



## Redefining Competency: A Paradigm Shift for Industry 4.0

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### Abstract-

*Industries today have no choice but to align with the constantly changing internal and external environment. Be they educational institutions, business or government organizations. Indian Education is also put on the path of ensuring employability or entrepreneurship. The organizations of today's industries are expected to meet the requirement of industry 4.0. The challenge is that some of it cannot be known now. The need is to ensure that the degrees being provided by various institutions equip the graduates with ability to learn, change, adapt, be committed to and endure during difficulties. Similarly, the new age organizations, be they in the field of technology, engineering, commerce or education, require such workforce which can create, innovate, learn and change as per the changing environment. Moreover, the stakeholders are now well informed, assertive and are socially and legally supported. An organization cannot ignore its stakeholders and only focus on its customers. The demand is for such products and services which meet the interests of environment, society and future generations besides the customers and shareholders. There is also a clear focus and demand on emotional and spiritual fulfillment of individual employees and organizational social responsibility. Hence, one needs to think anew and afresh. We cannot depend on those definitions and theories which have survived till Industry 3.0. Employees being the backbone of any economy or organizations, needs to be capable of sailing through such turbulent times and unpredictable changes. One of the ways to identify, assess and develop such capability of the employees is through understanding and ascertaining their competencies. In general, competency is that which is close to standard and an objective way of looking at one's suitability or match for a role. However, this understanding has not resulted into organizations becoming more competitive as evident from various surveys indicating towards poor employability and on ground skills. Besides, several important things are left out in this approach of defining a competency which would tap the undiscovered and deeper insights on one's emotions, calling and purpose. Both students and employees have found themselves caught in the trends and hypes causing them an unfulfilled career and isolated & incomplete outcomes for industries and societies. Besides, it has also resulted into students being groomed or trained in a partial way in institutions, and employees' capability being developed in an incomplete manner in industries. In order to meet the requirements of sustainable and humanly valuable outcomes both for industry and society, we need to rethink our understanding of what is a Competency or human capability i.e. what makes one willing, able, commit to, do it and do it well and enduringly so in a flexible way. The outcomes must meet the standards of quality, creativity and sustainability. Hence, this conceptual paper is rethinking on the human capability or competency which needs to be redefined, assessed differently and developed uniquely. There is a need for this paradigm shift for the industry 4.0 which is already setting in and even beyond that.*

*key words: employee competency, competency 2.0, competency innovation, redefining competency, competency paradigm*

### I. INTRODUCTION

The objective of this paper is to redefine Competency for Industry 4.0. This is to meet both the tangible and intangible demands of institutions and workplaces of future. Several surveys have shown poor employability and lack of required skills in those who are entering industries. Employers are asking for future ready employees who can innovate, learn, adapt and maneuver through difficulties and challenges in an uncertain world. Society is asking for protection of values and environment. Individuals are seeking meaningful work. Nature has ruthlessly demanded urgent attention to its deterioration. Sustainability is sought everywhere. Businesses are forced to meet the requirement of all stakeholders i.e. the promoters, common people, employees and their

family, nation and environment. Industry 4.0 has almost arrived. Although there are initial studies [1] which are predicting new types of jobs like IoT Designer, Smart System Designer et al, as widely held, such jobs and their nature is more unknown than known. We don't have detailed knowledge of what it is, and particularly what it will require from us, the people. But we still have the goals to meet the challenges of survival, growth and competition by establishing unique and flexible connections between people and machines, going digital in areas unheard of, develop machines and processes which communicate with and through objects in a wireless and borderless business world and become free of jobs which we were used to, once. Moreover, the industry 4.0 would operate in an environment which we don't know and hardly worked in till date. This environment is beyond one, one's job and one's organization. It is also beyond profit making and shareholder returns. This environment is also of the millennials and future generations who are different and would not be like those of previous generations of learners and employees. It becomes quite understandable that one cannot think of surviving, performing, succeeding and sustaining in such an era of Industry 4.0 and its uniquely unpredictable environment with the same level of understanding of learners and workers and what they come up with. We can't go on to assess, select and educate students of various domains like engineering, technology and management etc. in the same way what we have been doing till now. Similarly, we can't assess and train employees with the methods and means we used till now and prepare them for Industry 4.0 and beyond. We need a new paradigm in a new world. There are certain things we may have neglected till now when it comes to selecting and training students or employees which we cannot do anymore. We need to have a framework which is predictable of the human competence to survive and thrive in an unpredictable scenario. We need a paradigm which is more dependable than ever, upon which we can create methods of assessing, selecting and educating or training our future workforce. There is a need to redefine Competency which will meet the requirements of industry 4.0. Competency based education and industry practices has been there since last four decades. Competency is closed to standard and an objective way of looking at one's suitability and for high performance in a role. However, the industry today needs to move closer to a new way of understanding and utilizing the concept of Competency, if it has to survive the uncertain times and meet the expectations of various stakeholders. This paper conceptually proposes to rediscover the idea of competency which is comprehensive, holistic and has the potential to meet the various requirements of industry 4.0 and the internal and external environment in which it would be operating it.

## II. LITERATURE REVIEW

Competency has been a practiced term in management and industries. It's also an advocated approach for industry 4.0 [2] and competency-based education has also been a movement in last few decades [3]. Competency has been defined by scores of researchers and it remains an area of vast differences. Wikipedia [4] provides information about several researchers who defined or interpreted competency or competence [5,6,7,8,9]. Terrence [10] has also found out that there is no consensus on the definition or meaning of competency and it varies based on job situation, behaviour, outcome etc. McClelland [7] talked about competencies as a selection criterion instead of intelligence test alone, which should be based on life outcomes and advocated those tests which measures them. Spencer & Spencer [9] established the term competency as underlying characteristics i.e. motive, traits, self-concept, knowledge and skills based on extensive research studies which is also supported by Sanghi [11]. However, despite such efforts we still often come across various news about businesses and organizations failing to meet the goals of various stakeholders and there is a great uncertainty as to what will happen when industry 4.0 has set in. Author, through this paper wants to propose a novel way of looking at a competency to ensure that institutions and organizations have people identified, ready to deliver and willing to learn in the automated, digitized, IoTised and robotized workplaces of future. The requirement of a new view of Competency is also evident from various other researches which support the importance of identifying purpose and personality traits which otherwise is a neglected aspect in competency assessment for both students and employees alike. In case of higher education, Dreher & Ryan [12] informed that the academic and entrance test scores don't estimate all competencies and thus may not be accurate in student match to the degree programme. Gupta et al [13] in their survey of Management Institutes have identified the disconnect between what institutes offer and what employers look for. It may also mean that many recruiters might require overall competency which education is not providing for. This suggests better way of

evaluating budding managers and entrepreneurs. Zimmerman et al [14] in their studies have observed that personality characteristics like conscientiousness, emotional stability etc. can be good predictors of performance both in studies and work. It's vital to select students and employees for these competencies which cannot be easily developed but are crucial to deliver in a position. Journal of Accountancy [15] too found out in their behaviour based interviews that some required competencies for a role might be absent due to an attitude which is difficult to change. Boyce [16] for a particular aim, attempted to find if personality was fixed. Although, he did observe evidences of alternation in personality, he notified that it may be more because of a natural progression due to certain events rather than a conscious choice. Hence, one needs to assess a student or an employee for required personality traits before admitting them to one's programme or organization. Boyce et al [16] also referred to some researchers [17,18,19] who in their research found that personality is almost formed by adulthood. Hence, its necessary to identify those personality characteristics which are required in future students and managers we need to ensure the desired characteristics for a role and to think holistically and with a sensitivity towards environment. From industry point of view, managers must be inclusive, fair and loyal and behave responsibly since they are the custodian of institutions [20]. The importance of living one's purpose is also highlighted by Covey S.R. [21]. Besides, our understanding of self is of utmost importance if we have to lead a fulfilling life as suggested by Vedanta philosophy. Hence, it becomes essential to relook at how we view a competency and make sure that our view doesn't leave out an essential ingredient. Whitehead et al [22] too have discussed about lack of clarity around the term Competency. The above discussion confirms the gap and gives us an opportunity to redefine the concept of competency for the future. Adapting learning from above researchers and adding experiences and reflection, author proposes for a new version of understanding competency called Competency 2.0. The term coined is 'W-holistic Competency' as defined in the next section which will provide complete and holistic understanding of a competency for the learners and performers belonging to various domain which will meet the requirement of technical & managerial competence, innovation, adaptability, commitment to learn and outperform despite ambiguity and difficulty such that the expectations of various stakeholders are met with.

### III. RESEARCH METHODOLOGY

This is a conceptual proposition suggesting a paradigm shift in the way a Competency is understood or defined. It is an exploratory study which intends to fill the gap of unfulfilled social, organizational and environmental need of truly competent workforce and draws upon the learning from literature review and experiences of author as management professor, recruiter & manager. It attempts to provide a modified and innovative concept called as 'W-holistic Competency.' It suggests an indicative framework too which can be used by technocrats, entrepreneurs and managers of industry 4.0 to enable their organizations to survive, thrive in an uncertain era while meeting the benefits of triple bottom line.

### IV. CONCEPT AND CONSTRUCT

As discussed above, this paper suggests a modified and deeper understanding of concept of competency in view of current and future need of holistically competent workforce. Hence, it is preferred to call it as W-holistic Competency rather than just competency. The W-holistic Competency is defined as *sum of the sense of purpose, needs, self-understanding, personality characteristics (fixed or dynamic- mental, physical, emotional, spiritual), aptitude, set of knowledge & set of skills resulting into willingness and abilities, which together makes a person behave appropriately for a given role in its highest possible manner with a genuine attempt to satisfying various stakeholders of that role, while realizing oneself in an enabling organizational culture.* It suggests seven parts or types of competency which are sense of purpose, needs, personality characteristics, self-understanding, aptitude, knowledge set and skill set.

Figure 1 given below shows the seven variants of competency, the independent variables, when present & assessed for adequacy will result into realization of W-holistic Competency, the dependent variable, which in turn should provide for competent workforce for industry 4.0. It's important to note that the burden of competency can never be left only on the shoulders of an individual student or employee. It has to be adequately and encouragingly supported by organizational culture and competency evaluation and development processes. These two acts as moderating or mediating variable. Each of these competency variants are now discussed in detail.

A. *Sense of Purpose*

Intuitively, we know that people are born with a deep purpose inside them. It's very important that one identifies or discover the same before embarking upon a career. What Covey SR [21] calls that one should find one's Voice. This purpose has the seed for human happiness, success and meaningful life for oneself and the world around. If the chosen calling or vocation doesn't stem from this purpose, then person is not satisfied and cannot do well. Any potential candidate of higher education has to have a purpose which is aligned with the world of business, management, society and environment. For example, purpose like contribution to society or helping solve illiteracy problems or provide a required service at affordable cost like artificial intelligence based alert system to make up for common forgetfulness or illness alert to improve quality of life. When aspirant with aligned purpose join a particular degree programme or job they would be stable, committed in long term, socially conscious, and will come with an intention to serve and simultaneously earn a living, rather than coming only for a pure selfish reason i.e. to fulfill one's own needs alone. Currently, such thing is hardly checked during the interview or selection process. Identification of such purpose takes some deep reflection of oneself and having discussion with closed one's.

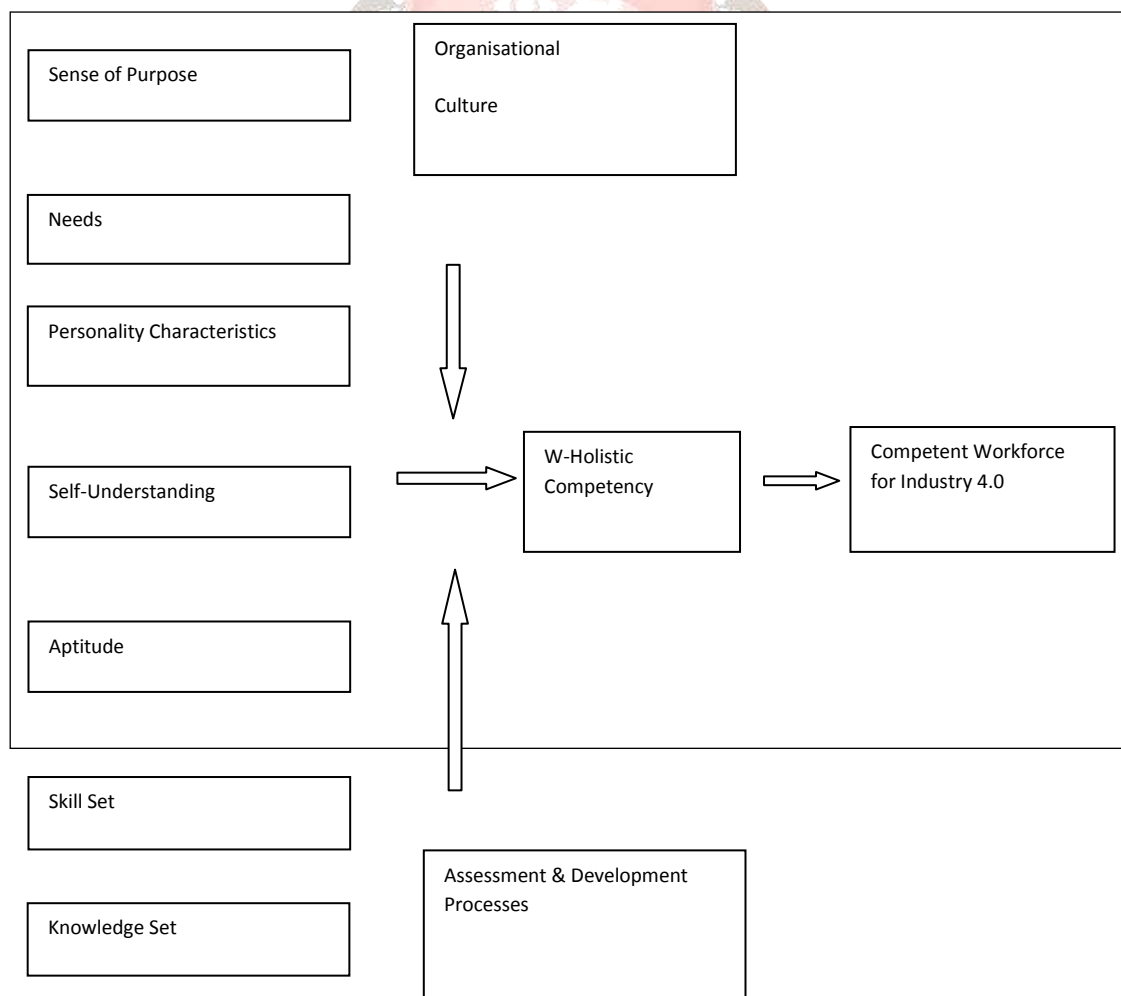


Figure. 1. The concept of w-holistic competency

### *B. Needs*

Various researchers have identified different needs present in human beings. Pareek [23] has provided instrument to assess the needs for influence, security, affiliation, extension, dependence and achievement. McClelland [7] termed the needs as motives although it would be better to call them as needs as motives can be much deeper indicating towards purpose and also surface level indicating towards needs for power, affiliation and others. These need competencies are equally vital to be assessed in a potential student or employee. Ramo & Saris [24] in their working paper researched and suggested the importance of motives or needs by grouping all competencies under three major motives. Needs should be aligned with one's purpose and should overall be favourable to the role taken by one. For example, one's too much focus on security need will affect performance, other orientation and health. One then might be too interested in job security and may not take even the required challenges essential for work innovation and healthy living. It's possible that needs are present in contrast to each other and may come in conflict with one's purpose. A person may also have opposing behaviour resulting into further complexity. It's difficult and time consuming to alter needs already formed in one's personality. Hence, it would be wiser to select those candidates who demonstrate the minimum required levels of such needs. For example, need for achievement is important for engineers to set challenging goals and achieve it, need for affiliation is important for managers to relate with people and their groups at work place, and need for extension is important for anyone to care for people, society and environment. An evaluation of needs is required to be done to avoid excess or absence of a need. Otherwise it's possible that a particular required behaviour may fully be ignored by an employee or one may display an extreme behaviour which will not be in the interest of all stakeholders.

### *C. Personality Characteristics*

Traditionally, theorists have suggested both hereditary and environment as major determinants of personality. By the time a person becomes adult and eligible for higher studies or work, several characteristics have taken shape in him or her. This finding is supported by Boyce [16] and other researchers. As discussed earlier, while these characteristics may be dynamic, it's very difficult to bring about a significant change in one's basic temperament, values, faith, beliefs after an age. Such change may come due to various circumstances faced by one but it may not be out of choice. The competency expert Boyatzis in an interview [25] have opined based on his longitudinal studies that change in some of the emotional or social intelligence characteristics for example empathy is possible but it takes good one to two years. However, depending on the role, organizations may have limited time and resource to achieve the same and may not be able to wait for some positions for that much time. Hence, it's important that people are selected for the required attributes of personality for a given career or role. These characteristics can be categorized commonly as physical, mental, emotional and spiritual. The physical characteristics include strength, features, general constitution, flexibility etc. The mental characteristics may include memory, reasoning, awareness, imagination, intelligence etc. The emotional characteristics may include risk taking ability, assertiveness, empathy, self-control, conscientiousness, intuition etc. Łupicka, & Grzybowska, K. [26] have identified accepting change or adaptability as an important attitude or social competency. Similarly, cultural competency is also emphasized which is to understand and appreciate other cultures through empathy by Ayokanmbi [27]. Spiritual characteristic would include love, humility, austerity, sacrifice, moral uprightness etc. For example, ethical and value competencies are also suggested by Ayokanmbi [27] in his study on competencies for Global engineers & technologists. An aspiring candidate needs to possess a minimum level of these characteristics, as required to play a role competently. A contrasting or lesser than needed characteristics which one has already developed is not going to make one a wholeistically competent manager, as they have to use their characteristics to analyze, communicate and influence while being empathetic and socially & environmentally conscious of the means and goals. Several of these will be learnt through hereditary and in the formation years by observing behaviour of people around one more as a natural course of life than a conscious choice. During a degree programme or employee training, cognitively a person can be convinced about usefulness of characteristic of conscientiousness but in practice it will come only when a person has actually developed that in the formation period of one's life. Hence, it would be in vain to try to develop them in adult technocrats, managers, software developed or those employed in other vocations, more

so when we want to start delivering from the beginning. As one can see, such characteristics would play extremely important role in business, education for them to have sensitivity and commitment to world at large.

#### *D. Self-Understanding*

People hold a view about oneself, one's suitability and capability for a given role or in general. It influences one's willingness and ability to learn and perform, though in quite a few cases it may not be fully correct understanding. Such self-understanding is formed over many years as one experiences oneself in relation to various situations and outcomes. Things like introspection, views of our closed one's and comments as heard from others, mainly from the authentic and reliable relationships may form one's idea of oneself. An employee or a student will have set of core values, principles, faiths, beliefs and attitudes of what is his or her capability, what he or she is made for, can do and whether good or not so good. For example, if a person has a self-understanding of being a peoples' person, loves to serve people and capable to help them, then one would likely gel well as Human Resource Manager or as a Social Worker. This is since his or her belief, values, attitude is aligned with the requirement of serving or leading others, provided the sense of purpose is also pointing towards it. A vital understanding is also that of one's true self and one's potential as a human being. The recruiters of students for management institutes and employees of industries need to decide a draft of what should be the self-understanding of their suitable candidate. Then they can decide on the standard of passing or eligibility for a role in this part of competency. It's a vital competency and just cannot be ignored as this will enable endurance, provide strength in difficulty and performance despite uncertainty.

#### *E. Aptitude*

An aptitude is the ability what one is born with or develops during formation years of life and education. It's a natural talent. Such aptitude comes in handy when it is aligned with one's purpose, which may happen that way. An aptitude means one already is oriented towards that ability, for example singing and it comes naturally to a person. This puts a person on a natural trail of progression, provides momentum from the beginning, leading to a possibility of higher or breakthrough performance in that domain. In the absence of the aptitude for a given role, it becomes time & resource consuming for a person to begin the journey and takes it longer & more painful for one to become competent. Hence, it's obvious that we need to assess one's aptitude before passing our judgement on his or her competency for a given role. Its more found than developed.

#### *F. Skill Set*

Skills can be a communication skill, team working skill, software skill, MS Office skill etc. A lot of business skills are comparatively more developable and many in shorter period of time by making conscious attempts as opposed to personality characteristics like temperament, disposition etc. which will take a lot of time and still we would not be sure of it. For example, skill like operating a lathe machine or writing a programme code in a particular language can be quickly learnt at a required competency level even within just few weeks. Some of the managerial skills like researching, decision making, leading etc. may require good many months or years. Most of the educational institutions or even some training centers have the time of some months and they also have various systems, mechanisms, resources to develop many of these skills which they are very good at. A few general or technical skills however, may take some considerable time and resources to develop like basic writing skill in a language may require years of childhood education. Hence, it's important to prior assess the presence of certain basic skills at minimum level which can only be acquired in a long duration which is beyond the scope of an educational degree or training programme. A set of all such skills must be predefined as essential eligibility requirements for the budding technicians, managers and others. However, it's imperative to note here that many competencies are inter dependent and absence of one is likely to affect the quantum of another. The idea is not to get a fully competent student for engineering, software or management programmes or as an employee candidate for industry 4.0, but to ensure that those who are selected are suitable. That means, they have the clear purpose, required characteristics, desired pattern of needs and overall potential in terms of willingness, adaptability to acquire further knowledge and skill set as they surface due to technological innovations. This is in order to deliver as a holistically competent role holder serving all stakeholders and not

just a few of them. This idea is at least partially endorsed by the study identifying key managerial competencies of Industry 4.0 done by Łupicka & Grzybowska [26].

#### *G. Knowledge Set*

Knowledge Set would include various types of knowledge which is normally gained through multiple sources during one's education and experiences in life. It can be a subject knowledge, field knowledge, understanding of an organization, person, event, facts etc. Prior basic knowledge is important for one to acquire still higher level of knowledge in the same domain or skill. It is further provided in an extensive manner during usual educational degree programmes. Knowledge set is required to gain wisdom or sense of what is to be done and what needs to be avoided in a role and on what premises. It's quite feasible to acquire knowledge on various functions of a business and about organization. One can see that a decision-making skill will require one to know how to collect relevant information, develop several options and analyze them using head, heart and even soul which is normally a neglected aspect. However, if person lacks basic courage to take risk of deciding on less information, conviction to stick to the decision, assertiveness to carry it out, perseverance to see it through completion despite hurdles, such decision-making skill will not be manifested properly in the real life and would remain more at information level. So there, one may be able to teach it but cannot do it oneself. This example reinforces the need of required personality characteristics and the difficulty to change it substantially in a given time period available for institutes and organizations.

### V. DISCUSSION

Origin of several science and management theories can be found in the times of wars and its strategic management by military. Hence, support for deeper assessment process for a competency can be drawn from defense sector. For example, they will assess their candidates based on scores of psychometric tests, numerous physical tasks both as individual and as groups, performance in interviews, several group discussions, leadership tests, medical tests etc. High performing organizations too invest more time and resources on right candidate selection and later on training them. For example, Google [28] uses an extensive round of interviews besides other methods to assess candidates thoroughly both for role, team and culture fit. This fact tells us on the importance of investing more in a candidate selection confirming their competency as that is the first step which will decide the future performance, innovations and adaptability by them. Besides, only a deeper assessment will have scope of identifying one's suitability not just for a role but for the environment in which that role is to be performed keeping interest of all stakeholders in mind.

To repeat, the idea is not to expect a candidate to possess everything before entering an educational institution or employment. But it's vital that we clearly differentiate as to what needs to exist as eligibility and what we can mold, change and develop in the aspirants and how much of it we can do, in view of available time and resources. All this keeping sustainability in mind and not just the customer and profitability.

The institutes and companies today, don't have an option to decide whether they want to focus on commercial aspects alone or also think of society and environment. For example, management institutes normally have two or three-pronged admission criteria i.e. a written test to check aptitude or intelligence, group discussion to judge communication, interpersonal skills and personal interview to understand further about personality although not so deeply. We know the limitations of interview method to judge emotional or spiritual traits. So the sensitivity to environment or society seems to have been neglected. In few cases, the purpose of a person and various needs may be superficially identified during interview unless the interview is in depth and conducted more in a natural setting which is often not a thing in reality. Still, those needs to be reconfirmed through a statement of purpose and a specific written test of needs assessment. Further, it's vital to note that self-reporting of personality & its traits particularly in terms of Big Five traits is considered universal and as meaningful predictor as against what critics of personality tests argue. Boyce [16] in his analysis has referred to several researchers [29,30,31] whose research directly or indirectly support this view point. Researchers like Pratt [32] have identified that the entrance tests for admissions in MBA, alone may not be a good predictor of student's success and prior work experience and GPA received in undergraduate degree needs to be assessed to ensure student success. Vallabh

& Vallabh [33] in their empirical research have found that the motivation to learn and amount of efforts put in by a student determines the success in a degree programme. The amount of effort is the tendency to do the hard work which is a characteristic enshrined in conscientiousness. Similarly, drive to learn is a characteristic which is embedded in openness to new experiences and in one’s sense of purpose. Although, their study differs in finding with Pratt [32] who found prior Grade Point Average (GPA) as a better predictor, Vallabh & Vallabh [33] have found that knowledge of course contents through previous experience is a useful predictor. But as we see, the environment and social sensitivity is mostly ignored from direct assessment of suitability of a candidate. This is since the concept of competency is used as the ability which is assessed through observable behaviour [34] and several aspects are not easily observable unless one consciously intend to find it out. The above discussion further makes a case for putting forward a basic framework based on which this W-holistic Competency can be assessed.

Brief meaning & description of each competency variant is given in the Table I below. Some competencies have sub-components or indicators. Further, how each competency can be assessed and what possible tools can be used are also suggested. Currently, the assessment techniques, tools or methods are only indicative based on ready reference and is not a careful research based list or specific recommendation. Also, this framework is directional than a fixed one. It may need to be well thought and customized in terms of weightages before it is planned for use, particularly from need, feasibility and resource consumption point of view.

Table 1.

Competency	Meaning	Utility	Description/Types/Sub Types/Indicative Example	Competency Assessment Method/Tool (e.g.)
Sense of Purpose	Deep reason a person has for a calling and role	Provides Meaning	Serve a need of society by providing a solution, help individuals achieve potential	Statement of purpose by candidate, verify by in depth interview
Needs	The needs one wants to be satisfied while playing the role in short and mid-term	Provides Intention	A unique combination of needs of- To serve, to form relations, to seek challenge, to get protection, to influence others, to get support or help etc.	Thematic Apperception Test (TAT), Work Preference Schedule (e.g.-Pareek, 2002)
Personality Characteristics	Mostly formed or inherited yet dynamic aspects of personality which align or don't align with the given role	Provides Facilitation	Physical- stamina, hard work, features etc.; Mental- memory, reason, imagination etc.; Emotional- adaptability, empathy etc.; Spiritual- humility, honesty, sacrifice, love, integrity etc.	Field tasks, medical tests; IQ tests, Big Five Personality Test, EQ test, Spiritual intelligence test
Self-understanding	Understanding of self in relation to role, others and as a human -includes faith, belief, values etc.	Provides Belief	Favourable attitude and values about one’s role & its outcomes; about people, society, nature; confidence about one’s ability as a human	A write up on self- verify by interview; Personal Efficacy Test (e.g. Pareek, 2002)
Aptitude	One’s natural or developed orientation and capability for a role or multiple role	Provides Talent	Role related talents -music, singing, art, graphics; numbers, math, science, robotics; language; nature; spiritual; social; leadership; physical work etc.	Combined methods of – demonstration, achievements and aptitude tests
Skill Set	Practical ability one has and can develop, which align with a role in some degree	Provides Ability	Calculations, systems processing; communication; software; internet of things, artificial intelligence, robotics; social media; team	IQ test; test, Interview; certification; work sample; experience; team tasks; physical evidences

## VI. SEARCH LIMITATIONS

This research is limited since it's a proposition. The obvious limitation of a conceptual study is its robustness which is yet to be seen practically. The research is limited as it's a modified yet a new concept. The practical aspects of such view of competency and its framework need to be studied in depth. The cost of going for W-holistic Competency based practices is likely to be high depending upon the number of assessments, selection or training steps decided. The interconnections, moderating and mediating variables have not been discussed since they were out of scope of the current study. But the same needs to be studied to find its effect on Competency. While the identification of required competency is feasible, the assessment of competencies is a challenge as also observed by Houston & Warner [3]. It's an area of future research.

## VII. PRACTICAL IMPLICATIONS

There is a renewed interest and focus both by policy making and regulating authorities to prepare for industry 4.0 workforce and also enhance the quality of higher education. Various studies have shown poor on the employability of management & engineering degree holders either in terms of the competency or in terms of ethical, sustainable and socially responsible working. Beravi [35] has highlighted the role as well as requirement of industry 4.0 for sustainability goals and its importance. This paper can help the decision makers of industries and management institutes to rethink on their student or employee assessment, recruitment and other processes to enable industry 4.0 in order to meet sustainable goals. Secondly, this paper has proposed a new understanding of competency called as W-holistic Competency. This provides a new way of understanding competency and has strong implications for those who would like to prepare for the coming era or use competency-based student or employee selection and human resource management which is both current and futuristic.

## VIII. CONCLUSION

There is no doubt that we need a new way of identifying and developing people beyond the knowledge industry and for the digitized, IoTised and human machines filled world. This too by duly considering the search of meaningful work for Gen Zee and further generations and the demands of various other stakeholders including environment sensitivity. Also, in order to meet the uncertain and complex environment, we need a more robust framework to depend upon. In the difficult and changing times, what matters most is how a student or employee is able to deal with it in an effective manner without compromising on needs of various stakeholders. This paper has thus proposed both a new competency definition and a framework to get competent people.

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