

*"The Voyage From 'M.C.A.S.T' To Industry"  
A Perceived Gap Analysis Of The Critical Competencies'  
Evaluative Dimensions In The Manufacturing Technical Sector*

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**Abstract:**

The manufacturing topography is changing as organizations re-organize to become more cost effective and efficient. In light of this, technical professionals have to learn new competencies in order to maintain both their employability and their organization competitive. In Malta, MCAST has been trusted with providing this baggage of competencies. This study examines the perceptual gaps of salient evaluative dimensions for four broad competency domains in this sector: Core Knowledge, Technical / Vocational, Managerial and Soft competencies. 200 technical students at MCAST, 30 instructors and 30 Human Resources personnel are surveyed and comparisons conducted. In general, evaluations are more homogeneous between students and instructors and different from those of HR representatives. While the former groups consider the more technical competencies to be high on the manufacturing agenda, HR representatives think differently. These perceptual gaps are discussed in light of the need for consolidating bridges between MCAST and the Manufacturing industry.

## Introduction

This study looked at the link between Education and Industry and the perceived gap in the competencies one domain is offering and which the other domain is expecting. While business-education partnerships have existed for many years, the need to foster stronger collaboration is greater today than ever before. The rapid pace of technological change, globalization and changes in the workforce has made it clear that schools cannot stand alone in the educational process. To prepare students for the workforce of the future, all resources will have to cooperate in the creation of a stronger and new model of career preparation and education. For obvious reasons, business is a key stakeholder in the process.

Post-secondary offerings to students finishing their obligatory education and entering into a technical career will become the determining influence for full participation in economic success. In the spirit of the mission of the 'Malta College of Arts, Science and Technology (MCAST)' for providing educational access and opportunity, the various colleges within this institution are in the best position to bridge the gap with appropriate programmes that form part of the solution.

### *Global business changes*

Changes in the world of work are happening with direct impacts on past forms of employment arrangements. These changes require individuals to keep up the pace with their knowledge and skill repertoires. The factors contributing towards this 'new world of work' (Mirvis & Hall, 1994) are well documented. These multiple features are inter-related and some have triggered off the others. Without elaborating on them, one can mention the increase in technology at work (Davis, 1995; van der Spiegel, 1995); changes in the political, economical and social context of new emerging economies giving rise to globalisation and the multicultural organisations (Cox & Tung, 1997; Pearce, 1997; Wever, 1995); the applications of new management and organisational practices (Burke & Nelson, 1997; Sadri, 1996) towards securing more competitive work organisations (Gallie et al., 1998; Guest, 1995; Mohrman & Cohen, 1995); the institutionalisation of new work schedules like flexibility, contingent employment and part-time work (Barker, 1995; Reilly, 1998a, b; Wiesenfeld & Brockner, 1998); the relative decline in trade union membership (Guest & Hoque, 1994; Hartley & Stephenson, 1992; Marchington & Parker, 1990); as well as the new emerging demographic trends of the work force (Offerman & Gowing, 1990).

Thus, in this era of volatile markets, while it is important that governments address the immediate concerns of their citizens, it is also important that longer-term goals and strategies be identified and acted upon. By so doing, governments strengthen citizen confidence in their future by preparing individuals and institutions to take full advantage of renewed economic growth.

Although it is a national challenge to ensure the acquisition of the proper competencies and knowledge needed in today's economy, effective solutions must be considered in a global context. No government single-handedly can successfully address this challenge. Meanwhile, the need to do so is urgent. Knowledge strategies must therefore focus on the learning needs, not only of the traditional learning population, but also, and most immediately, on the competencies of the current

workforce. The notion of ‘employability’ has substituted the term ‘job security’ (Herriot & Pemberton, 1995; Noer, 1993) and Brown *et al.*, (2003) remind us that:

“Employability is a notion that captures the economic and political times in which we live. Political and business leaders consistently tell us that efficiency and justice depend on people acquiring their knowledge, skills and capabilities that employers need in an increasingly knowledge-driven economy” (p. 107).

The G8 members have identified skills and learning policies as common priorities (HRDC, 2002) suggesting that all learning partners – governments at all levels, employers, educators, unions, NGOs and individuals themselves – must be involved in the development and implementation of effective learning strategies. Roger *et al.* (1995) assert:

“Students learn more when engaged in real-life experiences. Business leaders can have a major impact on how students choose vocations... any business-education partnership between labour employers and educators are going to be an intricate proponent of a student-centred approach to learning” (p.58).

Employers, unions and individuals share a mutual interest in addressing the skills agenda to help boost productivity and national growth. Providing learning opportunities through various initiatives, such as Union Learning Representatives can provide a win-win situation – employers benefit from enhanced skills, motivation and flexibility; unions boost their membership, status and influence in the workplace; while individuals get the skills they need to secure employment in a changing work environment.

#### *Putting people at the centre of success*

More and more authors are convinced that the proper channelling of people’s skills aligned to the current market forces shall benefit both individuals and organizations alike. Far from the concept of capitalist coercion over the employee, educational and business institutions are trying to look at reality from a more objective point of view. Personal capital and its management go well beyond the mere translation of knowledge into skills (Brown *et al.*, 2003). It ensures that personal capital fits correctly to generate the necessary institutional capital. What Leana and Rousseau (2000) refer to as *relational wealth* (that is the economic advantage derived from keeping intact the relations organizations have with their workforce), is heavily attributed to the knowledge, skills and abilities that individuals possess. Putting people at the centre of success is thus far from an over-used cliché.

The countries that will succeed in the 21<sup>st</sup> century will be those that invest heavily in education. For the individual, higher skill levels are associated with increased income, more employability, and enhanced social protection and participation. Three imperatives - rising skill demands, outdated learning systems and shifting demographics - suggest the time for action is now. The first two aspects are of particular relevance to this study and shall therefore be briefly expanded here.

The shift to a knowledge-based economy means an ever-increasing demand for a well-educated, skilled and adaptable workforce. The use of technology-based tools is

transforming the way we work and do business. Even now, traditionally unskilled or low skilled jobs require more advanced abilities, including basic literacy, numeracy and computer competency. Unfortunately, the response of the most industrialised nations has not always been quick enough to address any surfacing gaps. In 1999, for example, across the OECD countries, only 79 per cent of persons at the typical age of upper secondary school graduation had actually completed their upper secondary education (OECD, 2001). Also, most employer-sponsored training in industrialized countries is informal. While essential to overall adult skills development, competencies acquired informally may not be recognized by neither employers or as a basis for formal learning entry. In addition, a knowledge-based economy requires workers who can transfer knowledge and prior experience to handle a continuous stream of expectations. Every short production run or customized service is different and requires the transfer and tailoring of accumulated know-how to solve problems creatively. The hierarchical authority of the teacher instructing passive students is not unlike the world of bosses and workers in traditional workplaces. In both cases, passivity breeds boredom, poor performance, absenteeism and sabotage. In high-performance work systems, employees are involved, not passive. Employees are also active participants in learning processes that drive continuous improvements, especially employees down the line at the point of production, at the point of service delivery and the interface with the customer where most incremental learning occurs.

As regards improving out-dated learning systems, current estimates suggest that in 20 years' time, knowledge workers – individuals whose jobs require formal, advanced schooling – could make up close to two-fifths of the workforce of industrialised nations (Drucker, 2001). In the knowledge society, learning never stops. As noted in the G8 Charter on Active Ageing (HRDC, 2002), one needs to abandon the conventional concept of a three-stage lifecycle of education, employment and retirement. The learning must also focus on the adult population. Although there is a convergence between new research in the cognitive sciences and new functional requirements in cutting-edge, high performance workplaces, the dominant pedagogy is still producing workers for traditional workplaces. In traditional workplaces, where jobs are designed narrowly and tasks are repetitive, there is little need to transfer general knowledge to a series of unique applications. In high-performance work systems, however, machines perform all the repetitive mental and physical tasks and people spend their time deploying machine capabilities to produce variety and customize products and services.

### *Defining competency*

Arnold and Mackenzie Davis (1992) and Nicholson (1998) note that the word 'competency' has been used differently by different researchers even though it is currently popular in the business community to help model and cluster different attributes of results-oriented behaviours (Brannick & Levine, 2002). In the field of management, Jacobs (1989) provides the following definition: "an observable skill or ability to complete a managerial task successfully" (p. 33). Similarly Boyatzis (1982 as cited in Nicholson, 1998) defines it as "an underlying characteristic of a person which results in effective and / or superior performance" (p. 83).

### *Competencies in the manufacturing sector*

The move from a mass production market towards a customised market based on quality, price and speed of delivery is forcing companies to disregard centralised, autocratic, command-type management and control practices and embrace those giving employees more discretion about how to undertake their work (Howard, 1995; Leana & Rousseau, 2000). In the international context, drastic changes have happened in the manufacturing sector in these last two decades. The original reason was attributed to macro-economic forces. However, the emphasis has shifted towards the organization itself rather than to mere external and uncontrollable market factors. The first reason for success or lack of it in the manufacturing sector has been strategy. However, a second and perhaps more relevant reason is that production methods and technologies have changed, demanding a more refined balance between physical and cognitive demands (Wall & Jackson, 1995) especially amongst the technical staff which, after the great waves of delayering and restructuring in the 1980s and 1990s, have had to take up more roles of responsibility. A National Association of Manufacturers survey in the USA reports that 88 percent of manufacturers report a shortage of qualified workers in at least one job category, continuing a decline started in 1991 (Rauschenberger, 2001).

The need for competency standards has never been more pressing. In the 21<sup>st</sup> century, a skilled and knowledgeable workforce will be the manufacturing industry's principle competitive advantage. 'High volume' has been replaced by 'high performance' and 'high value added'. In this new environment, employers are looking for skilled workers who can work *smarter*, not just *harder*.

### *The situation in Malta*

Malta has a "micro" island economy. Malta has no raw materials and has had to rely on the initiative and resourcefulness of its people to build its economy. Manufacturing has been the motor driving economic growth in Malta contributing to over one-fifth of Malta's Gross Domestic Product (GDP). The rate of growth as measured in terms of the value added contribution by the Manufacturing Sector to GDP, at current market prices, stood at Lm271.3 million or 22.6 percent compared to Lm251.0 million or 22.5 percent registered in 1997. In 2000 it stood at Lm339.8 million or 25.4 per cent of GDP. Data for 2002 is only available for the first quarter and stood at Lm78.4 million (or 23.1 per cent) of GDP. The electronics industry has become the largest sector, overtaking clothing and textiles (NSO, 2004).

Focusing on the skills base of this economy, various local labour surveys have confirmed employers' complaints as to skill constraints, especially in lower managerial and technical positions. Workers are weakest in life skills, as well as literacy and numeracy competencies (Value 2000, 1998). The present skill shortage in Malta's workforce is largely the result of an observed mismatch between teens' aspirations and the economic-labour market realities they will face as adults. An under-prepared or unmotivated workforce, in the first place, has no hope of meeting the challenges of the future and deriving some benefit from the rising tide of prospective economic growth and prosperity.

According to Value 2000 (1998), Malta has still to struggle and find ways and means to be more competitive. A competitive Malta is the only way to deliver wealth and prosperity, as well as jobs and opportunities for its citizens. Malta's international

competitiveness has been losing ground and it could soon reach a point of serious concern. Malta's competitive advantage lies within its people.

The Federation Of Industries has claimed several times that there is a skills shortage in Malta but the fact remains that the employing class has failed to invest – or to attract foreign investment – in high-skill industries and criticisms of the educational sector have to be seen in this light. Many employers still appear to be dragging their feet in linking up with schools creatively. It would be good to see more leadership and altruism in the workplace. Raising young people's aspirations by giving them a taste of different working environments has to be a positive step. Furthermore, Darmanin (1992, p. 115) is probably correct when she argues that the "skills shortage" is a socially constructed problem, given that there is still occupational segregation in Malta, which automatically excluded capable individuals from vacancies, which employers claim they cannot fill (c.f. Cortis and Cassar, 2005, in press).

#### *Aim of the present study*

This research project attempted to shed some light on the way different stakeholders believe the contributions of salient competencies to be.

This project answered the following research question:

How do technical students, HR officials and MCAST instructors differ in their evaluative perceptions of the established competencies?

## **Method**

### *Settings and Participants*

The study was carried out among students of MCAST, teachers and instructors of MCAST and Human Resources executives and officials within the manufacturing sector.

In this study three categories of respondents were selected to provide data to answer the research questions set for this project. The first category included 200 students from MCAST housed within the two institutes pertinent to the sector addressed in this project, namely the Institute of Mechanical Engineering and the Institute of Electrical and Electronics Engineering. In addition, 30 MCAST instructors within the same institutes were also asked to fill in the research questionnaire. Finally, 30 HR executives were selected to represent the employers' perspectives on the competencies rated in the questionnaire.

### *Instruments*

The first part of this study was conducted using a competency evaluation questionnaire. Several ways of organizing competency models exist (Lucia & Lepsinger, 1999). The questionnaire in this study was based on a four competency domain model which, in the opinion of the researchers, was the most parsimonious. The competency list itself was derived from a variety of sources and cross-validated

by representatives from the educational and the manufacturing sector. The final list consisted of 40 competencies divided into *Core Knowledge* (e.g. the ability to understand and interpret numeric information), *Technical/Vocational* (e.g. the ability to carry an assembly through a defined process), *Managerial* (e.g. the ability to describe typical job-related activities and resources) and *Soft* (e.g. the ability to work collaboratively with others to achieve goals) competencies. Each competency was assessed against the respective evaluative dimension using a five-point interval scale. These evaluative dimensions were selected on the basis of review highlights and discussion with the principal of MCAST and HR representatives. Each section asked the respondents to evaluate the list of competencies identified on the basis of 6 evaluative dimensions. These included:

*Impact:* Respondents were asked to rate the relevance of impact the list of competencies identified have on the manufacturing sector on a scale ranging from 1=*No impact* to 5=*Very high impact*.

*Utilisation:* Respondents were asked to rate the degree of utility of each competence identified on a scale ranging from 1=*Not at all used* to 5=*Often used*.

*Learn and Engage:* Respondents were asked to rate the ease by which technical staff acquires the competencies identified on a scale ranging from 1=*Very difficult to learn and engage* to 5=*Extremely easy to learn and engage*.

*Time:* Respondents were asked to rate the amount of time needed to acquire the competencies identified on a scale ranging from 1=*Up to one year* to 5=*5 years +*.

*Future:* Respondents were asked to rate the pertinence of the competencies identified for the future on a scale ranging from 1=*Will not change pertinence in the future for business* to 5=*Will certainly be very pertinent in the future for business*.

*Financial return:* Respondents were asked to rate the financial return delivered from the competencies identified on a scale ranging from 1=*Nothing at all* to 5=*High return*.

Higher scores on each of the evaluative dimensions reflected a higher rating for the respective dimension. Single competency scores for each domain were added to create global scores.

### *Procedures*

The purpose of this study was to assess the profile of the gap. Hence a quantitative approach was adopted. To collect the quantitative data the researchers contacted the principals of the relevant institutes and obtained authorisation to conduct the study. Final year classes were unanimously covered, and to satisfy the ecological validity of the data other year groups were chosen randomly and covered in the survey together with their instructors. The greatest majority of questionnaire data was gathered from class visits and only a minority were gathered over the phone. In the case of the HR officials, a key person was asked to coordinate the contacts. The questionnaires were

then handed to the research incumbents personally. These were returned either by post or were collected personally.

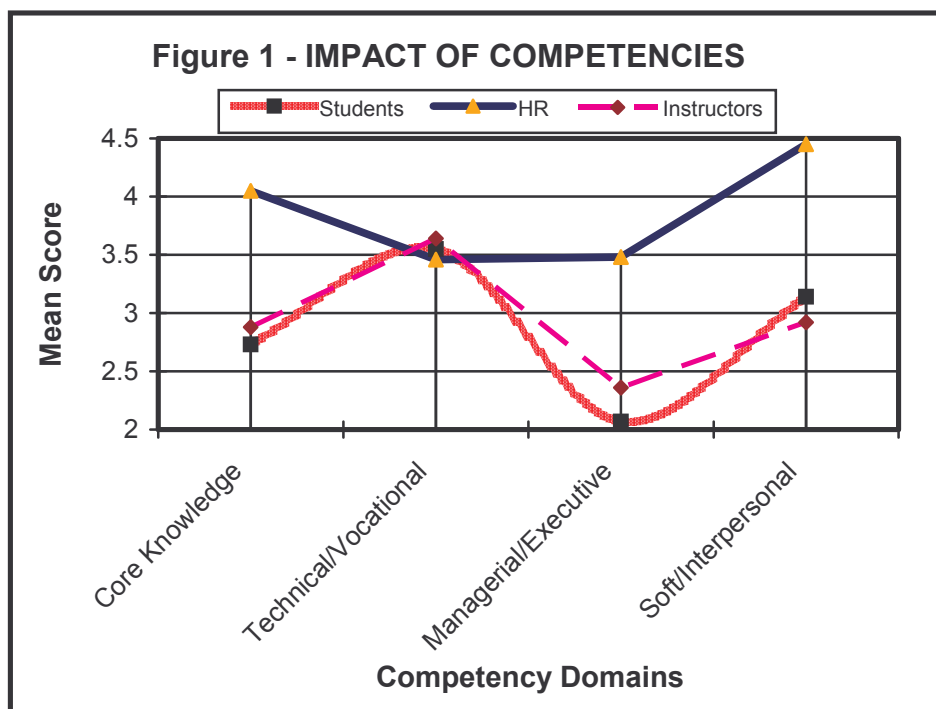
### *Data analyses*

Descriptive analyses were computed to identify the evaluative score for the four domains by each respondent category, and the average results were graphed. Non-parametric analyses were then computed using the Kruskal-Wallis One-way Analysis of Variance. This was done to compare mean rank scores between the different respondent categories. This technique was preferred over the parametric equivalent due to the small number sizes in two of the three sub-samples, which would have violated the conditions of normality required for parametric analyses. Where significant levels were achieved, single Mann-Whitney U-tests were computed to identify the site of significance and the direction of magnitude.

## Results

### *'Impact'* of Competencies:

The average scores obtained by the 3 respondent categories for this evaluative dimension is shown in Figure 1. The global mean scores have been divided by the number of competencies in each domain to facilitate comparison. As the figure indicates, all three respondent categories scored above the mid-point on the Impact of Technical/Vocational skills in the manufacturing sector. However, HR executives always scored towards the higher end of the scale compared to the other respondent categories on the other competency domains. It is however clear that on this evaluative dimension, students and instructors reflect a similar perception on the impact of all four competency domains, which is very different from the HR executives.

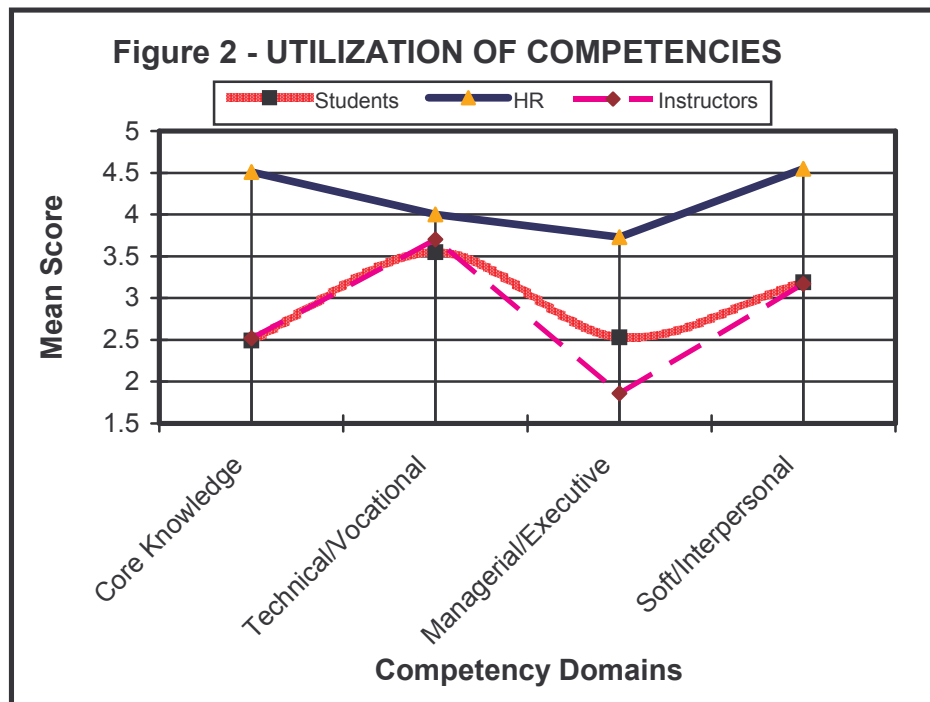




The Kruskal-Wallis results showed in fact that while the Technical/Vocation competency domain did not reveal a significant difference amongst the three groups on the 'Impact' dimension ( $\chi^2=1.83$ ,  $p=n.s.$ ), there was a significant difference for the other domains on this evaluative dimension, with HR executives scoring significantly higher than both Instructors and Students ( $p<.05$ ) about their Impact perception. In addition there was no difference between the latter two respondent categories on any of the domains when asked about the competencies' Impact.

#### **'Utilisation' of Competencies:**

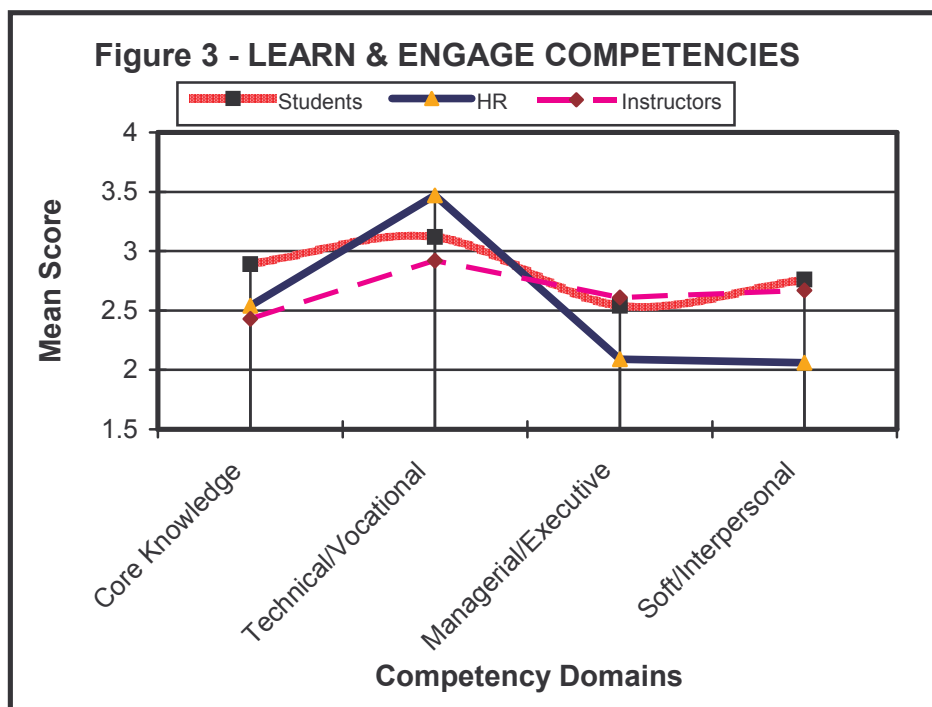
The average scores obtained by the 3 respondent categories for this evaluative dimension are shown in Figure 2. All three respondent categories scored above the mid-point on the 'Utilisation' of Technical/Vocational skills as well as the Soft/Interpersonal skills in the manufacturing sector. However, HR executives always scored towards the higher end of the scale compared to the other respondent categories on the other competency domains, particularly on the Core Knowledge skills, the Managerial/Executive skills and the Soft/Interpersonal skills.



The Kruskal-Wallis results showed that the entire competency domains revealed a significant difference on the 'Utilisation' dimension ( $\chi^2$  from 17.1 to 82.8,  $p<.001$ ). A constant pattern throughout this evaluative domain showed that HR executives scored significantly higher than both Instructors and Students about the 'Utilisation' dimension of such competency domains ( $p<.05$ ). In addition the difference between the latter two respondent categories did not reveal considerable differences on any of the domains when asked about the 'Utilisation' of such competencies.

#### **'Learn & Engage' of Competencies:**

The average scores obtained by the 3 respondent categories for this evaluative dimension are shown in Figure 3. All three respondent categories scored around the mid-point on the 'Learn & Engage' of all competency domains in the manufacturing sector. This time, HR executives have not always scored towards the higher end of the scale compared to the other respondent categories on the other competency domains. HR executives have a stronger perception of the 'Learn & Engage' of competencies on the Technical/Vocational domain within the manufacturing sector, but have scored on the lowest end of the scale when compared to the other respondent categories on the Soft/Interpersonal competency domain.

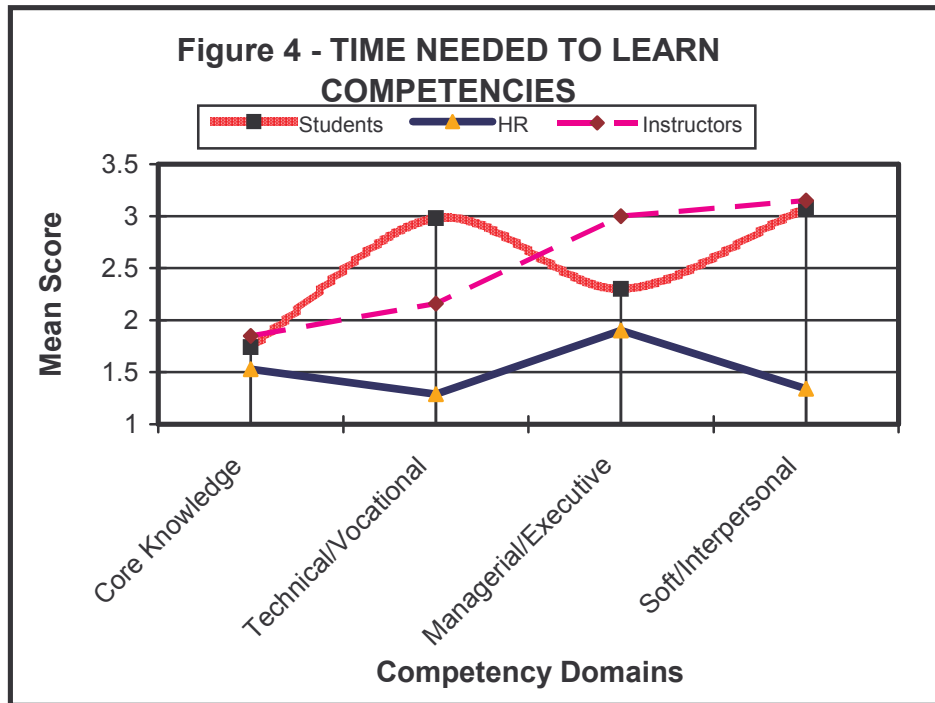


The Kruskal-Wallis results showed, similarly to the previous results, that the entire competency domains revealed a significant difference on the 'Learn & Engage' perception ( $\chi^2=15.4$  to  $17.0$ ,  $p<.001$ ). On this occasion the group rank means obtained for the 3 respondent categories reflect an indiscriminate high and low scoring on their 'Learn & Engage' perception of such competency domains. On a closer observation of the direction of the significance of the group rank means, from among the 3 respondent categories, students scored higher on 'Core/Knowledge' skills on their perception of this domain. HR executives scored the highest on the 'Technical/Vocational' competencies, but the lowest on both the 'Managerial/Executive' and 'Soft/Interpersonal' competencies. Instructors on the other hand scored highest overall group rank means on their perception of 'Managerial/Executive' skills on this evaluative dimension and on an equal level with students on the 'Soft/Interpersonal' competencies and both respectively higher than HR executives.

#### **'Time' needed to learn Competencies:**

The average scores obtained by the 3 respondent categories for this evaluative dimension are shown in Figure 4. All three respondent categories scored on or below

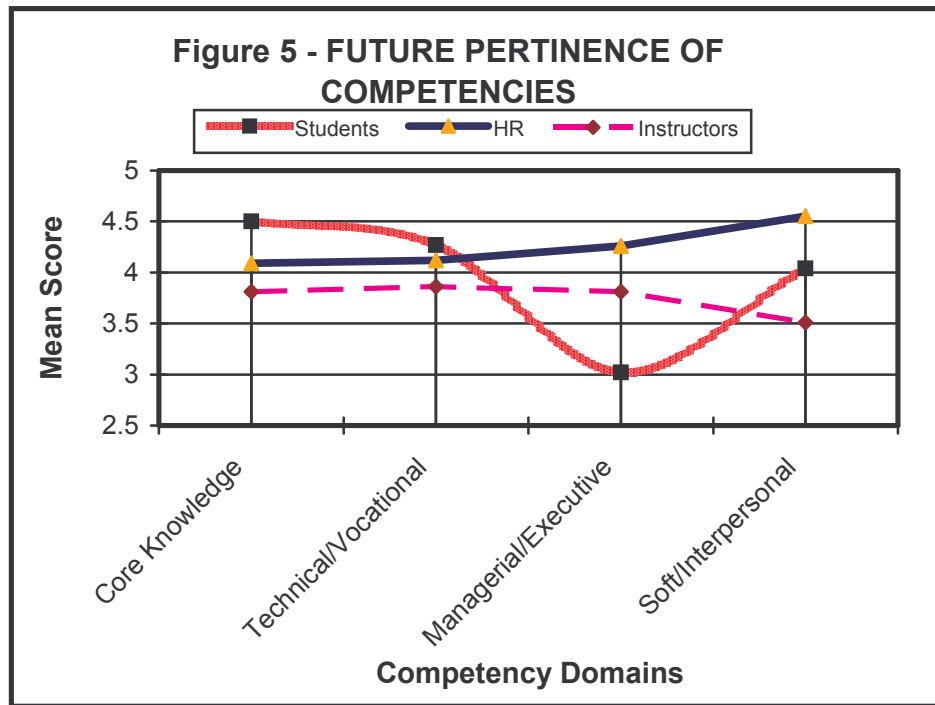
the mid-point on the 'Time Needed To Learn' of all competency domains in the manufacturing sector. In this instance, HR executives have scored towards the lower end of the scale compared to the other respondent categories on all competency domains for this dimension.



The Kruskal-Wallis results showed that the four competency domains revealed a significant difference on the 'Time' perception ( $\chi^2=12.7$  to 110.6,  $p<.001$ ). On the dimension of 'Time' the group rank means obtained for the three respondent categories reflect a constant low scoring of the HR executives on their perception of 'Time' for all the competency domains. On viewing the direction of the significance of the group rank means, results revealed that HR executives expect less time required to learn the four competency domains, particularly for the 'Technical/Vocational' and 'Soft/Interpersonal' domains. In contrast, instructors perceive significantly more 'Time Needed to Learn' 'Core Knowledge', and 'Managerial/Executive' skills. On the 'Soft/Interpersonal' competency domain, instructors match the students' perceptions. Concurrently, students match their perceptions with their instructors on the 'Core Knowledge' domain, and perceive that more 'Time' is needed to learn all skill domains than what HR executives would expect.

#### **'Future' of Competencies:**

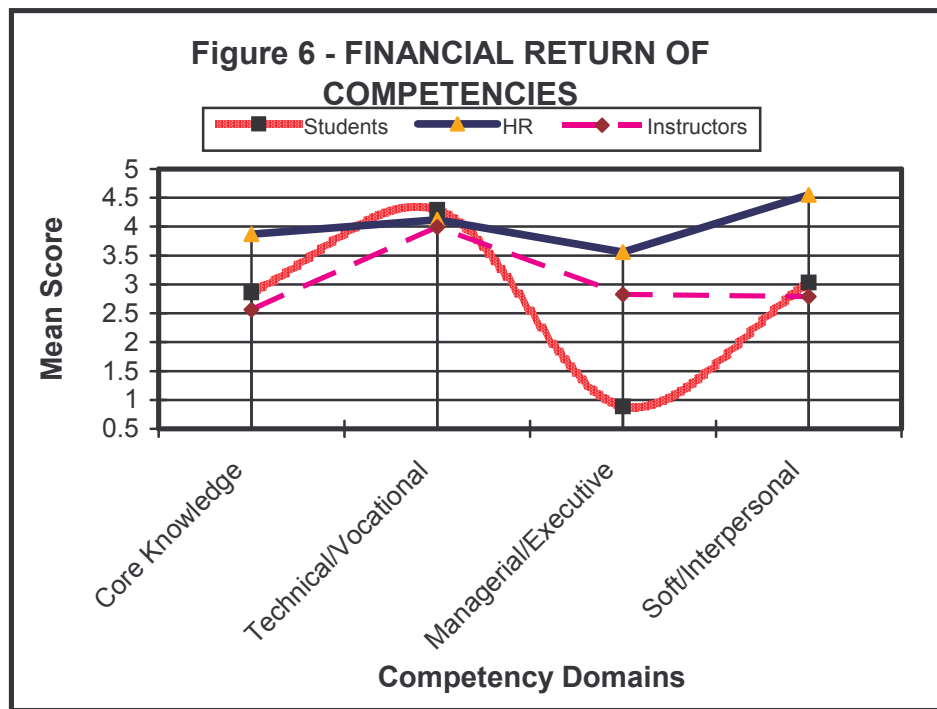
The average scores obtained by the 3 respondent categories for this evaluative dimension are shown in Figure 5. All three respondent categories scored above the mid-point on the 'Future' of all skills in the manufacturing sector. On this dimension HR executives as well as students share scores on the higher end of the scale compared to the instructors on this competency domain.



The Kruskal-Wallis results showed a significant difference on the 'Future' perception across the 3 respondent categories ( $\chi^2=18.8$  to  $63.0$ ,  $p<.001$ ). On this dimension the group rank means and the direction of the significance reflected a strong high scoring of the HR executives when compared to the other respondent categories on their perception for the 'Managerial/Executive' and 'Soft/Interpersonal' competence domains. However, students obtained a significant higher scoring than their counterparts on 'Core Knowledge' and 'Technical/Vocational' competence domains. Instructors on the other hand match HR executives on their perception of the 'Future' for 'Core Knowledge' and 'Technical/Vocational' skills and higher than students for 'Managerial/Executive' competencies (all  $ps<.05$ ).

**'Financial Return' of Competencies:**

Finally, the average scores obtained by the 3 respondent categories for this evaluative dimension are shown in Figure 6. All three respondent categories scored indiscriminately on the 'Financial Return' of all four competency domains in the manufacturing sector. However, HR executives on three skill domains scored towards the higher end of the scale compared to students and instructors.



The Kruskal-Wallis results showed significant difference on the 'Financial Return' dimension across the three respondent categories ( $\chi^2=18.5$  to  $70.2$ ,  $p<.001$ ). On this dimension the group rank means and the direction of the significance reflect a strong high scoring of the HR executives on their perception for three competency domains: 'Core Knowledge', 'Managerial/Executive' and 'Soft/Interpersonal' competencies. On viewing further the direction of the significance of the group rank means, results revealed that students and instructors match their perceptions on the 'Core Knowledge', 'Managerial/Executive' and 'Soft/Interpersonal' competencies.

## Discussion

The results from this study indicate that there is generally a discrepancy between the way HR executives and students/instructors from MCAST would evaluate the four competency domains. HR executives generally scored relatively on the higher side of the scale than the other two respondent categories, although there were instances when the latter showed higher ratings than HR executives. All in all this indicates there is a difference in the perceptual realities inherent in the manufacturing sector by prominent stakeholders. According to Sultana (1997) the employing class, therefore also including people directly involved in the human resources function and directly involved in the recruitment process, had failed to invest in the development of the workforce, primarily for reasons pertaining to the maintenance of control and power and secondly to invest in high skill industries during a time of growth within the manufacturing sector. However, things have changed and the scenario is different. From the results, HR executives are portraying a different picture. The demands and challenges of the manufacturing industry have evolved.

More specifically HR executives claim that the impact and utilisation of the four competency domains is far higher than claimed by the other two respondent

categories. This may suggest that those imparting these competencies and those receiving them have a lesser idea of the significance of these competencies on the manufacturing sector, which may in turn suggest their distance from the realities in the sector. As Roger *et al.*, (1995) report, students and apprentices learn more when engaged in real life experiences, clearly indicating at the limited manufacturing experiences that any educational training can offer in isolation. This is by no means a criticism towards the local educational institutions. However, the present results clearly indicate that educational as well as technical training without direct contact in the manufacturing industry will not achieve the real objectives of equipping the new workforce with the skills and competencies that the manufacturing sector is expecting.

HR executives also feel that work oriented competencies - i.e. the managerial and soft skills - are far more difficult to learn and engage than are more job-oriented competencies. This is contrary to what the other two respondent categories claim, who instead suggested that these are far easier to learn. This response is indicative of the lack of understanding by both students and instructors of the nature of such competencies. One must understand that most instructors at MCAST are heavy technical oriented, whilst students have never undergone or experienced the learning of such skills. At the moment MCAST has no full time personnel to satisfy the learning of these competencies, which as the interviews show, are in increasing demand if the manufacturing sector is to remain competitive in the future. A plausible explanation may be that students and instructors at MCAST consider managerial and soft skill competencies to be relatively easy to acquire than what HR executives perceive to be in the manufacturing sector. Of course, HR executives are possibly envisaging broader roles and responsibilities in the future manufacturing scenario than either students or instructors who may consider such competencies as only meaningful for one's specific task. This issue is clearly reflected in the six main reasons outlined by Howard (1995) as to why employees need to continue and further their knowledge and competencies in the face of an ever-changing and complex new work environment. Organizational responsibilities including executive development, management training, and supervisory training are key competencies within the present demands for a high performance work system. These are some of the preconditions existent within new work dynamics involving more human contact at work, more face-to-face interactions, more teamwork-organised activities and therefore more autonomy in exercising personal judgement and competence.

On the other hand, HR executives consider the time needed to learn managerial and soft skills as involving less time than expected by the other two respondent categories. This is a little contradictory given the previous finding. However, one must remember that HR personnel often engage into these competencies far more frequently than is normally expected, because of the nature of their job. Hence, they would have an innate predisposition to rate these competencies as faster to learn than the other competencies. On the other hand, because students and instructors at MCAST are fully immersed in learning and teaching respectively, core and technical competencies, they would consider the softer competencies as more time consuming to acquire. Arnold (1997) has in fact indicated that the gap that exists in the continuous rising standards and the corresponding fast increasing requirements in the labour markets have not assisted in the imparting of such competencies to the wave of advanced developing standards within the manufacturing sector.

Students consider these competencies as having an impact on the future success of the sector, an impression that is also shared with the HR executives. However, for students it is more the core knowledge and the technical competencies than the other competency domains, although they do score higher than their instructors on the future pertinence of soft skills. This is possibly a result of their apprenticeship encounters in organisations where they may generally have to sit down for interviews, work with other people and learn to communicate to be effective. However, it is HR executives who see an overall pertinence in all the domains, especially in managerial and soft skills. Instructors on this occasion acknowledged the pertinence of such non-technical competencies being viewed as increasing in pertinence and relevance of such skills in the manufacturing sector.

With reference to the financial return, HR executives see the return on all four competencies, especially on the last two - managerial and soft skills. On the other hand, students see no financial return by possessing managerial capabilities. While this may reflect the short-term career aspirations of students, namely getting a job and giving the company their skill services, it also shows the lack of long-term self-preparation of these students. As the review indicates, Miles and Snow (1996) highlight the new prescriptions of the next business profile demands on the workforce generation to come. The expectations for the new workforce in this new manufacturing reality request employees to be able to do anything, anytime, anywhere. The flexibility and the related competencies that such work dynamics involve call upon the broader profile of competencies needed for the future. All this is incorporated within a philosophy where the next generation of employees in this sector are expected to get better by competing and collaborating simultaneously together. The challenges of self-management by means of continuous knowledge creation and empowerment will reflect the better possibilities of a richer and more competent workforce, providing the local manufacturing organizations a competitive advantage over competition (Prahalad & Hamel, 1990).

All in all, the findings in this study indicate that this is a challenging period for MCAST and Maltese manufacturers alike. Today we are experiencing a dramatic shift in workforce demographics. The secure, unskilled industrial jobs of the past do not exist anymore. The vast majority of jobs within the manufacturing industry require a tailored psycho-socio-technical education and fluctuating sales and changing customer demands are putting pressures on these companies to become more flexible than ever. To compound the problems, all of the Human Resources interviewees believe that their future employees - that is - their sponsored students - are not well prepared to lead them into these directions. At the same time, they have had to trim their training and education budgets whilst needing students (employees) to know about interpersonal communication, management and a host of other psychosocial skills.

In this scenario MCAST has a vital role to fulfil. It has to put and place vocational education at par with University degrees; share a vision to develop a highly skilled world-class workforce that is able to work with innovations, improved productivity, and quality as well as serve as a link between Industry, students and the Employment and Training Corporation. What makes the MCAST outstanding is the convergence of teaching and practice, which helps to educate hundreds of students who will

provide the skills needed by the economic system in Malta. This is a College that is investing in skills that will benefit organisational performance directly and indirectly.

This research has shown that employers look for skills that do make a contribution to their businesses in terms of productivity and performance. In the Manufacturing sector, employers look for trained and skilled students who are able to adapt faster and more efficiently to change and are better at implementing new work practices that come around as business progresses and new products are introduced into the market. Human Resource executives want student-employees who can help firms update their practices and products at the rate demanded by rapidly changing markets and technical advances. Two important sought characteristics are flexibility and productivity. It is then their firm opinion that students need to understand what they are doing and why and how they can contribute to the organisations' objectives. In relation to this is the notion that learning is built on a wide range of skills, knowledge and understanding from the most basic skills of literacy and numeracy right up to life long education. A life long educational process is deemed to be a determinant to business success, which is translated into having people who can re-learn skills, as well as transfer skills from one occupation to another. More specifically these skills include communication, problem solving, team working, ability to work with computers as well as the skill to improve own learning and performance, reasoning skills, work process management skills, and personal values and attitudes such as motivation, discipline, judgement, leadership and initiative. It is important to note that some of these characteristics can be viewed as personal values, attitudes, moral and personality traits. Even though problems of definition and imprecision are again openly acknowledged, the list of skills is further supplemented by such 'generic skills' as scheduling work and diagnosing work problems, visualising output, working backwards for planning purposes, and sequencing operations.

The future enterprise will demand different general powers of the mind and will rely more on problem solving, report writing, fault finding, working with others and communication - all of which mean very little until they are placed in particular contexts and supported by networks of domain-specific knowledge, understanding and conventions. It is also important to note that it is simply fallacious reasoning to suggest that solving problems in, say, a classroom is anything like solving problems in electrical engineering, and communication or working with others in class bears little relation to engaging in those activities in the workshop.

### *Recommendations*

On the basis of the results obtained, the following recommendations can be put forward:

- The need to bridge the gap between the 2 worlds: This study indicates evident perceptual gaps. It may be recommendable to develop reciprocal exchange visits of instructors and HR personnel in order that the two groups may get a taste of each others' realities. In addition one may include students on supervised managerial assignments in the form of coaching during their apprenticeships. This will need to be part of a long-term career development plan which is understood by the student to help him/her appreciate the relevance of competencies in the long term.



- Broadening activities: It would be beneficial if MCAST could extend its official competencies repertoire to include more work-oriented activities than just dedicating to narrow job-oriented curricula.
- Creating national platforms for linking education and industry: It is high time to develop or establish a forum, which will bring together the various stakeholders to decide on a common national strategy forward, and to reduce the absence of awareness shared by either party about each other.
- Planning holistic apprenticeships: It may be effective to re-design the present apprenticeship schemes to include activities that will introduce and develop students about the business side of manufacturing. The demand for managerial and soft competencies amongst technical staff should be given a higher credit in the formation process of tomorrow's technical workforce and organizational set ups.

### *Limitations*

This study will not be conclusive without acknowledging its limitations. First, a replication of the study may be warranted to generalize further the findings. Secondly, it may be effective to repeat the study on different occasions. This will enable to develop an adequate understanding of the trends, especially in light of the implementation of certain recommendations. Thirdly, larger samples, especially HR representatives may shift a little the readings obtained. However, this is not really expected as the interviews justified the results obtained. One may also include in future studies technical supervisors and operations managers and not only HR officials, given that the former may have a better understanding of the state of competencies in the manufacturing sector. Finally, a major limitation of this study is the lack of local reviews on the subject, which may make comparisons a little difficult. This study hopes to contribute in remedying this limitation.

### **Conclusion**

MCAST and the manufacturing sector seriously need to work together in the context of developing national competitiveness in the sector and to develop a clear consensus concerning those competencies that will help us to achieve the sector's strategic objectives. Symbiotic awareness and progress will undoubtedly come although it is a prosaic process filled with grinding labour and repetitive small steps.

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