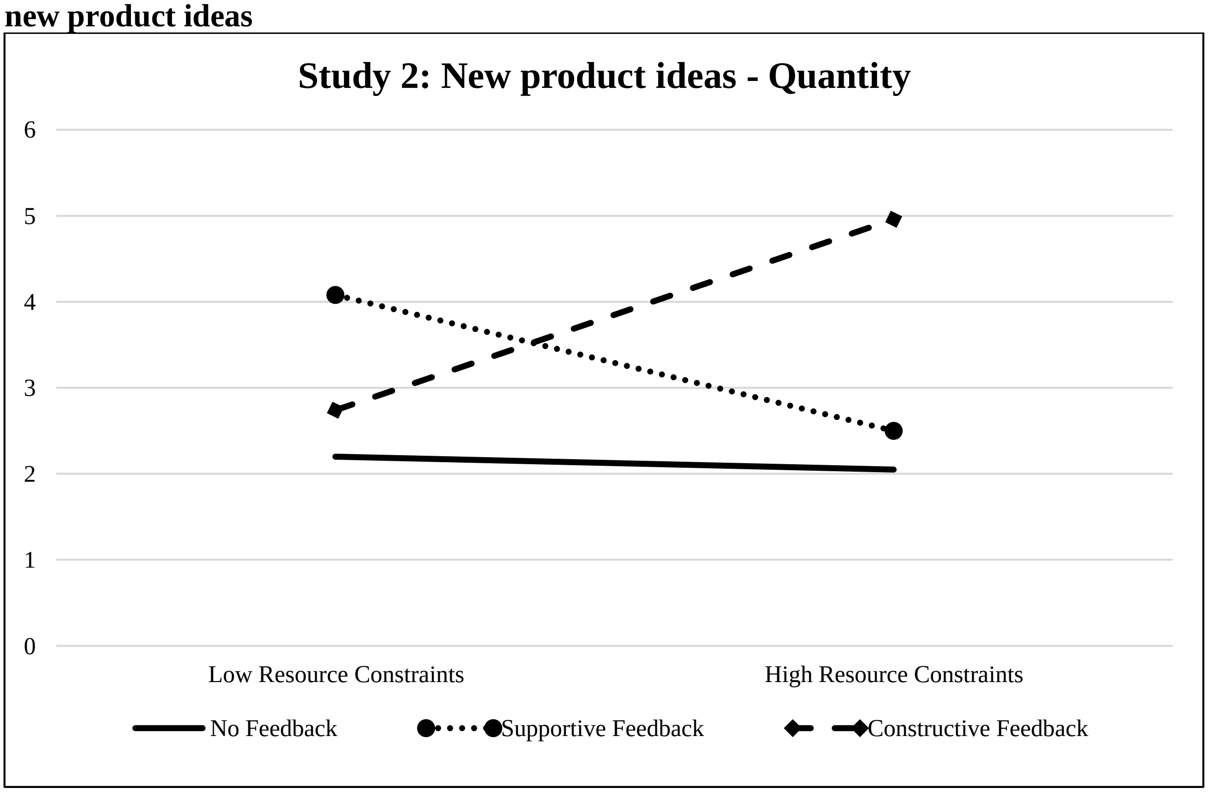
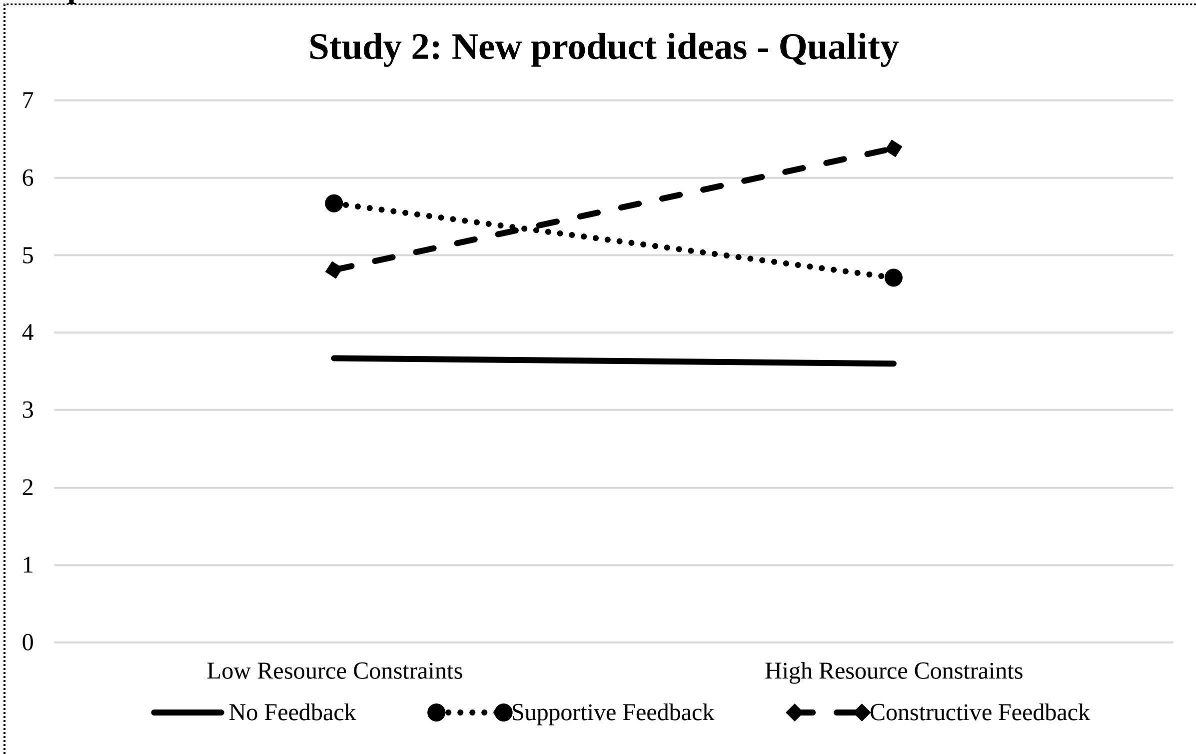


Figure 3. Study 2 - Moderating effect of resource constraints on feedback and quality of new product ideas



Appendix I. Study 1 – Feedback comments for three conditions

Feedback Condition	Feedback Comments
Supportive feedback condition	1. This is great progress, well done! 2. You are doing so well. 3. Wow, you are making great progress in accomplishing the overall goal here! 4. Looking good! Keep going and keep it up. 5. Nice going! Keep up the good work. 6. Way to go! 7. Great work, you are doing good! 8. You are working really well; this is a great head start. 9. It seems like you have a knack for this! 10. This is great work, kudos to you! 11. Don't worry. The task may seem difficult in the beginning, but it is easy to accomplish once you spend a few minutes to gather your thoughts. You'll do well once you have had a chance to think this through. 12. Everyone struggles to think of concrete ideas in the beginning, you just have to keep thinking
Constructive feedback condition	1. It is always helpful to think about the basic properties of the suggested material to consider its variety of uses 2. Think harder and go beyond the usual ideas 3. Think more on how to uniquely use or combine the given material with others 4. Do not worry about how your suggested product/idea/item will look, think more about its uniqueness or usability 5. It is always good to visualize or envision the item in your mind again and again to spark new ideas 6. It is useful to think of different kinds of users and environments while thinking of how to use the material given here 7. Imagine how differently you would use this material if you have access to a large quantity of this material. You can assume unlimited supply for the given material 8. At this point, do not think about feasibility, focus on all possible ideas 9. Think about situations where the material could substitute other materials in products around you. 10. Understanding the property or basic characteristics of the material might help you in identifying new uses.
No feedback condition	No feedback prompts were given in this condition When asked questions, the mentor simply stated "please refer to the instructions given to you, that's all the information I have".

Appendix II. Study 2 – Task instructions for three feedback conditions across two conditions of resource constraints

Condition	Task Instructions
1. Common instruction (provided at the start of the task for all groups)	Here are some basic everyday materials that you are likely to be familiar with. Please think of all the innovative and practical ways of using them or making products/solutions out of them.
2. High resource constraints (provided at the start of the task)	The given material needs to be the dominant material being used in your proposed product. You cannot use any other materials while thinking of creative and practical ways to use this given material or while making products/solutions from this given material. You can only assume that very basic materials or tools are available, such as glue, scissors, pliers, and nails.
3. Low resource constraints (provided at the start of the task)	The given material can be used with other major materials in your proposed product. You can use any other materials to combine with the given material while thinking of creative and practical ways to use or while making products/solutions. Major materials can be other major building materials such as wood, metal sheets, etc. (for example: paper combined with wood to make the product and so on). Also, you can assume that you have access to other basic materials or tools, such as glue, scissors, pliers, nails.
4. Supportive (provided during the task duration)	This is easy to do and a very simple task that you can manage effortlessly. All ideas are welcome and every single idea you write will indicate progress. For example: start writing all your initial ideas and thoughts that occur to you for the given material and build your ideas further from there on.
5. Constructive (provided during the task duration)	Your answers can range from very obvious uses of the material to very unique or out of the box uses/products. For example: any given material has basic physical properties that you can focus on to build your ideas. Such as a sheet of paper is essentially paper that can be used to substitute other basic materials such as paper bags, packaging etc.
6. No feedback	No feedback was provided during the task.

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