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Engineering Soft Skills vs. Engineering Entrepreneurial Skills*

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Soft skills, like communication and teamwork, are vitally important for an engineer's success in the workplace. Despite this, there is a perceived shortage of soft skills among engineers, particularly engineers of the youngest generational cohorts, the Millennials. This paper aims to evaluate the overlap between soft skills and the more concrete and the more enthusing category, entrepreneurial skills. An exploration of the literature reveals commonalities between soft and entrepreneurial skills and highlights the effects of the terminology differences on different generational cohorts. The paper concludes with five literature-supported assumptions about the current state of soft skills in engineering and how improvements can be made by rebranding soft skills as entrepreneurial skills.

Keywords: soft skills; entrepreneurial skills; engineering success; skill gaps; skill comparisons; engineering management; millennials

1. Introduction

Engineering communities have been struggling for more than a decade with the issue of soft skills development. There is a plethora of evidence indicating an urgent need for engineers to improve their soft skills. Many engineering scholars and authorities have been actively attempting to rectify the skills gap and calling upon their engineering toolkits in different types of publications [1–4]. The recognition of the supposed lack of soft skills is often referenced in the engineering management communities and their associated leadership conferences. However, simply identifying the lack of skills and campaigning to make people aware has not been effective as jobs that should be filled with degreed engineers are instead being offered to MBA graduates. While efforts have been made to bring about this necessary skills growth in an engineer's toolkit, this paper provides justification that there are better, more effective ways to remedy the existing reluctance by engineers to engage and grow their soft skills.

The paper suggests a fundamental paradigm change for improving engineering communities. This study recommends moving from a rather overanalyzed and overstretched term (soft skills) to a more enthusiastic and marketable term (entrepreneurial skills) often portrayed by and associated with the youngest generational cohorts currently in the workforce: the Millennials.

This study begins with looking at the backgrounds of soft skills, entrepreneurial skills, younger generational cohorts and engineering success. Five assumptions are then made about the effectiveness of this paradigm shift in terminology. The proposed assumptions are supported by literature as well as inferred, logical arguments. Lastly, this study will suggest directions for future research.

2. Background

This section is divided into three different parts. The first two parts reference the related publications for both soft and entrepreneurial skills. The purpose of these literature reviews is to provide a comparison of the two sets of skills in order to identify overlaps and gaps. The third section reviews the role of character skills in engineer success.

2.1 Soft skills

The term "soft skills"—usually contrasted against hard skills—alludes to the types of skills that involve living and working with other people. Spring [5] defines soft skills "as the behavior needed to function in the corporate world." The concept is likened with "Emotional Intelligence", or EQ. Goleman [6] insinuates EQ or soft skills can be more important than technical skills in determining the success of individuals [7]. The origin of the term "soft skill" can be traced to a future-looking book about education by Faure [8]. He states: "Aims of education work toward a scientific humanism, social commitment, creativity, and the complete man" summarizing his idea of including social skills in education. Europe, between 1982 and 1995, paid unprecedented attention to Mertens's four categories of skills: (1) basic skills, (2) "horizontal"

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skills (information seeking and learning), (3) broadening elements, and (4) knowledge of general subject matter [9]. In turn, the Secretary's Commission on Achieving Necessary Skills, the SCANS report [10], puts forward a basis for analysis of needed skills required in different jobs as a set of five workplace competencies and three elements. The competencies include the ability to use resources, interpersonal skills, information, systems, and technology and the elements include basic skills, thinking skills, and personal qualities.

In today's industry, retail, and service-based companies, soft skills are known more as communication, leadership, teamwork, and organizational skills. However, different academic disciplines and corporate cultures may have different names for each of the mentioned concepts. Table 1 identifies all of the skills defined as soft in literature from various disciplines.

Although the diverse disciplines and related articles have identified different definitions for what are considered as soft skills, Table 1 shows most of these disciplines have overlap. In the highest level of similarity, communication skills and teamwork skills are the most mentioned soft skills. The second level of overlap includes leadership skills, analytical and problem-solving skills, organizational skills, interpersonal skills, stress management and emotional stability (self-regulations), and initiatives and innovations. Other skills known as soft are mentioned but do not have much consensus. Regardless, all of the skills identified in Table 1 revolve around two main matters: (1) self and (2) the emotions of others.

2.2 Entrepreneurial skills

Often, entrepreneurship is defined by the recognition of who fits the criteria of being an entrepreneur. Shane and Venkataraman [28] recognize an entrepreneur as an enterprising individual who will take advantage of a lucrative opportunity. The nexus of their definition is the enterprising individual and the lucrative opportunity. Hisrich, Peters, and Shepherd [29] suggest a better linkage for these two parts of the definition: entrepreneurial thinking which is defined as the "mental process of overcoming ignorance to decide whether a signal represents an opportunity for someone and/or . . . whether an opportunity for someone is also an opportunity for them . . . and/or processing feedback from action steps taken." Entrepreneurship literature revolves around the characteristics and skills of the entrepreneurs themselves. For that reason, the focus of this component of the study centers around the

Table 1. Frequency of soft skills identified in literature from different disciplines

	Communication Skills	**Teamwork**	Leadership	Problem solving	Organizational skills	Interpersonal skills	Self-regulation	Initiatives & innovations	Responsibility & commitment	Foresight and planning	Work Ethic	Information Management	Understanding	Positive attitude	Integrity	Professionalism	Negotiation	Entrepreneurship	Eagerness to learn	Conflict management	Others
[7]	✓	✓	✓		✓		✓	✓													✓
[11]	✓		✓	✓	✓					✓											
[12]	✓	✓											✓								✓
[13]	✓	✓	✓																		✓
[14]	✓	✓				✓			✓		✓			✓	✓	✓					✓
[15]	✓	✓							✓					✓							
[16]	✓	✓														✓					
[17]	✓	✓				✓	✓										✓				
[18]	✓	✓	✓	✓							✓	✓						✓			
[19]	✓	✓	✓	✓			✓	✓													
[20]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓									✓		
[21]	✓	✓						✓												✓	
[22]	✓							✓	✓				✓							✓	
[23]	✓	✓			✓	✓	✓														
[24]	✓	✓		✓	✓	✓															✓
[25]	✓	✓								✓											✓
[26]	✓	✓	✓	✓							✓	✓						✓	✓		
[27]		✓		✓	✓	✓	✓		✓			✓			✓		✓				
Total count	**17**	**16**	7	7	6	6	6	5	5	3	3	3	2	2	2	2	2	2	2	2	

enterprising individual the characteristics and skills that make entrepreneurs successful.

There is emerging evidence on the existence of strong relationships between entrepreneurial skills and success. Hamilton, Papageorge, and Pande [30] argue people who would be successful entrepreneurs based on their personality traits are not always the ones inclined to be business owners. Hissey [12] describes more successful engineers as individuals with an entrepreneurial skill and mindset. Robinson and Stubberud [31] and Ingols and Shapiro [32] have two recent efforts showing how corporate entities highly involved with entrepreneurship have identified soft skills as an important asset for their workforce. Moreover, Shekhar et al. [33] identified six variables that are critically influential for the success of entrepreneurship education: entrepreneurial self-efficacy, desirability, entrepreneurial intent, life transitions, information and resources, and opportunities and barriers. Table 2 references the publications that have recognized these entrepreneurial characteristics in different disciplines. Compared to the soft skills listing, there are fewer censuses on the core skills of entrepreneurs. This shows entrepreneurial skills are broader than soft skills. The core elements of entrepreneurial skills that have been recognized are Opportunity, Leadership, Teamwork, Self-regulation, and Communication. The rest of the skills in the table are considered the secondary set of entrepreneurial skills.

2.3 Millennial generational cohort

Millennials are often associated with a lack of soft skills. Many credit Millennial generation cohort members with the creation of social media as its presently known. While Millennials have been identified as being more social than any previous generation [34–36], their desire to learn soft skills on the job [37] instead of in the classroom mean they often viewed lacking certain aspects soft skills required for entering the work environment [38]. This is no surprise as Eisner [38] describes "communication modalities" have caused problems between generations in the past. Baby Boomers, for example, prefer face-to-face communication whereas Millennials prefer electronic forms of communication [39]. This expectation Millennials have that they will learn soft skills once they enter the workplace, their high comfort level when communicating through a device, and their disinterest in practicing soft skill-related behavior once in the workforce is leading to workplace conflicts [34, 39].

The Millennial generational cohort expect entrepreneurship in the workplace. Despite this generation being shown to not possess the appropriate soft skills to enter the workforce [38], they have been identified as an entrepreneurial cohort based upon their self-actualized behavior and their desire to bring creativity and meaning to work [38, 40, 41]. According to Espinoza and Ukleja [42], Gamers sit atop the Maslow's Hierarchy of Needs where the

Table 2. Frequency of entrepreneurial skills identified in literature

	Opportunity	**Leadership**	**Teamwork**	**Self-regulation**	**Communication**	Responsibility and commitment	Risk taking	Human Resource development	Marketing	Organizational	Influence	Decision Making & Execution	Networking	Strategic Orientation	Problem solving	Initiative and innovations	Interpersonal skills	Negotiation	Customer Orientation	Planning	Financial Management	Others
[48]		✓	✓		✓		✓			✓	✓	✓		✓	✓		✓	✓	✓			✓
[49]	✓	✓	✓	✓	✓		✓									✓	✓		✓	✓		
[50]		✓	✓		✓	✓	✓			✓	✓	✓			✓	✓		✓				✓
[51]	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓			✓		✓	✓	✓
[52]		✓	✓		✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓				✓
[53]	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓			✓		
[54]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓			✓	✓	✓
[55]	✓	✓	✓	✓		✓	✓		✓		✓					✓				✓		✓
[56]	✓	✓	✓	✓				✓	✓	✓	✓			✓								✓
[57]	✓	✓	✓	✓	✓							✓	✓			✓						✓
[58]	✓	✓						✓	✓												✓	
[59]	✓			✓		✓		✓	✓	✓			✓	✓	✓			✓	✓		✓	✓
[60]	✓			✓	✓	✓	✓	✓				✓	✓	✓		✓			✓		✓	✓
[61]	✓			✓			✓		✓				✓		✓				✓			✓
Total count	**11**	**10**	**10**	**9**	**9**	8	8	8	8	8	8	7	7	7	7	7	5	5	5	5	5	

motivations in their personal and working lives are morality, creativity, spontaneity, and problem solving [43]. Trends from the Builder generation to Baby Boomers to Generation X have indicated an increasing desire for work-life balance [44] which leads to a desire of the Millennials to only work on what they consider to be meaningful. This desire to only perform meaningful work is derived from their motivation to make a difference in the world or to perform tasks for the greater good of mankind [38, 45]. Gamers measure personal success by making a difference and through giving back via community service [46, 47] with money as a less important goal [38].

2.4 Engineers' success

Fig. 1, adapted from adapted from [62], shows three important factors by which one's success can be predicted. There is little doubt of the roles cognitive ability and amount of effort impact the success of individuals. These two characteristics (Arrows 1 and 2 in Fig. 1) have been the basis on which universities and employers make recruitment decisions in order to ensure a higher level of confidence in the future success of their academic recruits and new employees.

In addition to cognitive ability and amount of effort, there is evidence that character skills are of equal importance in terms of having a successful career. Heckman and Kautz [63] empirically demonstrate school performance, IQ tests, and standardized achievement tests cannot fully capture or predict the successfulness of individuals in their future career and life goals. Additionally, they depict how those personality traits play an important role in determining the success of individuals. Their findings also suggest these personality traits are strong predictors of standardized tests such as the GRE which in turn consolidates the importance of soft skills in one's success. Borghans, Golsteyn, Heckman, and Humphries [64] and Kautz et al. [62] reach the same conclusion by showing the significant contribution of the personality variable on explaining the variance in achievement tests (Arrow 3).

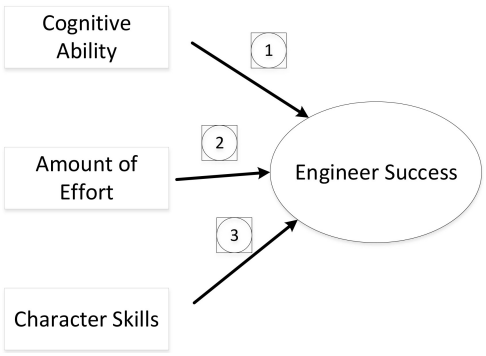

Fig. 1. Critical factors in defining engineers' career success; adapted from [62].

3. Research framework

This study presents five assumptions providing the arguments justifying initiation of a soft skills rebranding that leads to greater support for the need of entrepreneurial skills in engineering schools and engineering communities. The first assumption alludes to the necessity of engineering improving their soft—or entrepreneurial—skills. The assumption is supported by a review of the need to encourage engineering students and engineers themselves to acquire a taste for soft skills. The second assumption identifies engineers still have reservations about putting efforts toward the attainment of soft skills. Due to the perceived lack of interest by engineers in developing soft skills, a third assumption recognizes how soft skills are attainable. This postulation is supported by literature in identifying soft skills are not necessarily developed genetically but rather gained through education and quests for personal growth and career enrichment. To remedy engineers' reluctance to pursue soft skills training, this study hypothesizes a tweak of perception can be the solution. Assumption four justifies the move toward entrepreneurial skills in order to better appeal to an engineer's perceived desire for needed improvement from a creativity standpoint. The last assumption illustrates the close relationship between soft and entrepreneurial skills in the literature.

3.1 Assumption 1: Engineers need to improve their soft skills

Concerns about professionals needing soft skills for career success have begun to emerge in many technical areas [1, 2, 11, 13, 65–67]. Kumar and Hsiao [1] identified the lack of formal education in areas of communication and leadership in the engineering community and urged action to close this gap. Their research showed this lack of leadership and communication training as the cause of many other issues. For example, many of the executive positions which could use an engineering perspective are offered to MBA and JD graduates instead. Arciszewski [2] called attention to the same issue in the civil engineering community to stimulate the community to take actions for meeting the new demands. De Ridder et al. [11] discusses the training gap in six different categories: (1) communication skills, (2) organizational skills, (3) leadership skills, (4) troubleshooting skills, (5) networking skills, and (6) foresight skills, and how personal

growth in these areas can be achieved. Hissey [12] addressed the same issue by recognizing the importance of soft skills such as communications, marketing, and understanding business finance in engineers' career development.

Jansma [3] took a different approach, looking at the science of system engineering while raising doubts about being purely technical. The article has three dichotomies (leadership vs. management, process-based, and behavior and process skill) and discusses how engineering needs fresh perspectives which are associated more with emotions and intuition than technical prowess. Furthermore, in engineering education, an awakened rush for the inclusion of soft skills in engineering curriculums has been noted: "students graduate with an excellent aptitude in applying mathematics, physics and general science to solve problems in the industry. However . . . industry often evaluates graduates differently, focusing on soft skills" [68]. This evaluation focus can have a negative impact on future employees who are members of a generational cohort recognized as not having appropriate soft skills [38] further impacting their ability to be competitive.

3.2 Assumption 2: Engineers have reservations toward soft skills

There are many reasons why engineers are associated with not having soft skills. One reason the engineering research community has focused on is engineering curriculum. Often, the curriculum for engineering majors has been put to question based on objections asking why soft skills do not have their place [1, 2, 11, 13, 65–68]. This research is based on the premise that if engineering students had been formally taught how to improve their soft skills, engineers would have more soft-skill related competence. It can be inferred a shift of focus in curriculum could improve the expectations employers have about their future engineering job applicants and workforce. Despite the potentially positive results, placing the blame solely on engineering school curriculum is not justifiable.

There has not been much formal research into why engineers have reservations toward acquiring soft skills Except for the lack of proper education, people's informal point of view could be segmented into two main streams. First, people with less social aptitude are drawn into engineering majors. The assumption is because the engineering majors are too difficult and only accessible to people that are more intellectually gifted, engineers are less likely to have sufficient social skills. Second, engineers are often not expected to exude social skills. Were social engagement an expectation for engineers, one could presume engineers would have developed—or more heartedly attempted to develop—this skill with the same rigorousness of the applied sciences.

The first type of assumption seems to be the most serious as it alludes to a premise that engineers are born lacking soft skills and this has made them better with STEM disciplines but below average socially. However, this is a misconception. Nature is important in forming who we are, but nurture is also important [69]. With proper motivation, one can grow sociability in oneself. This premise insinuates if engineers had been encouraged and required to take actions to improve their soft skills at a younger age, they would have succeeded. Regardless of what didn't occur, publications in engineering education shows a ten-year history where engineering schools and engineers themselves have been asked to improve those social aspects.

A complementary premise is suggested for the second argument. Engineers are aware of the expectation that in the business world soft skills are required; however, engineers keep shying away from them. They think, like many other people, engineers are not sociable people. They may not have the proper motivation to gearshift their thinking toward one focused on soft skills. The community of engineers employed with competitive salaries may not expect to spend their time improving their soft skills. A potential opportunity is to better motivate individuals to move toward what is being asked of them from a soft skills improvement perspective. These motivations can be in any form. For instance, an employer could recognize engineers who extend their social "comfort zone" each year with a financial bonus so every engineer in the company will view improvement in soft skills as a financial opportunity.

3.3 Assumption 3: Engineers can attain soft skills too

Evangelizing the importance of soft skills may not be enough to convince engineers to commit time toward this part of their toolkit. The issue (shown in Fig. 2) is how the negative perception of these skills by engineers hinders efforts or desires to improve soft skills, thus lowering their chances of success. The myth that character skills remain unaffected despite attempts to make a positive change can be very disheartening. The good news for engineers who currently lack these characters is they can learn over time to improve their soft skills. Roberts, Walton, and Viechtbauer [70] and Roberts and Mroczek [71] have shown not only is there a statistically significant difference in the amount of change humans can have in their personality traits, but their research also illustrates mindful efforts on bringing about conscious changes in personality traits are not futile. Martins [72] provides further

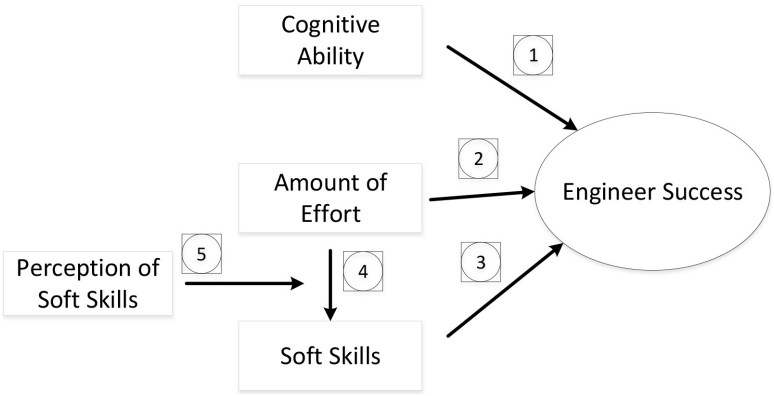

Fig. 2. Soft skills—the indirect and suggested route for engineer's success.

arguments for why the pursuit of characteristic change is not one of futility. Kandler [72] considers character development throughout an individual's life with a "nature versus nurture" point of view showing both genetics and experience will account for the state of change for individual's characteristics and temperaments. Gill and Prowse [73] studied the impact of both cognitive abilities and character skills in relation to the successfulness of individuals in a strategic game. The authors did not reject that cognitive ability plays an important role in players finding or merging toward equilibrium in the game; however, they did show cognitive ability was not the main successfulness factor. Gill and Prowse [73] illustrated that agreeableness and emotional stability showed statistically significant differences as well.

Arrow 4 in Fig. 2 visualizes the crux of this argument. The relevance of cognitive ability and amount of effort in individual success has already been established. Evidence of the importance of character skills on engineers' success (Arrow 3) has also been defined. Arrows 2 and 4 insinuate that the effort for engineering success can be focused or streamlined in two directions. The second direction is to put in efforts so as to improve character skills to have an indirect effect on engineers' success.

3.4 Assumption 4: Engineers will prefer entrepreneurial skills over soft skills

The recognition that perception and outcomes are highly correlated has been established by psychologists and human development experts. Furthermore, perception can alter the performance of individuals. Perception is such an important factor that even the perception from other people in close contact with individuals can hugely impact individuals' performance. A noted example of this causal relationship is when the expectations from a teacher influence the performance of students [74]. Therefore, if engineers have an improved or positively altered perception towards character skill development, they will be more inclined to put in time and effort to improving those skills. If negative feelings are attached to soft skills, there is less chance they will strive to make the necessary changes.

Education is often seen as the best approach to this issue. As shown by Arrow 5 in Fig. 2, the perception an individual has regarding soft skills may affect the efforts they will put into acquiring soft skills. Educating individual engineers can meaningfully enhance the role of soft skills and perception of those skills. The connection between efforts and soft skills, regardless of the perception of said soft skills, may be solidified by the introduction of external incentives, such as recognition awards. However, there may be an easier and less expensive way to get engineers to buy into the idea of growing these skills. When it comes to perception, simply changing a name of, or rebranding, a concept or a skill set can increase an individual's psychological involvement. For example, change the description of soft skills to entrepreneurial skills.

Contrary to soft skills, entrepreneurship is viewed as a very exciting and positive term in the mind of an engineer. Through the "exploitation" of the positivity associated with this term—entrepreneur—this study recommends moving toward new terminology: entrepreneurial skills. This rebranding could be very powerful, advantageous and, most importantly, inexpensive. The teaching of core soft skills should not be replaced; instead, these core skills should be updated to include the skills identified in Table 2.

3.5 Assumption 5: There is a strong relationship between entrepreneurial and soft skills

The literature of soft skills and entrepreneurial skills corroborates the assumption that there is a strong relationship between the two. In order to investigate the gaps and similarities that may exist between the two sets of skills, Table 3 compares and maps the

Table 3. Comparison of soft and entrepreneurial skill overlap

Skills	Soft	Entrepreneurial	Skills	Soft	Entrepreneurial
Teamwork	●	●	Communication skills	●	●
Self-regulation	◌	●	Leadership skills	◌	●
Opportunity recognition & exploitation		●	Organizational skills	◌	◌
Troubleshooting skills	◌	◌	Initiatives & innovations	◌	◌
Interpersonal skills	◌	◌	Responsibility & commitment	◌	◌
Influencing & persuasion		◌	Decision making & execution		◌
Negotiation		◌	Customer focus & orientation		◌
Risk taking		◌	Planning & foresight thinking		◌
Networking		◌	Conceptual & system thinking		◌
Strategic orientation		◌	Human Resource development		◌
Financial management		◌	Marketing & market awareness		◌

skills extracted from entrepreneurial and soft skills literature so insights into their relationships can be visualized. The skills of both categories are compared, highlighting two of the categories' core skills (teamwork and communication skills) as common. Also, several secondary soft skills are either core or secondary entrepreneurial skills.

Soft skills, represented by circles, are included within entrepreneurial skills, represented by ellipses. As shown, entrepreneurial skills are all-inclusive of soft skills yet include additional characteristics. One important entrepreneurial skill of note that is not a soft skill relates to opportunities. An entrepreneur is expected to know how to deal with opportunities and exploit them in the best way possible. This is a very distinct difference between

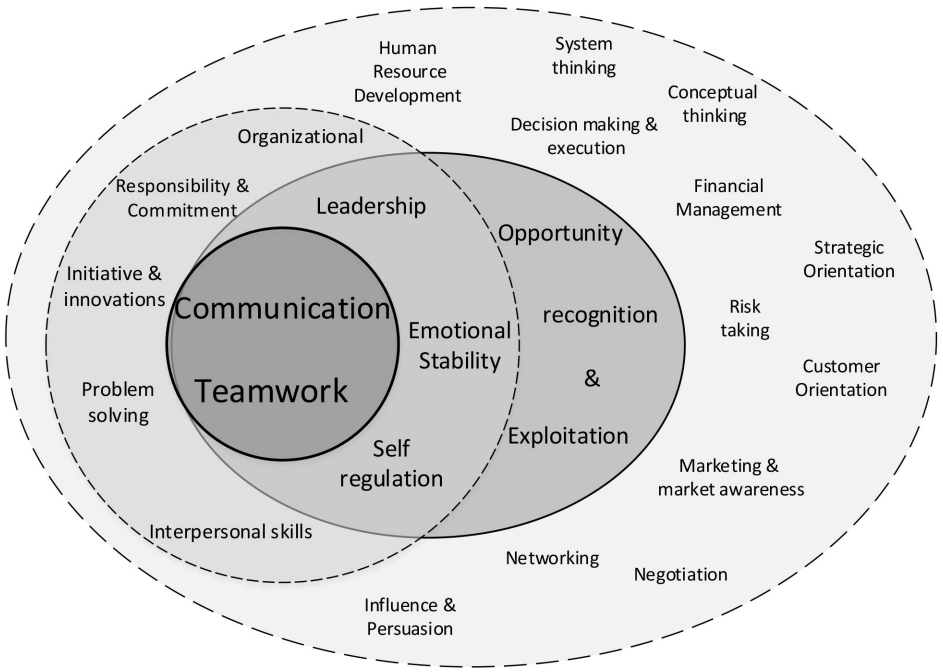

Fig. 3. Venn diagram of soft and entrepreneurial skills based on frequency of overlap in Table 3.

the two sets of skills, implying employers should support this change in nomenclature given the push to increase innovation and R&D decision making. The relationship between the skills within each term is further shown in Fig. 3.

4. Discussion

Through the examination of five assumptions derived from the findings in the literature review, this study supports a paradigm shift that should enthuse engineers and engineering students to improve characteristics normally associated with soft skills. This review has shown the efforts taken to ensconce the importance of soft skills into the professional growth plans for engineers have not been as successful as professionals and educators have hoped they would be. The root issue has been connected to engineers' lethargy in trying to bring about any characteristic changes. Various reasons for this situation have been introduced. Among others, there are many misconceptions about soft skills, to the point engineers may believe they are born without sufficient talent for this particular, soft skill set. Furthermore, engineers are becoming weary of constant criticism of not being good at social skills which make them less likely to associate positive feelings with the term "soft skills" and, in turn, less likely to find the right motivation. While the important roles of offering proper and updated education are acknowledged, introducing extra incentives could pique engineers' interest. Further still, the change that could cause the least disruption but have the largest impact is a paradigm shift, suggesting that the use of a new term, entrepreneurial skills, may lead to the same goal more quickly and with less effort.

Millennials, having been often associated with a lack of soft skills [35], could greatly benefit from a change in perception, especially a change that would improve the attractiveness of their inclusion in the workforce. Given young engineers' desire to be self-actualized and to express creativity in their careers [42], a change from being taught soft skills to being trained in entrepreneurial skills could create the desire needed by the youngest cohort to learn necessary skills in the classroom instead of waiting to learn them once in industry.

This rebranding of skills should be considered from different points of views. From an engineer's perspective, this could be interpreted in many ways. Most importantly, entrepreneurial skills do not have the negative connotations often associated with soft skills, but also entrepreneurship is a very exciting area. Furthermore, in the concept and language of entrepreneurship, an individual is the focus of attention. Entrepreneurial skill training focuses on the development of an individual's career—an engineer in this case—and acts as a guide toward greater success. For these reasons, engineers who are asked to improve skills in their toolkit such as leadership, emotional stability, self-regulation, organizational awareness, and most importantly, communication and teamwork under the name of entrepreneurial skills may likely show increased motivation.

The authors of this paper speculate some hesitation will occur on the part of companies with many engineers as employees. This is because executing this type of paradigm shift puts the concentration away from the corporate culture and places it more on the individuals which may further encourage the younger generation's narcissistic tendencies [41]. Companies have the option to choose and promote different working cultures, but many corporate human resources departments are motivated by instilling a sense of belonging and family into their employees in order to increase their loyalty. Therefore, companies looking to increase retention of and loyalty from their employees, especially their engineers, are good candidates for testing this paradigm shift in focus to entrepreneurial skills as it would show their support and loyalty to their employees through enhancing their personal growth. Additionally, engineering schools could also be affected by this rebranding and chance in focus for skills training. Entrepreneurship is already getting an unprecedented attention in schools and from primary research funding agencies like the National Science Foundation. The suggested change will suit engineering students (and their teachers) well as they are already primed to look positively upon entrepreneurial skills.

5. Conclusion and future research

Although a close relationship between soft and entrepreneurial skills was illustrated throughout this review, there is still a noted difference between the two sets of skills. The main difference is the fact entrepreneurial skills, unlike soft skills, largely focus on opportunities. Skillsets related to recognizing, analyzing, and seizing opportunities integral to entrepreneurship are not a part of what are currently classified as soft skills. This is important to note as the intent of this study is to put forward the idea of how the positivity associated with entrepreneurship can aid engineers' motivation about a required skillset not otherwise associated with engineering characteristics. Given the difference between the two different skills types, the intent of this recommendation is not to remove the training of core soft skills but rather to augment that training with a more business solution-creation focused set

of skills that complement the softer skills. Also of note is that pushing for entrepreneurial skills may create certain expectations on the audience. Detailed communications about courses or seminars with the name of entrepreneurial skills that in turn aim for soft skill training will make certain these efforts are transparent.

This research topic provides several future research possibilities. One direction is to provide statistical analysis for assumption four of this study. A psychological study through a survey could be used to test this hypothesis in a quantifiable way. The assumption suggests, if the same set of skill training is offered to engineers as soft skills or entrepreneurial skills, engineers (and the younger cohorts in general) may gravitate toward entrepreneurship demonstrating simply rebranding the skillset could make a difference. The researchers of this paper surmise a survey analysis with three versions of questions, one offering the skillset as soft skills, the other as entrepreneurial skills, and last one as the combination of both (control group), can offer insight into the importance of the difference between the two brandings. Moreover, should any academic institution or company decide to test this paper's suggestion for the recommended paradigm shift and rebranding to entrepreneurial skills, a thorough field study on how this change affected employee loyalty and peer perception will certainly enrich the literature.

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