



THE SKILLS NEEDS OF MANUFACTURING IN THE NORTH EAST 2017

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1. A JOINT INITIATIVE



This Audit is a joint collaboration between the North East Regional Skills Forum (NESRF) and FastTrack in Information Technology (FIT) Ltd.

The NESRF is one of nine fora set up across the country in 2015 in response to the most recent national strategies for economic development, jobs and skills. The Regional Action Plans for Jobs, Enterprise 2025 and National Skills Strategy 2025 all underline the pivotal role of peoples' skills to regional dynamism, the level of employment, good living standards and social inclusion.

The core mission of the NESRF is to facilitate an ongoing collaboration between employers and education & training providers in counties Louth, Monaghan and Cavan. The region's three local authorities, the state's development agencies and the Department of Social Protection are represented on the NESRF along with employers and education & training providers. The principal objectives of the NESRF are to develop a shared understanding among its members of the region's labour market and enterprise profile, the education and training services that are available, and how skills supply and demand in the region can be better aligned.

FIT Ltd. is a not-for-profit, industry-led body. Its core mission is to promote an inclusive Smart Economy by creating routes to marketable technical skills for people at a disadvantage in Ireland's labour market, including young people without a higher education. It has pioneered its own methods for working with employers to understand their skills requirements. Working in collaboration with SOLAS, QQI, other awarding bodies, it designs programmes that enable people to acquire the in-demand skills identified, assists local education and training providers to deliver them and supports those who complete the programmes secure employment.

Recent examples of programmes FIT has been instrumental in developing and is currently helping ETBs to deliver are two Associate Professional programmes in IT (in the process of becoming full apprenticeships) and a Manufacturing Technician Maintenance Programme supported by Intel.



2. A PILOT AUDIT

The NERSF is in the early stages of building a shared understanding among its members of the labour market and profile of enterprise in the North East. It is aware of the importance of skills studies carried out at the national level by the Expert Group on Future Skills Needs (EGFSN) on manufacturing sectors that have a large presence in the North East (e.g., on Food & Beverages, in 2009). It approached FIT Ltd. to ‘test-run’ with it the conduct of a genuinely regional and local inquiry into employers’ skills needs within the manufacturing sector.

FIT has a specific approach and instruments for conducting ‘Skills Audits’ that it has used to diagnose skills shortages and skills deficits in the IT and other sectors. Its audits probe employers’ skills needs in sufficient practical detail that training solutions can be designed and implemented within an acceptable time frame. Its expertise is recognised by leading employers in the IT sector and cited in Ireland’s National Skills Strategy 2025. In this collaboration with the NERSF, it is testing and adapting approaches that have been fruitful at the national level to the specific challenges of better aligning skills demand and skills supply at a regional level.

This pilot audit focuses exclusively on manufacturing being carried out on sites in the North East. The objectives are to capture what may be specific about the scale and nature of these locally based plants, their current and emerging skills needs, and the challenges and opportunities that education and training providers face if they are to become more pro-active in supporting the current and future competitiveness of manufacturing in the region and, thus, its sustainability and expansion.



This pilot audit focuses exclusively on manufacturing being carried out on sites in the North East.



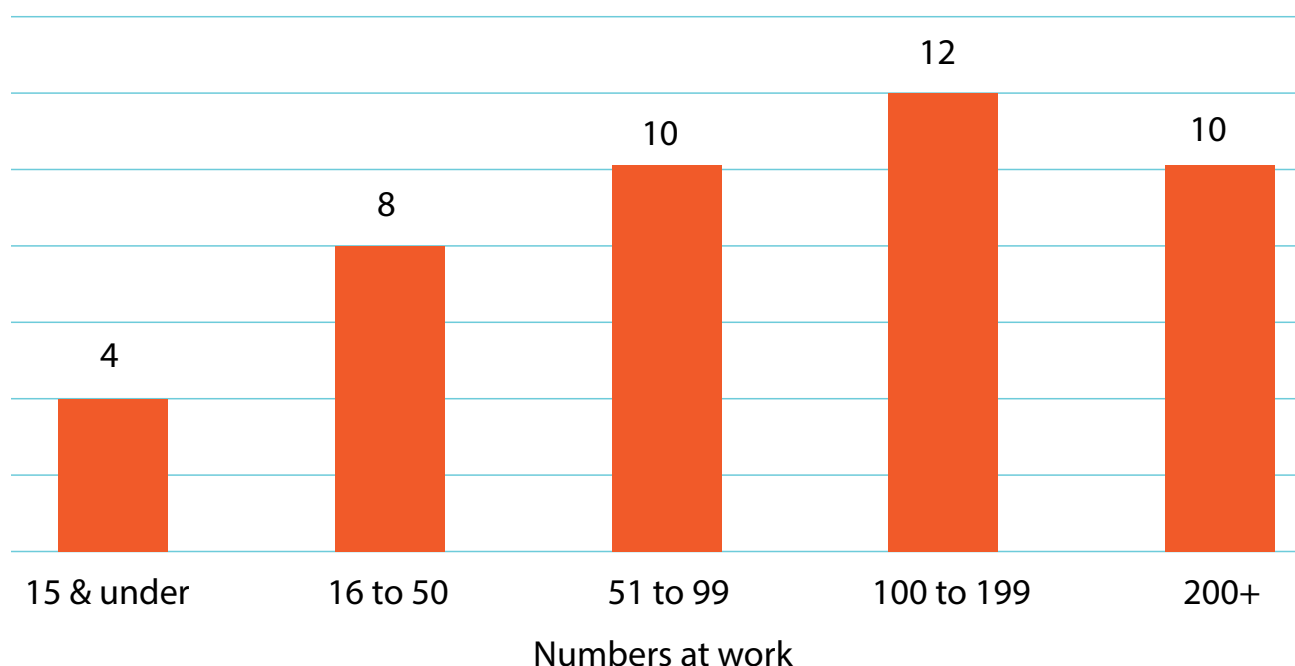


3. THE COMPANIES INTERVIEWED

The principal manufacturing locations were identified county by county - 52 companies were approached, three declined and 49 were interviewed. Five were subsequently found to carry out little actual manufacturing at their North East locations and were excluded from the analysis.

Altogether, 5,686 people are employed across the 44 manufacturing locations that have been studied, with the median being 94. The single largest location had 460 at work and the smallest 10; 12 (28%) of the companies had 50 or less people at work while 22 (50%) had 100 or more. In the time available and with limited resources, it was decided to privilege large enterprises so as to cover as large a number of people at work as possible.

Companies interviewed, by numbers employed



One-half of the companies were in Louth and the remainder spread equally between Cavan and Monaghan. Interestingly, the average number at work at these manufacturing locations differed markedly by county. It was much larger in Cavan than in Louth. This may point to the greater need and preference for small, innovative manufacturing concerns to cluster and be near large

customers and R&D networks (as in Louth) whereas operations on a large scale producing tried and tested products are sustainable in more rural locations once good road access is guaranteed (as in Cavan).

Companies	Interviews	Average at work
Cavan	12	174
Monaghan	11	155
Louth	21	94

The companies are spread across a wide range of manufacturing sub-sectors, with those in Food and Beverages (11) most easily classifiable while a large number could be considered wholly or in part to be in Engineering, Metal Fabrication or Machinery and Equipment (7). The ownership structure of the companies interviewed varied hugely, from stand-alone single locations where local management had full control and responsibility for the business to wholly-owned subsidiaries of large multinationals (American, French, Thai and Irish). The degree to which the locations draw on R&D and use advanced technology also varied widely.

Respondents were provided with a grid outlining, in effect, the full inventory of skills which manufacturing activity can potentially require and asked to specify the numbers of workers they had currently supplying a given specific type of skill and the level at which they were providing it ('expert', 'competent' or 'entry').

They were further asked if they intended to increase the supply of any of these skills and, if so, how (e.g., by upskilling current workers or through additional recruitment; relying on the company's own trainers or engaging with outside trainers, etc.).

Generally, respondents (typically, they were HR Managers, General Managers or CEOs) found the questionnaire and interview process interesting, even stimulating, and gave generously of their time. Their interest in and commitment to the county where they are based was palpable (also noted by Local Authorities, during their consultations in drawing up their county economic development plans). For example, it was not unusual that they noted and discussed the types of skill that appeared on the questionnaire but were not currently required for their operations (e.g., Robotics, Big Data, etc.). The experience of carrying out the survey offers good prospects that employers will help drive county and regional skills analyses.



4. 'TOP DOWN' AND 'BOTTOM UP' VIEWS ON WHAT TO EXPECT

A background study was conducted of what can be learned about manufacturing in the North East from national level sources (CSO data, the annual Regional Labour Market Bulletins of the SLMRU) and from the County Development Plans of Louth, Monaghan and Cavan and the more recent Local Economic and Community Plans.

4.1 'TOP DOWN': INDUSTRIAL STRUCTURE

In the Border Region as a whole - and by inference in the North East that makes up one-half of it - industry accounts for roughly the same shares of regional GDP (GVA) and employment as in the State as a whole (Table 1, rows 1 and 2). It is the **composition** of industry in the Border region, however, that is markedly different from that in the State as a whole. Much more of it is classified as traditional¹ rather than modern, and as low-tech rather than medium-or high-tech (rows 3-5)².

In addition, a larger number at work in the Border Region work in very small enterprises and a much smaller number in large ones than in the State as a whole (rows 6 and 7), while less of those at work are classified as professionals or associate professionals and more as elementary workers or General Operatives (rows 8 and 9). Finally, it should be noted that the level and productivity of employment in the Border Region relative to its population (as measured by its Gross Value Added [GVA] per person) is 40% lower than in the State as a whole, partly explained by its lower participation rate (rows 10-12).

Further data (not shown) confirms that the counties of the North East are far from affluent by national standards. The latest data (2014) on disposable income per person place it below the State average in each of the three Counties – by 7 per cent in Louth, 11 per cent in Cavan and 14 per cent in Monaghan (the second lowest in the State).³

¹ Traditional manufacturing (note, focusing in on more than just 'industry') includes textiles/clothing, wood/paper, minerals/materials, transport manufacturing and furniture, whereas modern manufacturing includes chemicals, electronics and printing/publishing(including reproduction of software) and, thus, those sectors in Ireland that are dominated by multinational firms (NCC[2013] *Ireland's Productivity Performance, 1980-2011*).

² 'Low-tech' manufacturing refers to food and beverages, tobacco, textiles, wood, paper, furniture and printing. 'High-tech' refers to pharmaceuticals and computer, electronic and optical products. (SOLAS, EGFSN, 2016).

³ CSO (2016), County Incomes and Regional GDP.

Table 1: The Economic Structure of the Border Region – Selected Features

No		Border	State
1	Share of Manufacturing, Building & Construction in GVA (2011)	27.9%	28%
2	Share of Total Employment in Industry	13%	12.6%
3	Share of Traditional Industry in Gross Industrial Output (2012)	79%	42%
4	Share of Modern Industry in Gross Industrial Output (2012)	21%	58%
5	Manufacturing employment by technological intensity (Q4 2015)		
	% low-tech	52%	38%
	% medium-low	22%	16%
	% medium-high	13%	18%
	% high-tech	13%	18%
6	Share of total employment in micro-enterprises (<10 persons)	39%	28%
7	Share of total employment in large enterprises (250+ persons)	11%	31%
8	Professionals + Associate Professionals (% total employment)	23.7%	30.4%
9	Elementary Workers + General Operatives (% total employment)	20.9%	18.4%
10	GVA per person (€) 2013	21,445	35,464
11	GVA per person (State=100)	60.5	100
12	Participation rate (15 years and over)	56.5%	60.0%

Sources: Regional Labour Markets Bulletin 2016, SOLAS/EGFSN (2016); CSO (2016).

It is easy to conclude, based on figures like these, that we should expect to find much of the manufacturing in the North East being undertaken by high volume, low margin businesses employing large numbers of low skilled workers. The Audit, as we will see, finds evidence of some plants like that, but, overall finds more sophisticated activities underway in the North East.

4.2 'BOTTOM UP': COUNTY-LEVEL ECONOMIC DEVELOPMENT PLANS

Each Local Authority has embraced, and is enthusiastic about, the heightened responsibility it has been accorded under the Local Government Act 2014 for specifically **economic** development at the county and regional levels. The ground was well prepared in their County Development Plans (CDP) by their embrace of the need for **sustainable** development with its requirements to foster a hierarchy of population settlements, protection of the natural environment and promote green industrial processes and products.

In 2016, each published a Local Economic and Community Plan (LECP) which benefited from informed contributions from local business leaders, among others, to strengthen and update what is required and feasible at county level to support enterprise and economic development.

The three counties, as well as sharing common features, have circumstances and potential for economic development that differ in significant ways from each other. The CDPs and LECPs identify counties' specific economic assets, as local business leaders are experiencing them, and commit to reinforcing them to support the expansion and attraction of high quality enterprise.

Each LECP is aware that, if advanced manufacturing operations are to locate in the NE, they must be able to carry out core business functions – principally, identify and adopt technological improvements, source high quality sub-suppliers, enjoy good transport links and advanced freight and logistics services to reach international markets, and be able to recruit and retain the skilled workers they need. Each county, in its LECP, has been able to draw on at least some instances where this is happening.

Each is also strongly aware that, to date, it has attracted a relatively small share of the inward investment that has been pivotal in transforming the national economy, and is notably determined to attract more inward investment to locate high-value manufacturing and service operations within its boundaries. For example:

Prioritising higher skilled jobs creation in the county is essential to stem the flow of young educated people out of the county and also to insulate the local economy to shocks in commodity prices and competition from Eastern Europe and Asia for manufacturing.

In several respects, the LECP is each county's integrated and long-term strategy to address the full range of these factors so as to generate a net 'brain gain' rather than 'brain drain'. They set out to ensure that people and enterprises that have alternatives will, nevertheless, choose their county because of the net balance of what is on offer.

The LECs are aware that relatively low county incomes bring both challenges and opportunities. On the one hand, low county incomes are mainly bad news for businesses serving local markets, and such enterprises employ the majority of each county's workforce. They make it harder to provide the high quality locally traded services (from childcare, schools and health services to retail, restaurants, bars, hairdressing and leisure activities) that make counties 'places where people want to spend time and money' and to exploit what *Enterprise 2025* describes as the interdependence between enterprise development and 'place making'.

On the other hand, a relatively low local cost of living (especially for housing) can aid the competitiveness of enterprises. An overall quality of life and access to amenities (especially the countryside) that households on high incomes find difficult to enjoy in large urban areas can be leveraged to attract and retain high-skilled workers, and the companies that employ them.

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5. FINDINGS & ANALYSIS



5.1 HEADLINES

There is a lack of awareness in the North East and in Ireland as a whole of how manufacturing has evolved as a sector – in terms of its complexity and sophistication. There appears to be a general negative perception in terms of manufacturing which permeates into the policy and support system. The ‘newer’ activities in internationally traded services sectors have grabbed the attention of policy makers and educationalists, to the detriment of what is somewhat pejoratively termed ‘traditional’⁴ manufacturing.

- There *are* opportunities for manufacturing in the North East which can be realised. As a priority it is important to redress public and political perception about the potential of its current plants and about the changing nature of manufacturing, its potential to offer job and career opportunities across a range of skills levels and across all counties.
- Of the Manufacturing companies audited in the North East, an estimated 600-700 manufacturing jobs will need to be filled over the next 12-18 months.
- Company expansions are being driven by indigenous companies supplying niche products into international markets.
- The number of training interventions sought on behalf of those in work is very much greater than for training new people to enter the sector.
- General operatives are the single biggest group in employment, and they apply their skills at expert and competent levels as well as at entry level.
- Routine-intensive tasks are important at many locations and are associated with lower skill levels. But skilled workers also carry out routine tasks, while some companies actively seek to advance their general operatives to higher positions.

⁴This issue is well presented in Making It in Ireland: Manufacturing 2020 and found to apply with force by this Audit.

- There is a strong demand for a group of jobs types with synergistic skill requirements or what could be called ‘cross disciplinary manufacturing skills’, particularly within SMEs- e.g., for the same workers to have mechanical and electrical skills, workshop *and* quality assurance skills, manufacturing and control skills, etc.
- Some skill areas are notably not in-demand, either now or anticipated, in particular robotic and big data skills. Direct demand for advanced ICT skills (networking/PC maintenance, programming, big data etc.) is also low – as these requirements are largely outsourced or provided through head office locations.
- Companies are hugely varied in their need for, and interest in, engaging with external education and training providers. It is affected in particular, by ambition for their workforces, their access to in-house or intra-company resources for training, and the importance of innovation to their plants’ viability and the extent of their knowledge of current education and training provision within the region.
- The networked nature of manufacturing today – the interconnectedness of roles within plants (quality assurance, logistics, machine maintenance and calibration, manual activities) and the manifold links plants in the NE must maintain with outside bodies (suppliers, buyers, transport companies, regulators, parent companies, etc.) – mean there is a high level of need and interest in improving team-working, communications and other soft skills.
- There is also evidence some manufacturing in the NE is being ‘servitised’, i.e., bundling the provision of more services along with the supply of core products and blurring the boundary between manufacturing and service.
- There is a huge variation in companies’ awareness of and the extent of their recourse to the supports and services offered by the development agencies, by education and training providers and through Intreo.

5.2 THE SKILLS MOST IN USE

Companies were asked to state how many workers they have supplying skills in each of the 18 specific disciplines or domains. Their responses are summarised in Figure 1. The majority of the workers currently employed in manufacturing in the North East supply general operative skills - 46% of all workers in the companies interviewed. The most frequent tasks or responsibilities required of them include low level machine maintenance, manual handling, production line operation, and following specifications closely. The next largest skill set of quantitative importance are manufacturing process skills - 15% of workers, and their most frequent responsibilities include continuous improvement, lean/Six Sigma and maintenance planning.

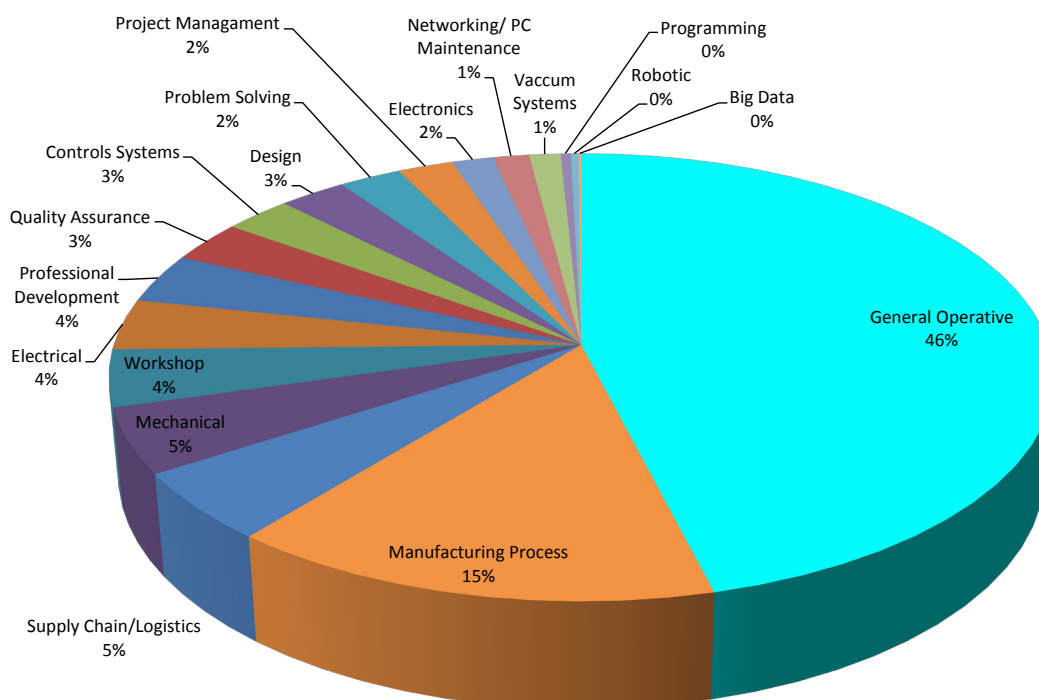


Figure 1. Skills most in use

Eight other disciplines or domains of skills follow that are each of a broadly similar quantitative importance to the companies interviewed – each is supplied by between 3% and 5% of all workers. The disciplines are supply chain/ logistics, mechanical, workshop, electrical, professional development, quality assurance, controls systems, and design. As Figure 1 shows, cumulatively 31% of all workers employed in the companies interviewed are supplying skills in one or other of these domains.

At a first glance, this profile of the skills currently being used in manufacturing activities in the North East appears to be in line with what characterises the classification of industry in the Border Region on the basis of CSO and SLMRU data, namely, that it has relatively large components that are ‘traditional’ and ‘low tech’.



The majority of the workers currently employed in manufacturing in the North East supply general operative skills - 46% of all workers in the companies interviewed.



In several respects, however, the findings do not support the designation ‘low tech’ or the assumption that ‘traditional’ involves largely low skilled work. At many of the plants interviewed that would be classified in this way, production is being carried out using expensive machinery, the operation, adjustment and maintenance of which is critical to the plants’ functioning, in work environments where quality, safety, lean manufacturing, green credentials, responsiveness to customers and suppliers, and compliance with regulations are part of the culture and carefully monitored.

There is also a significant degree of multi-skilling being undertaken with up to 20% of all workers being called on to supply skills in more than one discipline or domain.

It is important to note, as the OECD points out, that, while being related, job tasks and workers skill levels are not synonymous. Routine-intensive jobs tend to be associated with lower skill levels, but in several of the companies interviewed skilled workers carry out ‘their share’ of routine intensive tasks. The conclusion of the OECD research appears valid for the companies interviewed: ‘the correlation between skill content and routine intensity is indeed negative, i.e. that more routine-intensive occupations tend to require lower level skills, but this correlation is not necessarily very strong’.⁵

The disciplines or domains of skills that do not figure prominently are not required of workers employed in the plants for very different reasons. They may simply not be relevant to what is being made there – big data and robotics feature little for this reason. Or the skills in question may be important but are outsourced or supplied by a parent company and, though important to the plant’s operations, not be needed of anyone on the plant’s payroll. Networking/ PC maintenance skills are frequently outsourced or supplied by a parent company.

A nomenclature that can be particularly misleading is the term ‘general operative’. In some large plants but particularly in smaller ones, it is not uncommon that workers supplying general operative, workshop or manufacturing skills are considered ‘expert’. This reflects the critical importance to the plants in question that specialised machinery should operate reliably and continuously in transforming expensive inputs into finished products. Workers who begin by carrying out primarily routine manual tasks may be given opportunities to develop new skills that differ hugely depending on the product lines, business model *and* corporate culture of the companies employing them. Some companies are committed to identifying and supporting those of their general operatives who have the motivation and ability to upskill and advance to more senior roles. They typically have a low labour turnover.

The extent to which some employees supply **only** general operative skills varies widely depending on how companies choose to organise internally and ask staff to rigorously specialise or to undertake a mix of tasks. It is significantly related to plant size.

⁵ Marcolin, L., et al (2016), “Routine jobs, employment and technological innovation in global value chains”, OECD Science, Technology and Industry Working Papers, No. 2016/01

General operatives tend to account for a larger proportion of the overall workforce and to engage primarily or only in general operative tasks when plants are large. Plants are large precisely because they are undertaking a lot of ‘hands on’ production at their North East locations. At the extreme, large proportions of frontline production workers are Accession State nationals. Significant issues can arise with the status and attractiveness of these jobs, and with individuals’ aptitudes for them. Some companies voice significant concerns with the work ethic and willingness to engage in manual work of local jobseekers. In some instances, turnover is high.

Overall, the level at which skills, across all disciplines, are most exercised and required is the competent level (48%) with expert accounting for 30% and entry level for only 22% (Figure 2). In short, skills genuinely are the ‘currency’ (*National Skills Strategy 2025*) that buys entry to manufacturing employment in the North East rather than, for example, levels of educational attainment or qualifications. Some companies consider even MSc graduates to be supplying skills at ‘entry level’ because they lack experience and practical, specialist knowledge, while – as already noted – general operative skills can be considered ‘expert’.

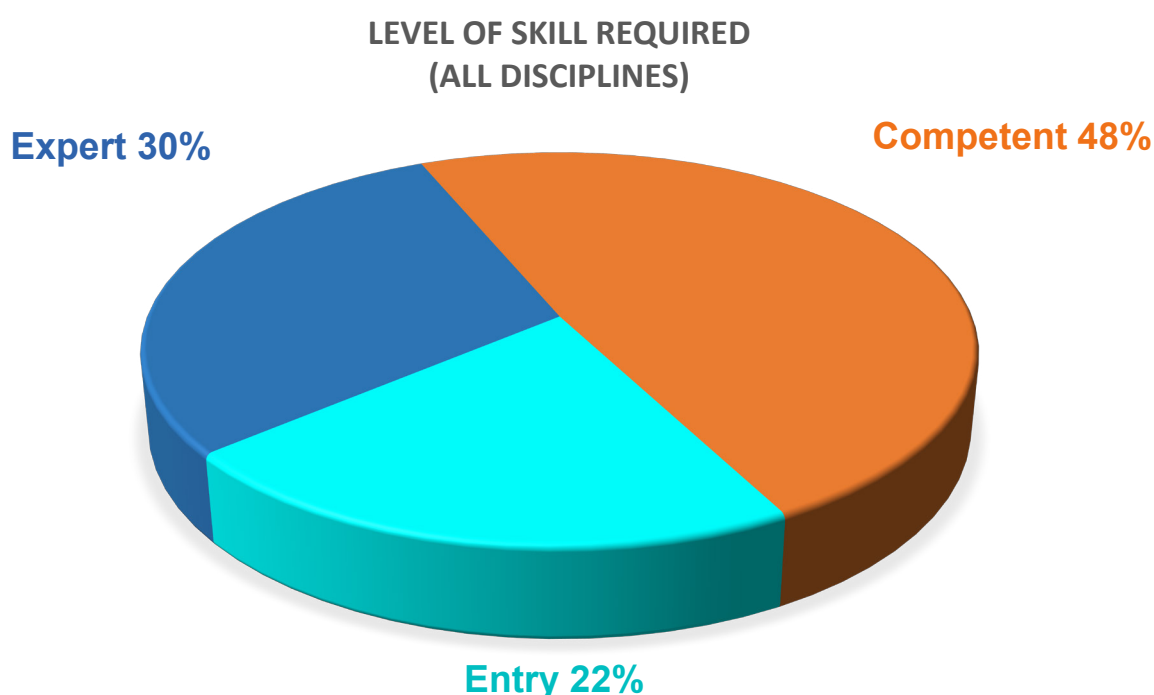


Figure 2. Levels at which skills are being exercised and required



There is also a significant degree of multi-skilling being undertaken with up to 20% of all workers being called on to supply skills in more than one discipline or domain.



BEING ON THE FACTORY FLOOR OR IN A WORKSHOP IS NOT A DEAD-END

Company A (producing pharmaceutical products) is focused on promoting and empowering people in the company. This includes upskilling general operatives to become senior line operators or to make a career move and become maintenance technicians. This means knowing the basics of engineering, being able to identify and fix issues that do not require calling an engineer over, understanding the processes, being confident in setting machines, being able to reset the machines without contaminating the products, to take the line down if necessary and reject products that don't meet standards.

Company B (making plastic packaging) seeks to encourage every employee to progress and not stay at entry level in anything. An internal apprenticeship programme recruits 6 plus top performers from among its general operatives each year to become machine maintenance technicians. The training takes 6-10 months and is carried out externally. Every worker has a professional development plan.

Figure 3. Examples of In-Company Skills Development

5.3 VACANCIES IN THE NEXT 12-18 MONTHS

On the basis of the companies interviewed, it can reasonably be estimated that some 600-700 jobs need to be filled in the manufacturing sector of the North East as a whole over the next 12-18 months, with the bulk of expansion demand being driven by a small number of indigenous firms that are supplying niche products to international markets. As Figure 3 shows, 39% of these job opportunities are for general operatives but 49% are spread across disciplines or domains of skills more typically associated with technical training (mechanical, workshop [largely welding], electrical, manufacturing process, quality assurance, logistics and electronics).



...over the next 12-18 months 39% of job opportunities are for general operatives.



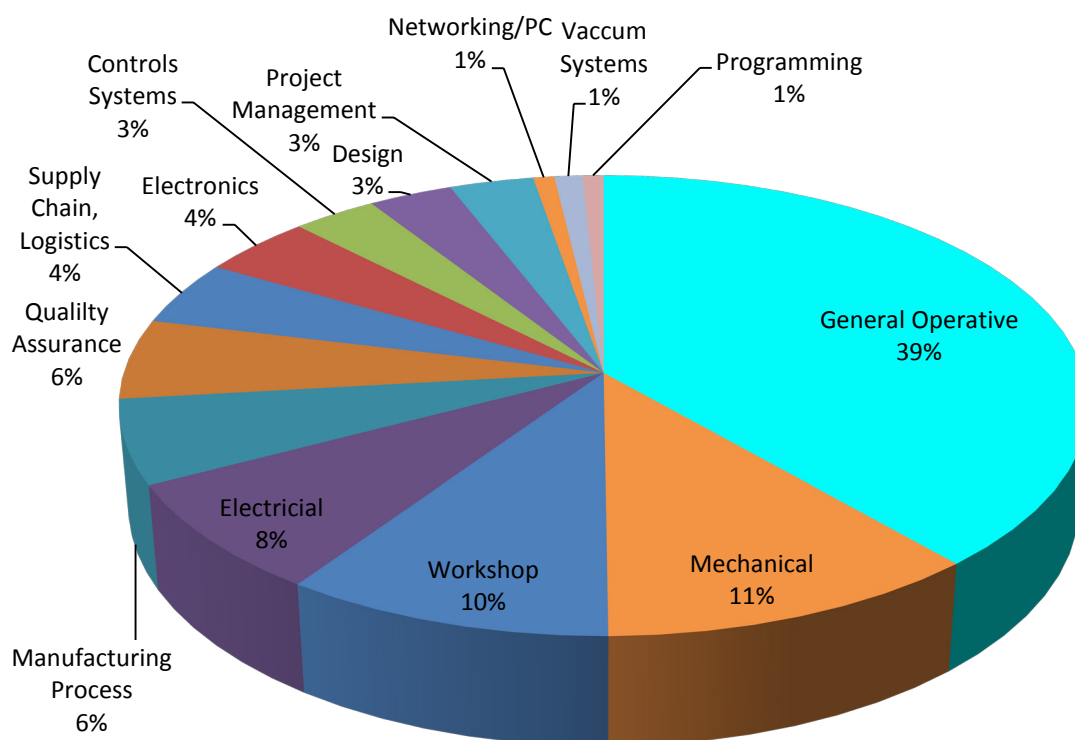


Figure 4. Possible vacancies in next 12 months by skills most required

5.4 THE DEMAND FOR MORE SKILLS/UPSKILLING

A major issue is the need to **upskill current staff**. Companies have very different resources and practices for doing this. Some are large enough to have their own in-house training programmes or are able to draw on academies and programmes operated elsewhere by their parent company. Others acknowledge their need to collaborate with external education and training providers and do so in varying degrees. Their need to release staff for training without affecting current production points to a potentially large premium on training that is available locally, either wholly on-the-job or off-site but at times suited to the responsibilities individuals have for maintaining the continuity of production.

In some companies, upskilling is important chiefly to the individuals themselves. It can help them advance to better paying positions within the plant or elsewhere with the plant's parent company. It may also take the form of a purely individual choice in a bid to move away from and improve on their existing job with, at best, the current employer accommodating this ambition.

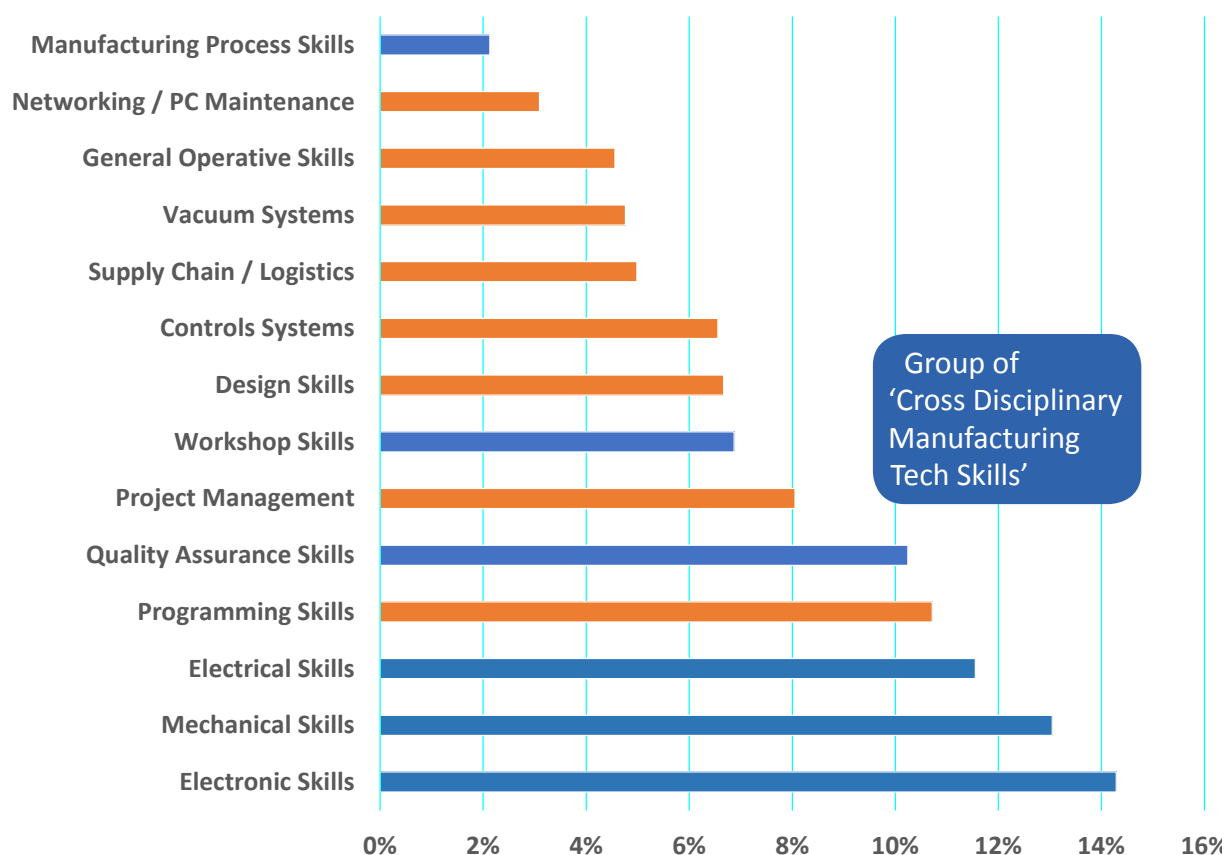


Figure 5. Skills needed by % growth in next 12 months

In other companies, workforce upskilling is important to safeguarding the future of their operations in the North East. The adoption of new machines and new processes is critical to remaining competitive in their current locations, in comparison with off-shoring and outsourcing alternatives. The adoption of new machines and processes will entail at least some degree of reskilling and the embrace of new work tasks, processes and procedures.

The larger employers in particular have hugely different levels of interest in engaging with local Further Education and Training (FET) providers to promote the upskilling of workers engaged in primarily manual tasks. Some do not envisage any upskilling because the current job description is not expected to change, some are happy to rely on in-house training or what is available through their parent company, while some would welcome co-operation with local FET providers in designing and implementing be-spoke training programmes.

The areas where demand for upskilling were most required are as follows.

Table 2. Areas where upskilling is required

Skill Area	Demand Indicator	Potential Programme
Management, Leadership & QA <ul style="list-style-type: none"> • Project Management • Leadership • Communications/Presentation • Team Work • Customer Focus • Problem Solving • Lean & Six Sigma • Continuous Improvement • Kaizen Facilitation • Maintenance Planning / Prediction • Critical / Analytical Thinking 	High demand (50% +) across a representative range of companies / manufacturing sectors	Could be offered as a course at two levels: A. Introduction to Advanced Manufacturing B. Excellence in Advanced Manufacturing
Technical Skills <ul style="list-style-type: none"> • Electrical Skills • Electronic Skills • Control Systems • Workshop Skills 	Medium level of demand (30% +) across a range of companies.	Could be offered at two levels: A. Introduction to Cross Disciplinary Manufacturing Skills B. Advanced Cross Disciplinary Manufacturing Skills
Robotics	Low to medium demand	Run a course only if a minimum number of participants seek places.
Hydraulics	Low to medium demand	
Vacuum Systems	Low to medium demand	
Supply Chain / Logistics	Low to medium demand	
Line Management	Low to medium demand	
Health & Safety / Manual Handling	Low to medium demand	

The need for improved **soft skills** was acknowledged in large and small companies, indigenous and multinational, for every skill area and at every level. It is inherent to manufacturing that it entails less direct contact with customers than services but its jobs, nevertheless, involve high levels of interaction with people performing different functions within the same plant and across the supply chain of which the plant is part. A high level of ‘we could do better’ was voiced by respondents.

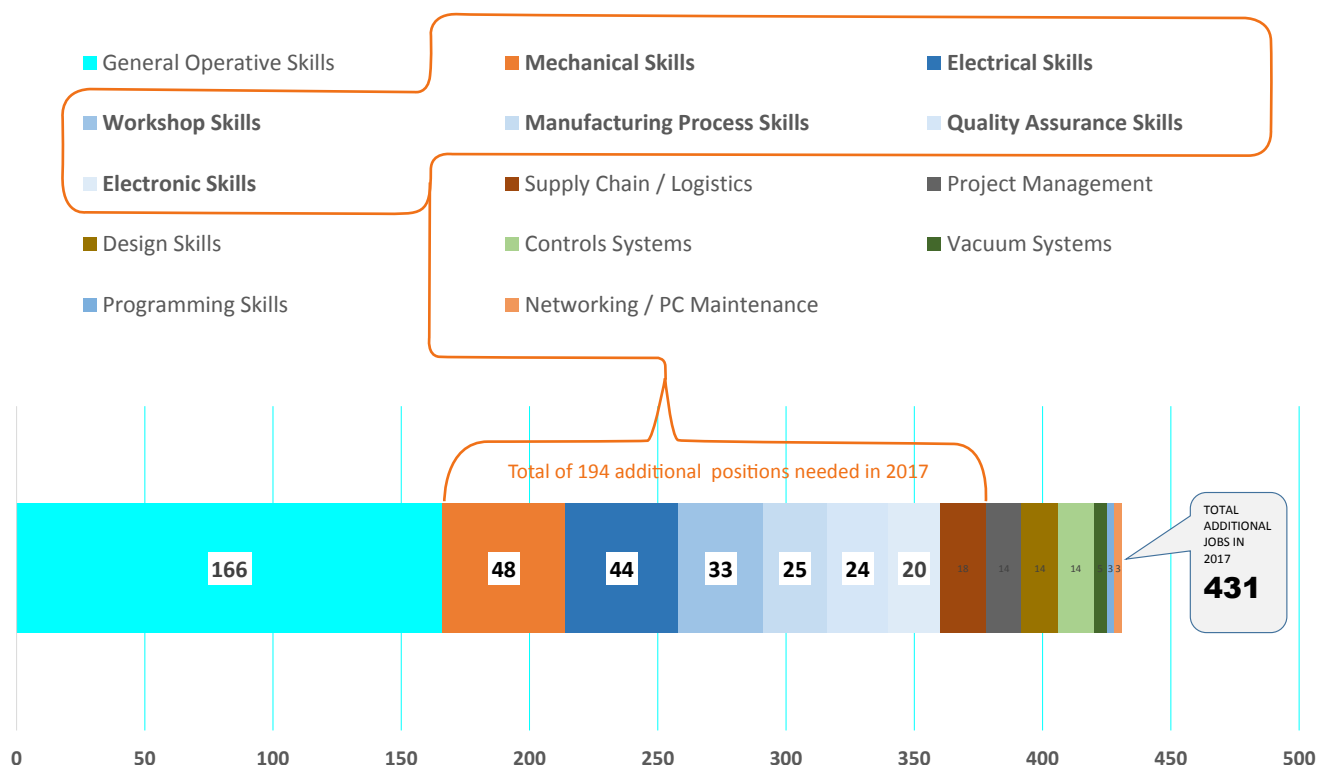


Figure 6. Estimate of additional skills needed by number in the next 12 months



The need for improved soft skills was acknowledged in large and small companies, indigenous and multinational, for every skill area and at every level.



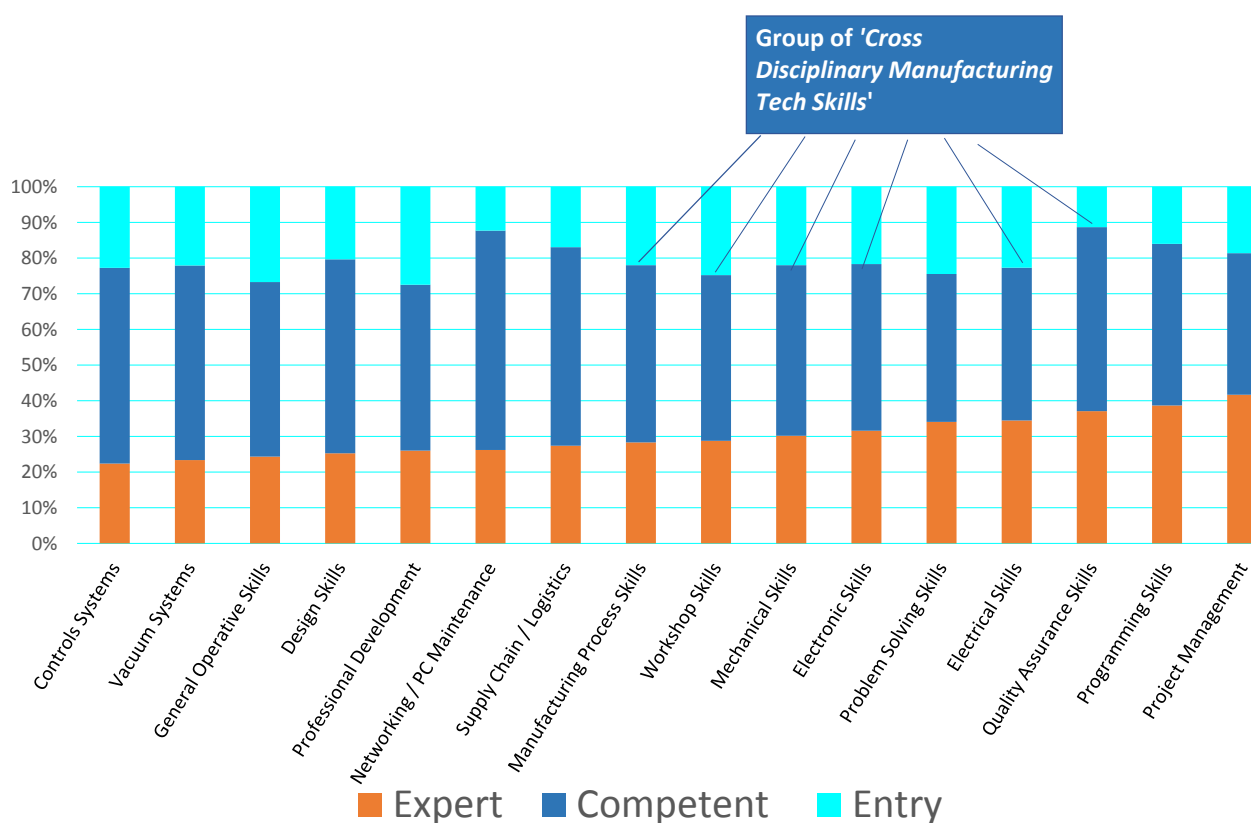


Figure 7. Level of skill required by discipline

The survey responses were also analysed to determine the specific skills most in demand for each discipline. This information is presented in radar charts which present the data in a form easy to assimilate and which gives readers an overview of the intensity of demand reported for each specific skill with a discipline. In each radar diagram:

- The outermost ring representing the highest demand for a specific skill
- All rings represent significant demand even the inner ones
- Different coloured symbols illustrate demand for entry, competent and expert levels
- A table gives the same information in the form of a ranked list with the number 1 position occupied by the most in-demand skill

Readers of this report are invited to explore the top ranked skills / high demand roles as set out in the radar diagrams and tables which follow for any of the disciplines which are of particular interest to them or indeed all of the disciplines if a comprehensive understanding is required. For those who only need an overall understanding of skills needs the following general findings should prove useful:



GENERAL TRENDS IN RELATION TO MANUFACTURING SKILLS' DEMAND

In the Electrical Skills category Electrical Test and Measurement is the most in demand skill set. The profile required is for a blend of seven skills including the above. This profile could be described as an 'all-rounder' able to support implementation, maintenance and troubleshooting in all of the seven sub-areas.

In the Electronic Skills discipline Fundamental Electronic Knowledge stands out as the key skills requirement. Analog/Digital & Digital/Analog Conversion and Instrumentation skills follow closely.

Hydraulics is the most sought after skill in the Mechanical Skills discipline followed by Material Testing. Transversal skills such as Problem Solving and Project Management are also regarded as important in this sphere.

The stand-out skill set required in the Workshop Skills category is Welding and this is followed by Soldering. Project Management is also valued highly and thereafter a range of specific workshop related skills

Skills in the use of AutoCAD are undoubtedly the foremost requirement

in the Design Skills discipline. Thereafter transversal skill sets in the areas of Project Management and Problem Solving are ranked most highly.

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GENERAL TRENDS IN RELATION TO MANUFACTURING SKILLS' DEMAND.....CONTINUED

In the NE Region there is a solid requirement for those in the Supply Chain / Logistics discipline. At Competent and Expert levels skills most sought after are Inventory Planning, Inventory Management and Inventory Procurement. At Entry level more emphasis is put on Scheduling and Transportation skill sets.

Skills in high demand in the Manufacturing Process Skills category are Maintenance Planning and Continuous Improvement. In a similar vein they are followed by Lean / Six Sigma and Predictive Maintenance Scheduling.

In the Programming Skills discipline it would seem that most needs are met via external resources. Highest demand is for C+ Programming, Visual Basic.Net and C++ & Delphi.

Skills in the Big Data discipline are not a significant requirement in the NE Manufacturing sector and where needed SQL and C++ are most often cited.

In the category of Problem Solving Skills all levels had the same top skill needed which was Root Cause Analysis, followed by Technical Report Writing.

In the Project Management discipline it was notable that Expert level skills were most in demand whereas Competent level skills was the dominant need in other categories. Highest demand was for Six Sigma / Lean skills combined with solid experience in the field.

In the General Operative Skills category the strongest requirement is for Manual Handling skills and then on an ability to carry out tasks in line with specifications.

In the Robotics sphere employers' requirements were minimal reflecting the limited use of such equipment. Where there was a requirement it was mostly at the competent skill level and the most in demand skill was Robot Teaching.

In the Quality Assurance domain the stand out requirement at all levels was for the ISO 9000 skill set and then for knowledge of national and international quality standards. Thereafter Document Control and Process Change Control were key requirements.

In the Professional Development category the most in demand skills at Entry & Competent levels were Verbal and Written Communication. Perhaps not surprisingly at Expert level the top skills need was Leadership.

6. RECOMMENDATIONS



- Consider the development of a **‘Cross Disciplinary Manufacturing Skills’ course** at Level 5 in collaboration with the CMETB and LMETB. A course should be piloted in each for 15/20 participants designed in collaboration with local manufacturing employers. They should incorporate a dual-education approach to the greatest extent possible so that participants ‘hit the ground running’ upon course completion and match closely the competent levels required by employers.
- Consideration should also be given to developing a **regional variant of the Manufacturing Technician Maintenance Programme** developed collaboratively by KWETB, SOLAS, FIT and Intel for the Greater Dublin Area. Despite the lower technological sophistication of manufacturing operations in the North East compared to the Greater Dublin Area, similar skills are required of those who operate advanced machinery across the diverse plants in the North East (knowledge of basic engineering, electronic and mechanical processes; familiarity with control systems, CNC, etc.).
- **Promote the wider development and use of mechanisms to increase the incidence of upskilling among those currently employed in manufacturing** in the NE, particularly in SMEs.
- What was diagnosed as a major gap at national level for the manufacturing sector (EGFSN 2013) is strongly applicable to the North East. **Visible and credible career paths are needed** that allow local school leavers, graduates and other jobseekers, on the one hand, and providers of education and training, on the other, to see how specific courses, programmes and qualifications enable individuals to progress from operative and junior levels to more senior roles. These career paths should ensure an apparently humble start performing largely routine manual tasks can be a starting point rather than a dead end by mapping dual-education course offerings to current and emerging skills needs of locally based enterprises.
- **Target as a priority the small cohort of larger companies that expressed a willingness to work with local FET providers** to design and implement company-specific upskilling programmes. It appears a potentially effective and efficient approach to reach a large number of workers and strengthen the local economy (the Cavan CDP, for example, notes that there are just five businesses in the county that employ 250 or more people)

- Where large proportions of frontline production workers are Accession State nationals, CMETB and LMETB **should focus on the provision of ESOL.**
- **It is important that a distaste or reluctance to engage in factory-type work and the belief that is has a low status be countered**, particularly when the manual work in question is being carried out in companies whose employment practices, green credentials and corporate ethics are of high standards. Manual work has an intrinsic value and in several major employers in the North East is a stepping stone to tasks that are more complex and to the upskilling that is needed to perform them.
- Though they cover the period 2016-2021, the LECs had only Census 2011 data available to profile the education and skills levels, employments and occupations of their populations. Data from the 2016 Census will not be available until November 2017. Core labour market data (QNHS) should become available annually for the North East Region and not have to be inferred from data for the Border Region. **Census 2016 data on the education, skills, employments and occupations of the three North Eastern counties should be promptly and expertly analysed for the NERSF.**
- Attracting and retaining people with advanced skills and qualifications to live in the North East – and, thus, indirectly helping to attract more high value-added FDI to choose the region and existing enterprises to advance up the value-chain requires being able to **provide a broad range of high quality locally traded services** (from childcare, schools and health services to retail, restaurants, bars, hairdressing and leisure activities). *Enterprise 2025* refers to this as the interdependence between enterprise development and ‘place making’. The strategic importance of raising the quality of locally traded services for the work of further education colleges such as the Cavan and Monaghan Institutes need to be factored into each county’s economic development strategy.
- Each county needs to strengthen its colleges and institutes of further education to function far beyond preparing students for, or arranging for outreach courses by, Dundalk Institute of Technology (DkIT), important though these roles are. **There is a need for the further development and strengthening of linkages between employers and the the Further Education (FE) and Higher Education (HE), institutions in the North East** and for awareness raising amongst employers of the services available to businesses from the Education & Training providers in the region. Such linkages will ensure that modules or programmes meet the skills needs of local enterprise and prepare people for quality employment near to home.

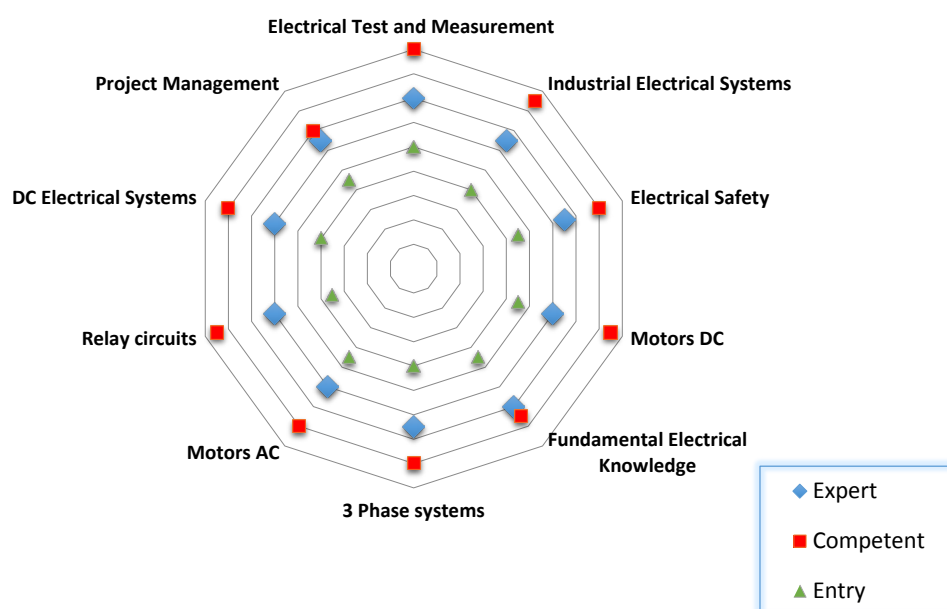


1. DISCIPLINE 1: ELECTRICAL SKILLS

In the Electrical Skills category, Electrical Test and Measurement is the most in demand skill set. The profile required is for a blend of eight skills including the above. This profile could be described as an 'all-rounder' able to support implementation, maintenance and troubleshooting in all of the eight sub-areas.

Electrical Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

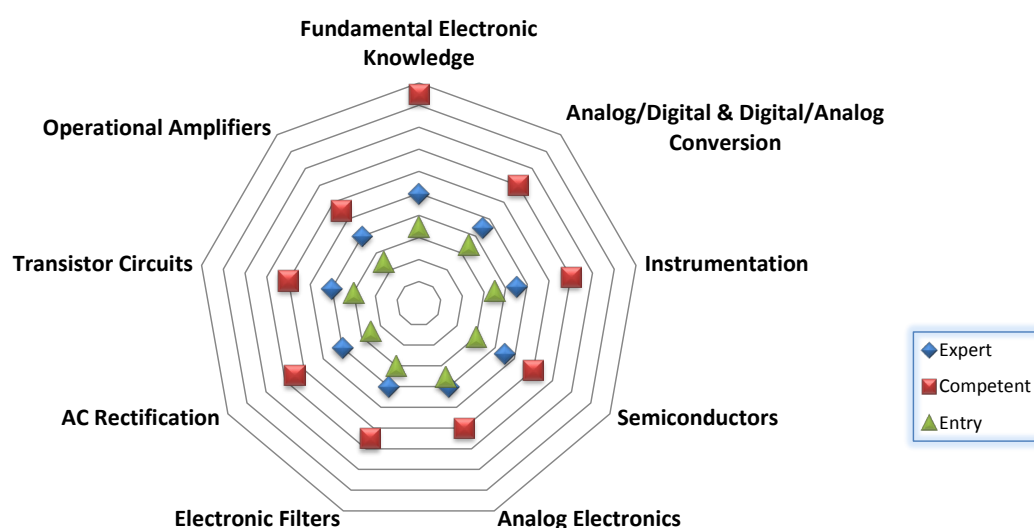
Rank	Entry Level	Competent Level	Expert Level
1	Electrical Test and Measurement	Electrical Test and Measurement	Electrical Test and Measurement
2	Motors AC s	Industrial Electrical Systems	Fundamental Electrical Knowledge
3	Electrical Safety	Relay Circuits	Electrical Safety
4	Motors DC	Motors DC	Industrial Electrical Systems
5	Fundamental Electrical Knowledge	Electrical Safety	3 Phase Systems
6	3 Phase Systems	3 Phase Systems	Motors DC
7	Industrial Electrical System	Motors AC	Motors AC
8	Relay circuits	Fundamental Electrical Knowledge	Relay circuits

2. DISCIPLINE 2: ELECTRONIC SKILLS

In the Electronic Skills discipline, Fundamental Electronic Knowledge stands out as the key skills requirement. Analog/Digital & Digital/Analog Conversion and Instrumentation skills follow closely.

Electronic Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

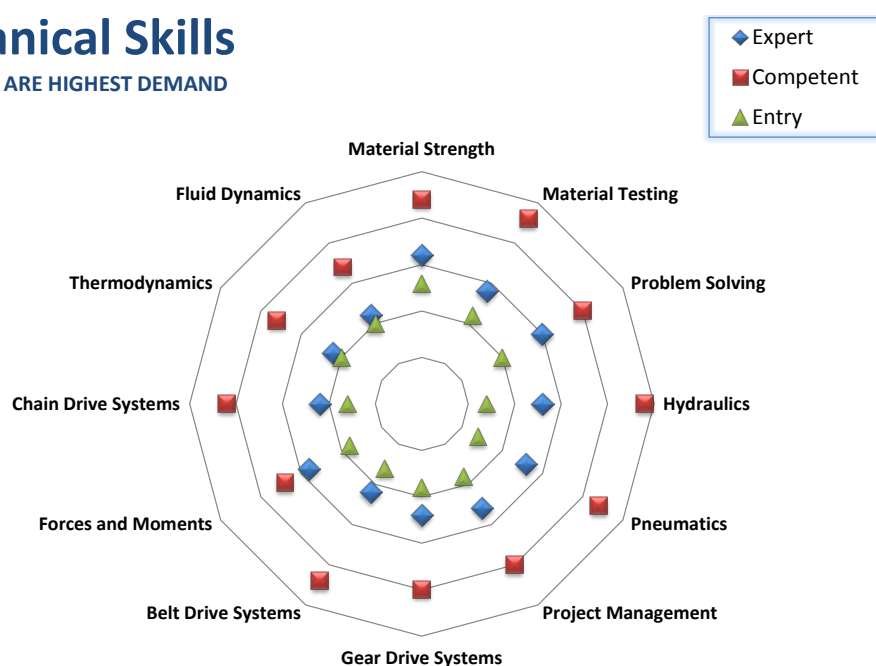
Rank	Entry Level	Competent Level	Expert Level
1	Fundamental Electronic Knowledge	Fundamental Electronic Knowledge	Fundamental Electronic Knowledge
2	Analog/Digital & Digital/Analog Conversion	Analog/Digital & Digital/Analog Conversion	Analog/Digital & Digital/Analog Conversion
3	Instrumentation	Instrumentation	Instrumentation
4	Analog Electronics	Electronic Filters	Semiconductors
5	Semiconductors	AC Rectification	Analog Electronics
6	Electronic Filters	Semiconductors	Electronic Filters
7	Transistor Circuits	Analog Electronics	AC Rectification
8	AC Rectification	Transistor Circuits	Transistor Circuits

3. DISCIPLINE 3: MECHANICAL SKILLS

Hydraulics is the most sought after skill in the Mechanical Skills discipline followed by Material Testing. Transversal skills such as Problem Solving and Project Management are also regarded as important in this sphere.

Mechanical Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

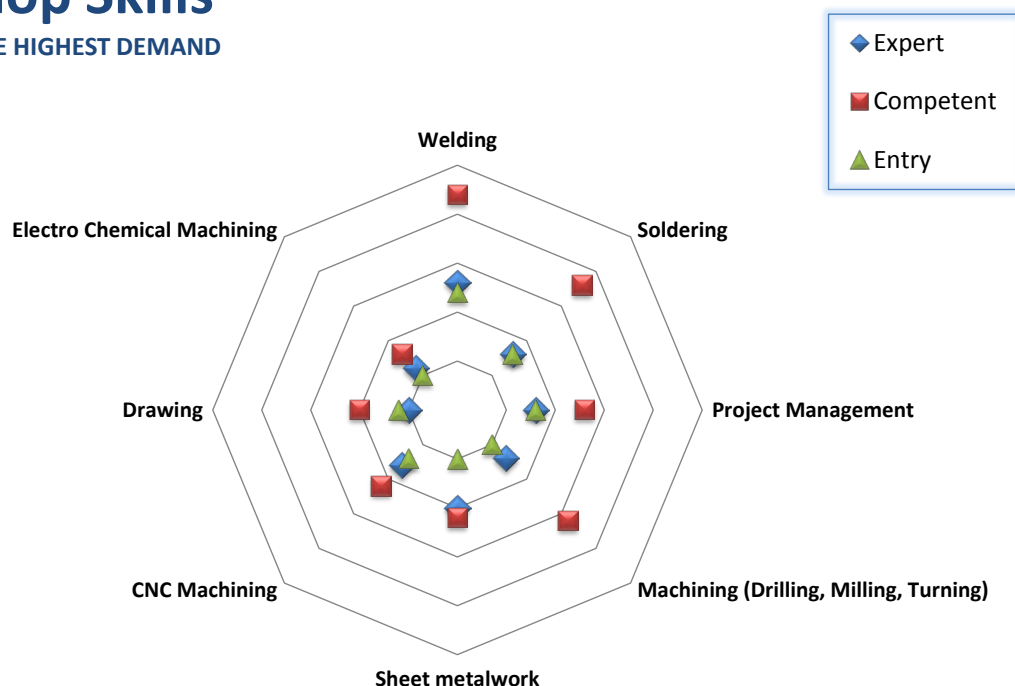
Rank	Entry Level	Competent Level	Expert Level
1	Material Strength	Hydraulics	Material Strength
2	Material Testing	Material Testing	Problem Solving
3	Problem Solving	Material Strength	Material Testing
4	Project Management	Belt Drive Systems	Hydraulics
5	Gear Drive Systems	Pneumatics	Pneumatics
6	Hydraulics	Project Management	Project Management
7	Pneumatics	Gear Drive Systems	Gear Drive Systems
8	Belt Drive Systems	Problem Solving	Belt Drive Systems

4. DISCIPLINE 4: WORKSHOP SKILLS

The stand-out skill set required in the Workshop Skills category is Welding and this is followed by Soldering. Project Management is also valued highly and thereafter a range of specific workshop related skills.

Workshop Skills

OUTER RINGS ARE HIGHEST DEMAND

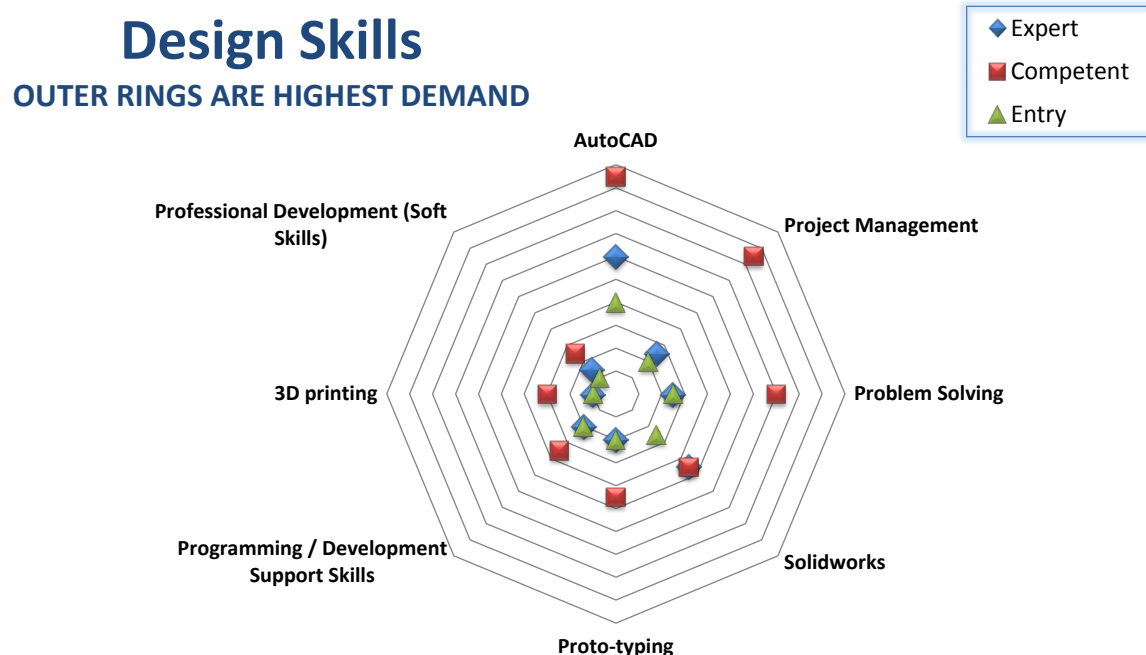


Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Welding	Welding	Welding
2	Soldering	Soldering	Sheet Metalwork
3	Project Management	Machining (Drilling, Milling, Turning)	Project Management
4	CNC Machining	Project Management	CNC Machining
5	Drawing	Sheet Metalwork	Soldering
6	Machining (Drilling, Milling, Turning)	CNC Machining	Machining (Drilling, Milling, Turning)
7	Sheet Metalwork	Drawing	Electro Chemical Machining
8	Electro Chemical Machining	Electro Chemical Machining	Drawing

5. DISCIPLINE 5: DESIGN SKILLS

Skills in the use of AutoCAD are undoubtedly the foremost requirement in the Design Skills discipline. Thereafter transversal skill sets in the areas of Project Management and Problem Solving are ranked most highly.



Highest Demand Ranked by Most Needed

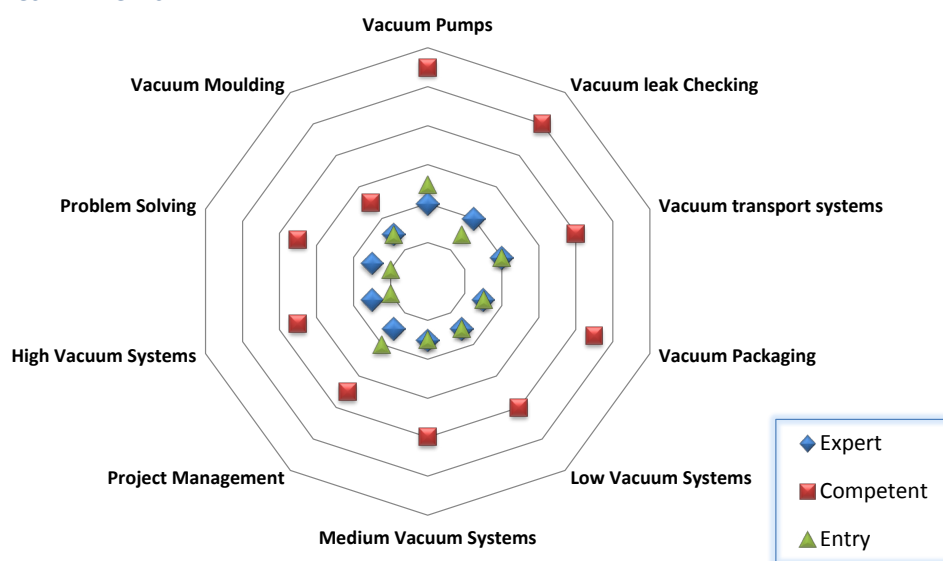
Rank	Entry Level	Competent Level	Expert Level
1	AutoCAD	AutoCAD	AutoCAD
2	Problem Solving	Project Management	Solidworks
3	Solidworks	Problem Solving	Problem Solving
4	Project Management	Solidworks	Project Management
5	Proto-typing	Proto-typing	Proto-typing
6	Programming / Development Support Skills	Programming / Development Support Skills	Programming / Development Support Skills
7	3D printing	3D printing	Professional Development (Soft Skills)
8	Professional Development (Soft Skills)	Professional Development (Soft Skills)	3D Printing

6. DISCIPLINE 6: VACUUM SKILLS

In the Vacuum Systems category, the most in demand skill set related to Vacuum Pumps followed by Vacuum Leak Checking, Vacuum Transport Systems and Vacuum Packaging

Vacuum Systems

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

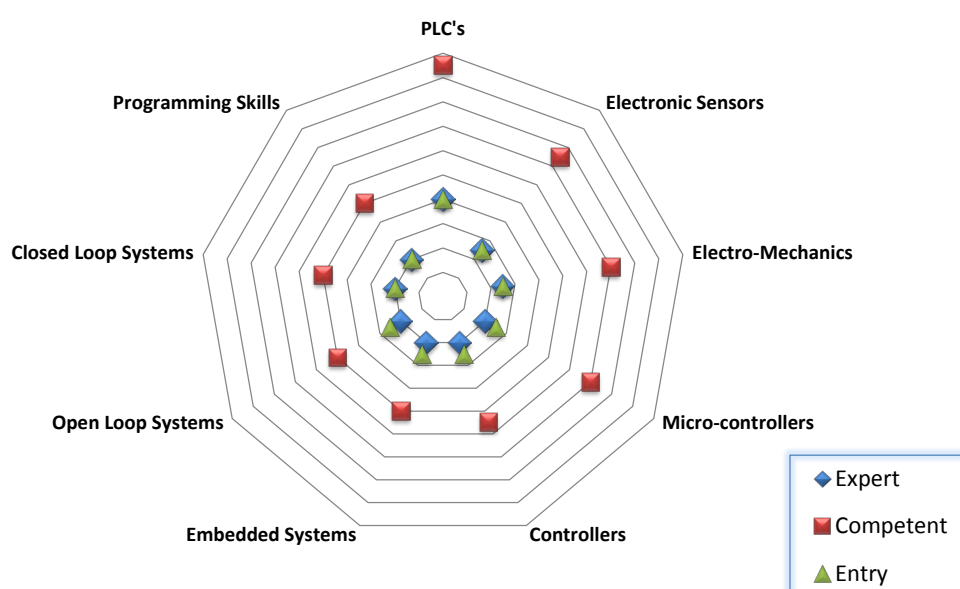
Rank	Entry Level	Competent Level	Expert Level
1	Vacuum Pumps	Vacuum Pumps	Vacuum Pumps
2	Vacuum Transport Systems	Vacuum leak Checking	Vacuum Leak Checking
3	Project Management	Vacuum Packaging	Vacuum Transport Systems
4	Vacuum Packaging	Vacuum Transport Systems	Vacuum Packaging
5	Low Vacuum Systems	Low Vacuum Systems	Low Vacuum Systems
6	Medium Vacuum Systems	Medium Vacuum Systems	Medium Vacuum Systems
7	Vacuum Leak Checking	Project Management	Project Management
8	High Vacuum Systems	High Vacuum Systems	High Vacuum Systems

7. DISCIPLINE 7: CONTROL SKILLS

The stand out skill set needed in the Control Systems discipline was PLCs. Thereafter skills in Electronic Sensors, Electro-Mechanics and Micro-controllers were in demand.

Control Systems

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

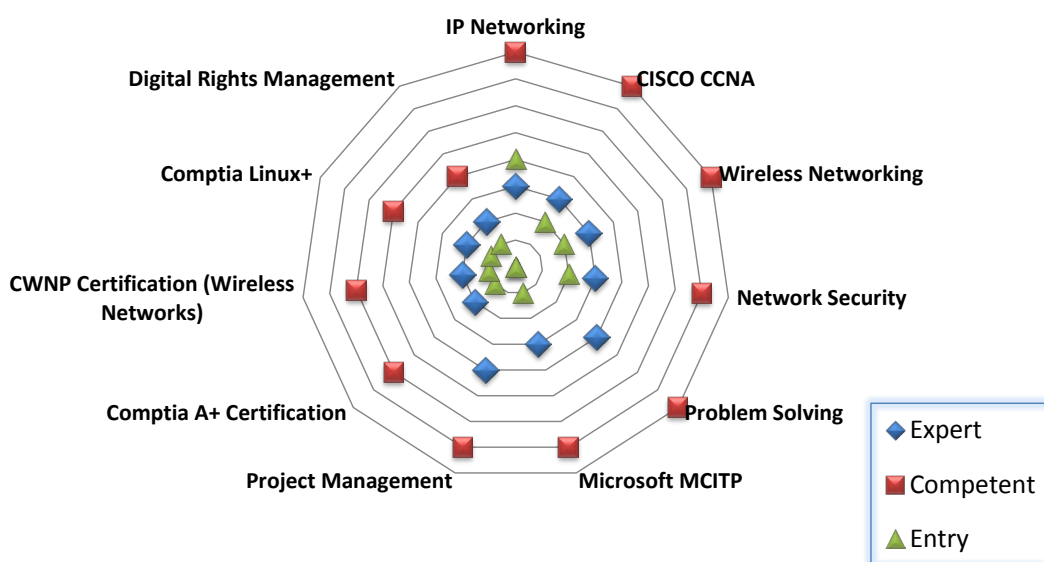
Rank	Entry Level	Competent Level	Expert Level
1	PLC's	PLC's	PLC's
2	Electronic Sensors	Electronic Sensors	Electronic Sensors
3	Electro-Mechanics	Electro-Mechanics	Electro-Mechanics
4	Micro-controllers	Micro-controllers	Micro-controllers
5	Controllers	Controllers	Controllers
6	Embedded Systems	Embedded Systems	Embedded Systems
7	Open Loop Systems	Open Loop Systems	Open Loop Systems
8	Closed Loop Systems	Closed Loop Systems	Closed Loop Systems

8. DISCIPLINE 8: NETWORKING / PC MAINTENANCE

In the discipline of Networking / PC Maintenance a set of fundamental skills are most needed i.e. IP Networking, CISCO CCNA and Wireless Networking. At Expert level, however, a requirement for Problem Solving and Project Management are the top tasks. The skills needs analysis suggests that more complex requirements are met from external resources.

Networking/PC Maintenance

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

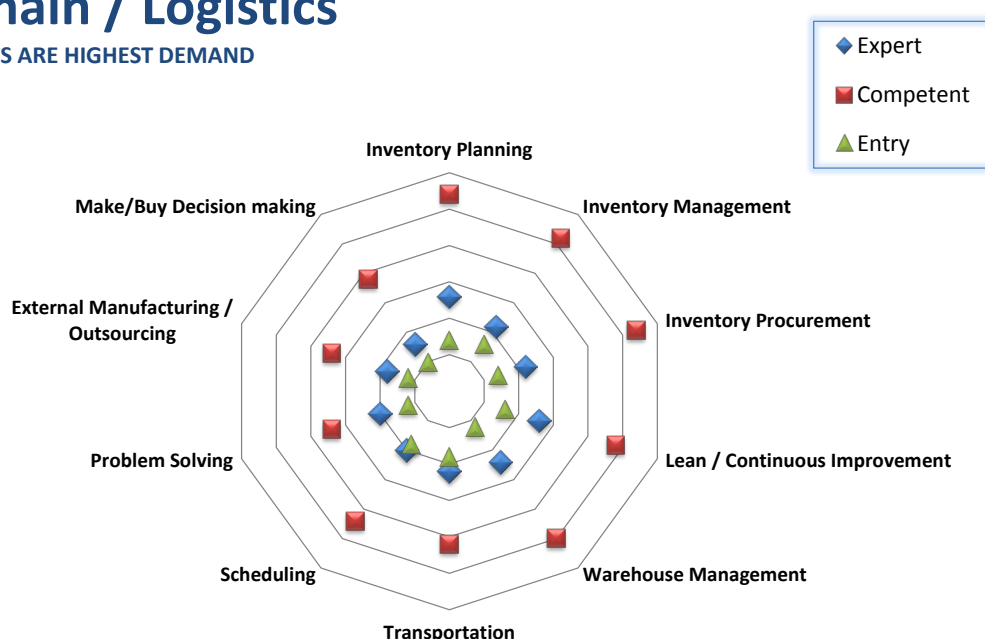
Rank	Entry Level	Competent Level	Expert Level
1	IP Networking	IP Networking	Problem Solving
2	CISCO CCNA	CISCO CCNA	Project Management
3	Wireless Networking	Wireless Networking	Wireless Networking
4	Network Security	Problem Solving	Network Security
5	Microsoft MCITP	Network Security	IP Networking
6	CompTIA A+ Certification	Microsoft MCITP	Microsoft MCITP
7	CWNP Certification (Wireless Networks)	Project Management	CISCO CCNA
8	CompTIA Linux+	CompTIA A+ Certification	CompTIA A+ Certification

9. DISCIPLINE 9: SUPPLY CHAIN / LOGISTICS

In the NE Region there is a solid requirement for those in the Supply Chain / Logistics discipline. At Competent and Expert levels skills most sought after are Inventory Planning, Inventory Management and Inventory Procurement. At Entry level more emphasis is put on Scheduling and Transportation skill sets.

Supply Chain / Logistics

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

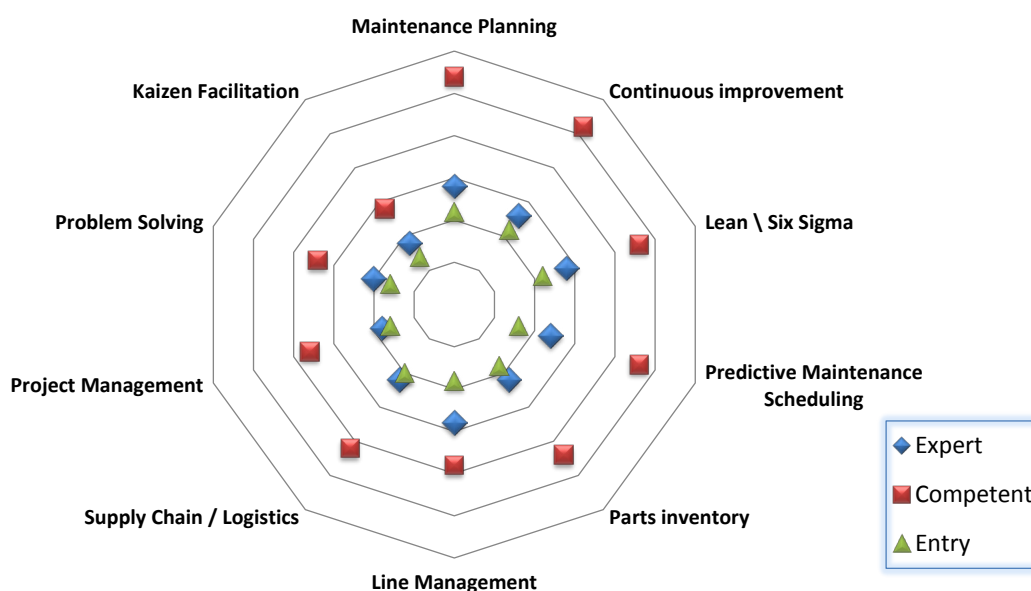
Rank	Entry Level	Competent Level	Expert Level
1	Scheduling	Inventory Planning	Inventory Planning
2	Transportation	Inventory Procurement	Lean / Continuous Improvement
3	Inventory Management	Inventory Management	Warehouse Management
4	Lean / Continuous Improvement	Warehouse Management	Inventory Management
5	Inventory Planning	Lean / Continuous Improvement	Inventory Procurement
6	Inventory Procurement	Scheduling	Transportation
7	Problem Solving	Transportation	Scheduling
8	Warehouse Management	Problem Solving	Problem Solving

10. DISCIPLINE 10: MANUFACTURING PROCESS SKILLS

Skills in high demand in the Manufacturing Process Skills category are Maintenance Planning and Continuous Improvement. In a similar vein they are followed by Lean / Six Sigma and Predictive Maintenance Scheduling.

Manufacturing Process Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

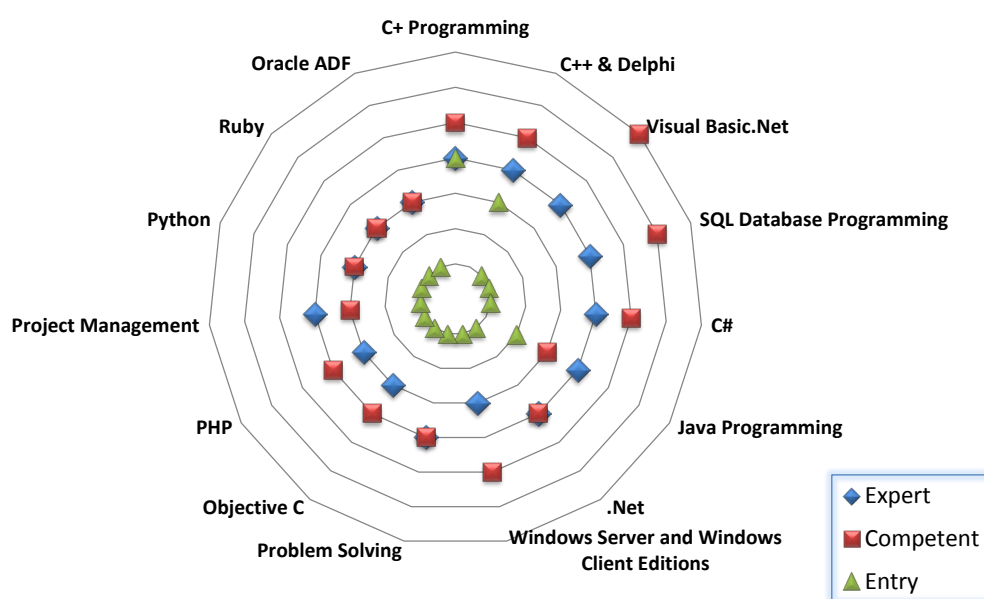
Rank	Entry Level	Competent Level	Expert Level
1	Maintenance Planning	Maintenance Planning	Maintenance Planning
2	Continuous Improvement	Continuous Improvement	Line Management
3	Lean / Six Sigma	Lean \ Six Sigma	Lean \ Six Sigma
4	Supply Chain / Logistics	Predictive Maintenance Scheduling	Continuous Improvement
5	Parts inventory	Parts Inventory	Predictive Maintenance Scheduling
6	Line Management	Supply Chain / Logistics	Parts Inventory
7	Predictive Maintenance Scheduling	Line Management	Supply Chain / Logistics
8	Project Management	Project Management	Project Management

11. DISCIPLINE 11: PROGRAMMING SKILLS

In the Programming Skills discipline it would seem that most needs are met via external resources. Highest demand is for C+ Programming, Visual Basic.Net and C++ & Delphi

Programming Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

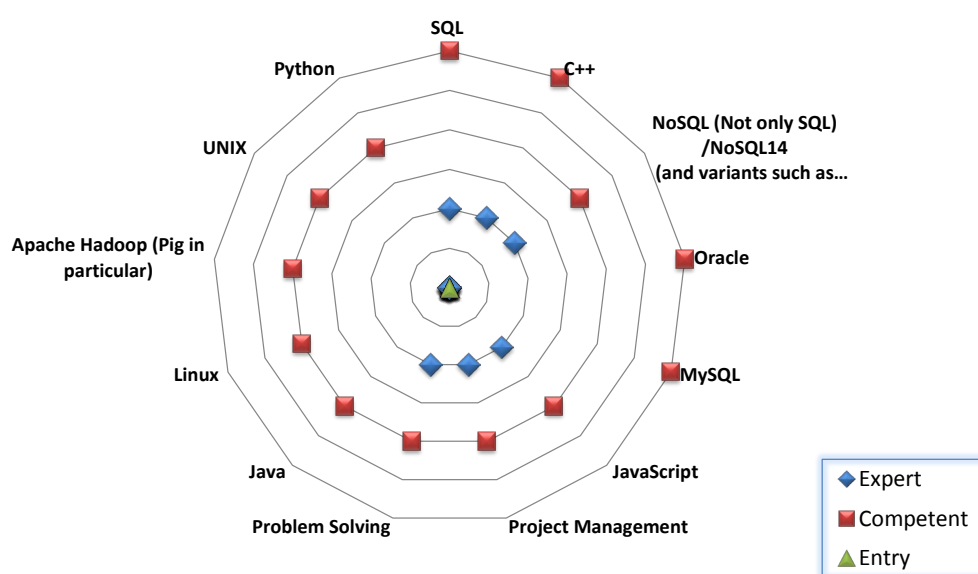
Rank	Entry Level	Competent Level	Expert Level
1	C+ Programming	Visual Basic.Net	C+ Programming
2	C++ & Delphi	SQL Database Programming	C++ & Delphi
3	Java Programming	C+ Programming	Visual Basic.Net
4	SQL Database Programming	C++ & Delphi	SQL Database Programming
5	C#	Windows Server and Windows Client Editions	C#
6	Visual Basic.Net	C#	Java Programming
7	.Net	.Net	.Net
8	Windows Server and Windows Client Editions	Java Programming	Windows Server and Windows Client Editions

12. DISCIPLINE 12: BIG DATA

Skills in the Big Data discipline are not a significant requirement in the NE Manufacturing sector and where needed SQL and C++ are most often cited.

Big Data

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	None cited	SQL	SQL
2	None cited	C++	C++
3	None cited	NoSQL (Not only SQL) / NoSQL14 and variants	NoSQL (Not only SQL) / NoSQL14 and variants
4	None cited	Oracle	JavaScript
5	None cited	MySQL	Project Management
6	None cited	JavaScript	Problem Solving
7	None cited	Project Management	None cited
8	None cited	Problem Solving	None cited

13. DISCIPLINE 13: PROJECT MANAGEMENT

In the Project Management discipline it was notable that Expert level skills were most in demand whereas Competent level skills was the dominant need in other categories. Highest demand was for Six Sigma / Lean skills combined with solid experience in the field.

Project Management

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

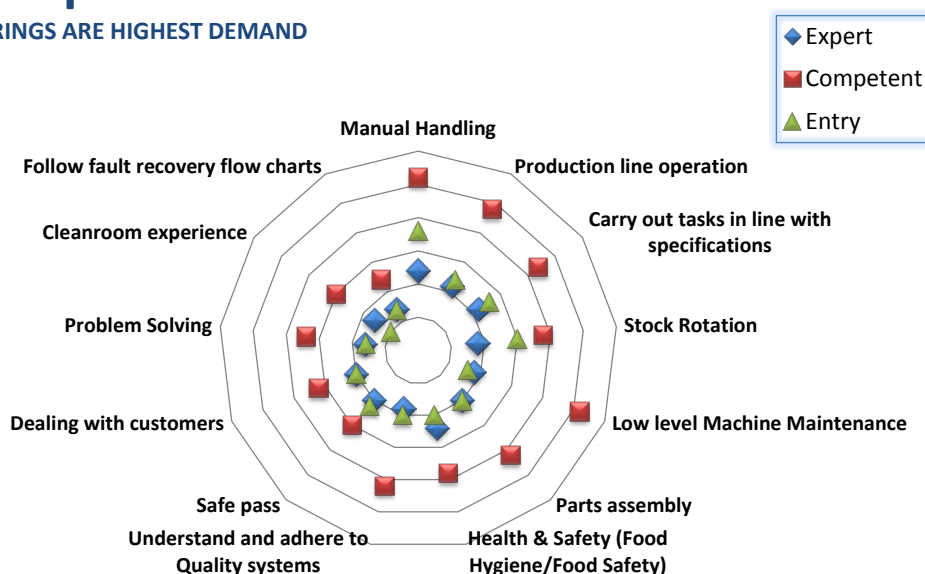
Rank	Entry Level	Competent Level	Expert Level
1	Six Sigma / Lean	Six Sigma / Lean	Experience in People Management
2	Experience in Project Management Capacity	Experience in Project Management Capacity	Six Sigma / Lean
3	Experience in Strategic Planning	Knowledge of Project Management Techniques	Experience in Project Management Capacity
4	Experience in People Management	Experience in Strategic Planning	Experience in Strategic Planning
5	Knowledge of Project Management Techniques	Experience in People Management	Knowledge of Project Management Techniques
6	Project Management	PMP	Project Management
7	Problem Solving	Problem Solving	Problem Solving
8	PMP	Project Management	PMP

14. DISCIPLINE 14: GENERAL OPERATIVE SKILLS

In the General Operative Skills category the strongest requirement is for Manual Handling skills with emphasis then placed on an ability to Carry Out Tasks in line with Specifications

General Operative Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

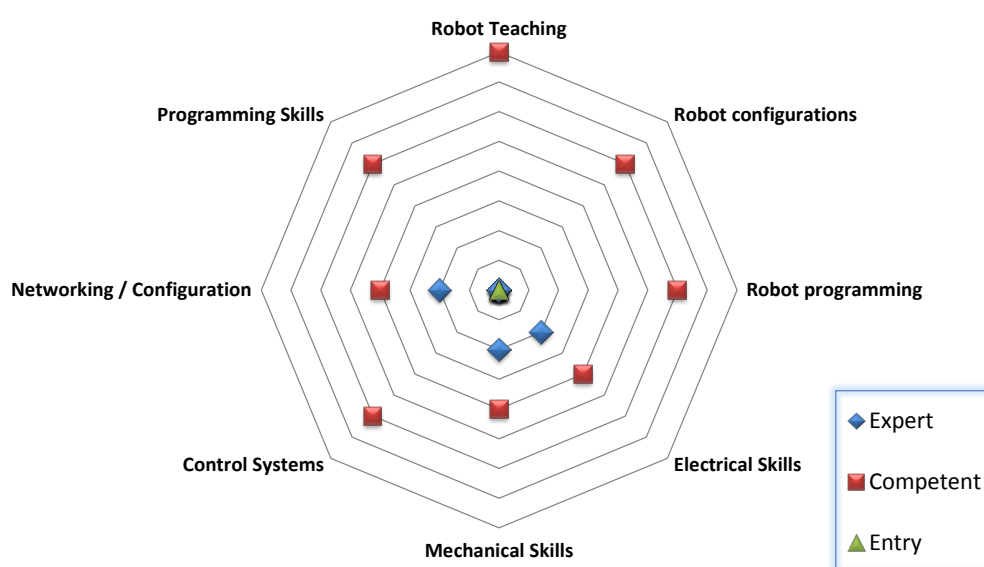
Rank	Entry Level	Competent Level	Expert Level
1	Manual Handling	Manual Handling	Manual Handling
2	Stock Rotation	Low Level Machine Maintenance	Health & Safety (Food Hygiene/Food Safety)
3	Carry out tasks in line with specifications	Production Line Operation	Carry out tasks in line with specifications
4	Production Line Operation	Carry out tasks in line with specifications	Parts Assembly
5	Parts Assembly	Understand and Adhere to Quality Systems	Low Level Machine Maintenance
6	Health & Safety (Food Hygiene/Food Safety)	Parts Assembly	Stock Rotation
7	Understand and adhere to Quality systems	Health & Safety (Food Hygiene/Food Safety)	Production Line Operation
8	Low level Machine Maintenance	Stock Rotation	Understand and Adhere to Quality Systems

15. DISCIPLINE 15: ROBOTIC SKILLS

In the Robotics sphere employers' requirements were minimal reflecting the limited use of such equipment. Where there was a requirement it was mostly at the Competent skill level and the most in demand skill was Robot Teaching.

Robotic Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

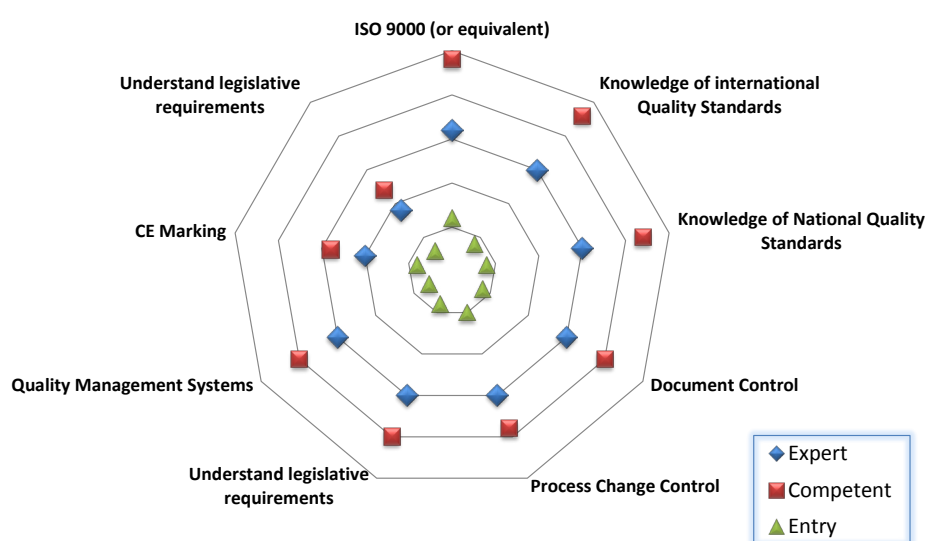
Rank	Entry Level	Competent Level	Expert Level
1	None cited	Robot Teaching	Electrical Skills
2	None cited	Robot Configurations	Mechanical Skills
3	None cited	Robot Programming	None cited
4	None cited	Control Systems	None cited
5	None cited	Programming Skills	None cited
6	None cited	Electrical Skills	None cited
7	None cited	Networking / Configuration	None cited
8	None cited	Mechanical Skills	None cited

16. DISCIPLINE 16: QUALITY ASSURANCE SKILLS

In the Quality Assurance domain the stand out requirement at all levels was for the ISO 9000 skill set and then for knowledge of national and international quality standards. Thereafter Document Control and Process change Control were requirements.

Quality Assurance Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	ISO 9000 (or equivalent)	ISO 9000 (or equivalent)	ISO 9000 (or equivalent)
2	Process Change Control	Knowledge of International Quality Standards	Knowledge of International Quality Standards
3	Knowledge of National Quality Standards	Knowledge of National Quality Standards	Knowledge of National Quality Standards
4	Document Control	Document Control	Document Control
5	Knowledge of International Quality Standards	Quality Management Systems	Process Change Control
6	Understand Legislative Requirements	Understand Legislative Requirements	Understand Legislative Requirements
7	CE Marking	Process Change Control	Quality Management Systems
8	Quality Management Systems	CE Marking	CE Marking

17. DISCIPLINE 17: PROFESSIONAL DEVELOPMENT

In the Professional Development category the most in demand skills at Entry & Competent levels were Verbal and Written Communication. Perhaps not surprisingly at Expert level the top skills need was Leadership.

Professional Development

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

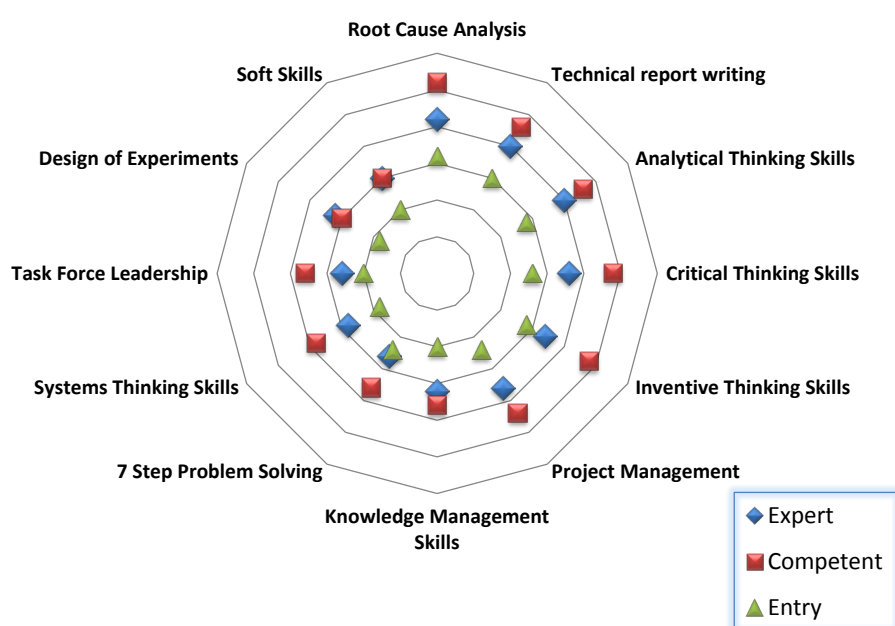
Rank	Entry Level	Competent Level	Expert Level
1	Communication Written	Communication Verbal	Leadership
2	Presentation Skills	Leadership	Presentation Skills
3	Communication Verbal	Communication Written	Communication Written
4	Teamwork	Teamwork	Communication Verbal
5	Leadership	Prioritisation	Teamwork
6	Project Management	Presentation Skills	Project Management
7	Multi-tasking	Project Management	Multi-tasking
8	Prioritisation	Multi-tasking	Prioritisation

18. DISCIPLINE 18: PROBLEM SOLVING SKILLS

In the category of Problem Solving Skills all levels had the same top skill needed which was Root Cause Analysis, followed by Technical Report Writing.

Problem Solving Skills

OUTER RINGS ARE HIGHEST DEMAND



Highest Demand Ranked by Most Needed

Rank	Entry Level	Competent Level	Expert Level
1	Electrical Test and Measurement	Electrical Test and Measurement	Electrical Test and Measurement
2	Motors AC s	Industrial Electrical Systems	Fundamental Electrical Knowledge
3	Electrical Safety	Relay Circuits	Electrical Safety
4	Motors DC	Motors DC	Industrial Electrical Systems
5	Fundamental Electrical Knowledge	Electrical Safety	3 Phase Systems
6	3 Phase Systems	3 Phase Systems	Motors DC
7	Industrial Electrical System	Motors AC	Motors AC
8	Relay circuits	Fundamental Electrical Knowledge	Relay circuits

Working together to meet employer's skills needs

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