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Design Activity in Malta
A Macro-Economic Analysis*

An EPD Study for Valletta 2018

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Abstract

The present **economic analysis** focuses on **design** and **innovation**. It compares Malta to leading design innovators in the EU, namely Germany, Italy, Sweden and Finland. Findings include positioning of Malta in relation to these focus countries, overall, by firm size and by sector. Furthermore, manufacturing fares timidly in design innovation both internally in relation to other sectors, and also when compared to other EU Member States. Within services, IT and consultancy are relatively high design innovation spenders, whereas financial services come in at the lower end. The analysis also evaluates the multiplier effects of design services and the inter-industry linkages involved in design activity.

Keywords: Malta, Design, Innovation, Macro-economic Analysis, Investment, Skilled Jobs, Non-price Competition, Community Innovation Survey, Design Exports, Multipliers, Input-output, Value-added, Industry Interlinkages, GDP, GDP per capita.

List of Acronyms

ACM	Arts Council Malta
CCI	Culture and Creative Industries
CIS	Community Innovation Survey
EPD	Economic Policy Department
ESA	European System of National and Regional Accounts
EU	European Union
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
NACE	European Statistical Classification of European Activities
NSO	National Statistics Office, Malta
SIOT	Symmetric Input-Output Table
SUT	Supply and Use Tables
UK	United Kingdom
WEF	World Economic Forum

1. Introduction

1.1 Structure of this document

The potential for design innovation to move Malta's productive capacity in manufacturing and services upstream towards higher productivity and value added provides the main justification for the research on design undertaken in this paper. We start this analysis with the background justifying our contemplation of design as a valid economic research question. This includes references to new growth theory and the product life-cycle hypothesis which presents design innovation as an upstream high value added activity. Existing research and statistics on innovation suggest that design activity in Malta as a means to improve productivity and competitiveness of other industries is relatively limited, at times constrained by high fixed costs, and at other times by possible constraints in technology transfer. These research questions are pondered in some depth, albeit incompletely, in Section 2 whilst Section 3 deals with the multiplier effects of the design industry and the interlinkages with the rest of the economy.

1.2 Background to this study

This research is an outgrowth from ongoing economic research on the Culture and Creative Industries (**CCIs**) that is an established line of research of EPD and a standard service line wherein EPD delivers yearly studies to the Valletta 2018 Foundation, the Arts Council Malta (ACM) and the Creative Economy Working Group. In the course of this research emerging results pointed EPD to the opportunity of taking a deep look at **design**, a deliberate creative activity with an intended market outcome, a product or a service to be traded. Design will be defined in Section 1.5.2.

The emerging line of research is promising new economic insights. Our future design research and CCI studies will be planned holistically, with alignment and synergy in mind. To date, to our knowledge, the **design economy** has seen no local empirical studies. Furthermore, no systematic data collection effort is in place specifically to provide primary data for such research. As a result, the present study is based on **two proxies**, namely local data on **innovation** that may be relevant to design but not wholly, and data on **architecture** and **engineering** economic activity. The two alternative approaches to study the same area turned out to be a sound and fruitful approach, but we caution that innovation and design are siblings, not the same thing, and that architecture and engineering do not cover all design activity. With these cautionary provisos we can with reason assert that the present broad-scope macro-economic study has spurred us to take two steps leading to systematic collection of design data for Malta's economy, which in future should help us address some of the research questions and evaluate alternative hypothesis raised in this paper.

1.3 Design, and why economists care

This study reveals, **empirically** and on **the basis of local data** that design earns its keep, generously paying its way through the economy. The research suggests that putting money into design results in the metaphorical boomerang returning with more than the energy that was put into it. The study is informative, both in what it reveals and, interestingly, in new economic questions that it opens up for us to ponder. The study is suggesting, but the case is not conclusive, that **barriers to entry** into the **design-intensive market** vary with **firm size**. This had never been observed or postulated for design economics for Malta (see Section 2.2.3 and Figure 7).

It would appear, but the case is not closed, that small companies have **one structural type of barrier to entry**, and that **larger firms have a different one**. These various barriers to entry for local companies to become **design-intensive** and/or **to grow** (two different issues) may be related to the **cost structure** of undertaking design in Malta. Different patterns of **fixed costs** and of **variable costs** may be functions of firm size (see Figure 7 in Section 2.2.3). EPD sees value in pursuing this line of economic research.

On a less technical level we now present a visual metaphor on why design interests economists. The picture below, a waterfall, is more than a fresh water cascade. To the economic mind, macro-person with a public sector mindset, and equally to the astute businessman, the entrepreneur, that cascade is a visual metaphor:

- for upstream and downstream activity
- for 'source' and 'sink'
- for the early-bird, to the fast follower, silent majority, and laggard

The metaphoric vertical drop, the gravitational gradient has macro-economic and entrepreneurial parallels. **Upstream** in the cascade **is research followed closely by design innovation**, whilst **downstream** is **operation and maintenance**. The early-bird economic player appropriates huge value; the downstream one can expect more modest returns. There is more. Because upstream is **strategic**, **market-informed**, and **user-centred** it is sustainable and resilient. The downstream players, those doing operation and maintenance, are in a more vulnerable position in relation to both general volatility and structural shocks. The drying up of capital, emerging markets and new technologies all fit into that description.

1.4 Malta: A World Economic Forum view

The structure of the present has been revealed, as were the background to this line of thinking. It is time at this juncture for an external look, some context, and a reality

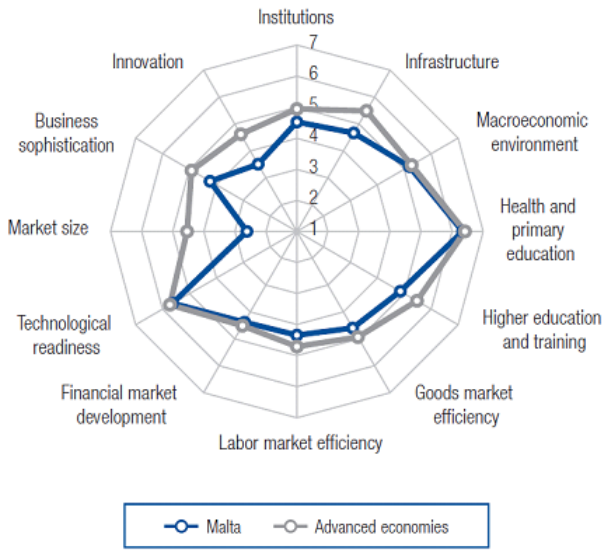
Figure 1: Malta – Design Futures, Future Design

check; we now consider how the World Economic Forum (**WEF**) saw Malta's economy as at end 2015. The **WEF's Global Competitivness Report for the year 2015-2016 was published in December 2015**. That yearly study presents an analysis of economic competitivness, by country, and for several **economic drivers** of **competitiveness**.

The WEF Global Gompetitivness Index (GCI) as reported for Malta in the year 2015-2016 appears below. The spider diagram (KIVIAT plot) of 12 axis is displayed radially. The plot shows Malta's score on each of the 12 sub-indices of the global competative index. The plot shows Malta's situation in blue and the average for the advanced economies in grey. After market size, innovation is the second strongest constraint to our competitiveness ranking. It is clear that Malta can do little about its size, except look **onwards** and **outwards** by exploiting further the EU internal market and establish further inroads into export markets. Design – strategic and upstream – looks onwards, and in itself can support Malta's drive to tap export markets through non-price competitiveness.

This WEF global competitivness metric demonstrates strongly that size and innovation are critical elements for a way ahead for Malta. Our study of the local data shows us through a proxy that as an element of innovation the design activity currently undertaken in Malta merits nurturing.

Figure 2: WEF Spider Plot (Malta's Economy 2015-2016) – Global Competitiveness Report 2015-2016, World Economic Forum



1.5 Design: what it is

This section sets out the definition of design adopted in this report. The understanding of design adopted is based on our previous CCI work and informed by international sources on design policy and economics, as well as by sources of best practice in areas of corporate thought leadership and business excellence. Design is not new to humankind, as the Sanskrit and ancient Greek languages amply show.

1.5.1 Design roots: in language and thought

Design, like great art, great literature and seminal music has long-range roots. The latter span from pre-historical artefacts to igloos, from megalithic structures to renaissance art, from ancient irrigation systems to space structures, industrial robotics and 3D printing. All this human activity involves design. Pre-historical instruments of warfare, however nasty their effects, were designed, and so were craft and artefacts of lasting, timeless beauty. Tools, then and now are designed, as were the irrigation civil engineering works that fed communities in ancient Egypt and Mesopotamia.

What future for manufacturing without robotic design and additive technologies (3D printing)? Suffice it to say that medical prosthetics and military hardware – aeronautic –

have been 3D-printed, and there was an attempt to 3D-print (manufacture) in the absence of gravity, in outer space.

The word design has long roots in Sanskrit, mother of Indo-European languages, and in ancient Greek, a nearer even if still a hugely pedigreed language. Sanskrit, already spoken in the Indus Valley circa 4,000 years ago had rich and elaborate shades of meaning including: "design", "*absence* of design", and "done *un*designedly". In Sanskrit the word design appears in both the verb and noun forms as "to intend", and "intention", and as "talent" and "ability". (Sanskrit dictionary @ the University of Chicago; (http://dsal.uchicago.edu/dictionaries/apte/).

Ancient Greek yields entries for both the word design and undesigned. Design had already appeared in noun form as "purpose", "plan", and "outline", and in the verb form as "sketch in outline" and "contrive". (S. C. Woodhouse, Christ Church, Oxford, Dictionary at the University of Chicago (http://www.lib.uchicago.edu/efts/Woodhouse/). The purposeful, desired outcome, the sought-after characteristic of a plan or scheme have long roots in human **tought** and **action**. The **talented** ability, what modern economists would call potential for **value-add** has long been establishded in language.

1.5.2 Design: Adopted definition

As noted above, EPD and NSO worked together on this year's Structural Business Survey (SBS) to collect one datum: how many firms in Malta do design. The SBS **2015** questionnaire, as customary, carried guidance notes for respondents to consult in order to complete the questionnaire accurately. The guidance notes explained the terms design, **design of product** and **design of service** to respondents, with examples.

Respondents were asked to answer in the affirmative if they / the firm undertake design as an economic activity done to be sold in the market. Design **by a company or professional** was described as activity to **create** a product or a service, one in which the product or service is devised for an intended **use or outcome**.

Product and **Service** were described as designed if they were invented, originated through drawings, blueprints, schemes or models that were made before the product was made or the service delivered.

The guidance set out that in product design an object is created, with service design creating **experience or perception outcomes**. In both cases significant thought may be given to **aesthetics**, **look**, **feel** and **form**. Design was also described sometimes purely **functional**, **technical**, and practical, without aesthetic concerns. In other cases design may be both **beautiful and technically useful**.

By way of example, the following are in order, For **product design** *e.g.*:

- design of a tool / instrument / device / equipment; an artefact; design of software - software code is developed for sale; textile / fashion; jewellery design; furniture / glass / ceramic design; and similar.

For **service design** *e.g.*:

- design of an insurance policy; design of an investment portfolio; design of services - software is operated commercially for third parties, as a service; logistical planning; architectural design service; graphic or illustration service; photographic / filming service; TV and digital animation service; entertainment and similar.

These lists were offered as illustrative and not exhaustive.

1.6 Design economics? A study on design in the UK economy

The UK Design Council refers to the Cox Review (2005) which defines design as: *"what links creativity and innovation"*, and *"shaping ideas to become practical and attractive propositions for users or customers"*. The UK study identified the Design Economy by establishing the occupations of those working in design and then identifying the "design-intensive" industries as those industries in which design occupations account for more than 30% of the people employed in that industry. As a result the UK study captures not only those industries which are purely "design industries" such as architecture but also design activity in other sectors such as aerospace or finance and also design activity in support functions such as administration or finance. The following are some of the interesting findings of the UK study:

- The design economy generated £71.7 billion in gross value added (GVA)
- Workers with a design element to their work were 41% more productive than average
- In 2013, the total value of exports where design had made a key contribution was £34 billion
- The design economy compares more favourably to the wider UK workforce in terms of designers [....] who have a disability or a work-limiting illness (11.7%)
- £52.5 Billion (nearly three quarters) of design GVA was generated by designers in non-design industries

- Design's contribution to the economy has grown at a faster rate than the UK average
- There are 72,340 design firms operating across the UK
- At £47,402 the productivity (the average output per worker) across the design economy exceeded the UK economy average of £33,667 per worker
- The design economy in the UK is the 9th biggest employment sector. The design economy employs 1.6 Million persons in the UK, like the hospitality sector, with logistics employing 1.5 Million persons

1.7 Malta's economy, then and now: A half a century economic retrospective

After deliberating linguistic, historical and economic points of view, presenting the SBS view of design we now ponder the Maltese economy in a snapshot as at year end 2016. Below, are outlined a six decade economic development, the thinking and doing of many people over many years. For further reference, and more detailed explanations and quantifications refer to Aaron G. Grech's two working papers, *"The Evolution of the Maltese Economy since Independence"* and *"The Diversification of the Maltese Economy"*.

A 60 year retrospective must per force note Malta's nascent venturing into manufacture and into tourism. Prior and post independence Malta's entrepreneurs, and public policy searched and researched for pathways into new growth sectors, as we do now. Both manufacturing and tourism grew in successive years. Industrial decline, as elsewhere, followed for reasons both internal and external. With the benefit of hindsight it may be said that internal reasons for re-trenchment in manufactured volume would at least in part have been postponed if design activity had been promoted among domestically owned or foreign owned firms, and the domestic labour force were better trained in **design innovation**. Surely, availability of capital, hard to come by for a fledgling State, was another factor in short supply. It may be conjectured that industrial decline may well have been reversed if we had a thriving, variegated and multivariate design phenomenon adding value faster than the rate at which margins were eroding. With that conjecture in mind the waterfall of Figure 1 in Section 1.3 is recalled.

In comparison, tourism successfully re-invented itself over the years, with the innovation of product differention. English-language tourism, diving holidays and conference tourism come to mind. Nevertheless, there is still scope for further product differentiation by design with a view to attract higher quality tourism in Malta and thus gain market shares internationally, increasing profit margins and raising the productivity and pay of those employees wishing to pursue a career in the tourism industry.

Subsequently and recently, i-Gaming and financial services saw their birth. I-Gaming and financial services came along fast and impactfully. The latter are substantial and welcome income-generating streams. In the context of external vulnerabilities, design has the potential to mitigate the adverse impact of any strategic correction to this economic reality, new thinking for economic resilience makes economic and social sense. Design innovation can contribute also towards increasing the value added generated domestically in these service-based industries, whilst also contributing to make the presence of these industries more stable in the domestic economy. But again this requires a conscious, concerted and planned effort to promote design activity in services and create a new competitive advantage.

Economic development with high value-added and productivity that is resilient would address such concerns. In a sense, the demand for design innovation is a constant even when the demand for the product or service being designed is volatile. A vibrant design capability in Malta, that would need long term-nurturing, could achieve those economic and social objectives. Design is conceptual, immaterial, depends on inventivness, education, training, culture, technology – much of it of the 'soft' variety. A strong design capability in Malta would add impetus, quality, **projection** and market **credibility for 'Brand Malta'**. It would be upstream, strategic, and shared National intent.

2. An Economic Analysis of Design Activity in Malta

2.1 General

The potential of **economic** and **social value** which can be created through good design has not been acknowledged until recently. We recall the reasoning in the cascade (see Figure 1 in Section 1.3), the WEF view of Malta's competitiveness (see Figure 2 in Section 1.4) and the understanding of design in this year's SBS, and indeed the linguistic roots at the heart of Indo-European languages (see Sections 1.5.1 and 1.5.2).

As to the potential of economic and social value which can be created through good design, according to New Growth Theory, which emerged in the 1980s, innovation plays an important role as it is considered the main stimulant of economic growth. In this relatively new economic thinking, which is centred around the elements of knowledge and technology, price is not considered to be the dominant criterion to assess the level of competitiveness in the market. Unlike the two conventional factors of production, labour and capital, ideas are not scarce. Therefore, a sustained **flow of ideas** for more efficient processes and **new products** potentially makes continuous growth possible. Knowledge of technology and experience in its applications can appreciate into human capital, a powerful concept in explaining why many firms are more proficient than others in innovation.

New growth theory also unlocks the potential for increasing returns to technology, ideas and innovation. This is another substantial challenge to traditional economic theory, and provides a better understanding of the potential for growth unlocked by this new theory. It can be argued that diminishing returns was a valid concept in the days of 19^{th} century smokestack industry, and still is valid in resource-based industries such as agriculture and mining, but not in the new knowledge-based industries.

New Growth theories often relax the assumption of perfect competition and introduce monopoly structures in the ownership of ideas. To this end new growth theory recognises that vital kinds of knowledge may need to be coded and explicitly communicated. This can take many forms – documentation in the form of patents, licensing agreements, proprietary information, contracts, formulae, data and manuals, operating procedures or other formats. In doing so new growth theory explains how innovation generates enough returns to justify the investment in innovation activity.

As an element of innovation, design contributes to competitiveness. As a matter of fact, companies which invest in and carry out design activities in a deliberate manner tend to be more innovative, more profitable and grow faster than those that do not. At the same time at a macro-economic level, there is a strong positive correlation between the use of design and national competitiveness. These are the main conclusions from an analysis carried out by the European Commission on design (2009).

According to the **Global Competitiveness Report 2015-2016** published by the **World Economic Forum (WEF)**, Malta is classified as an innovation-driven economy and **was ranked at the 48th place out of 140 countries, with a score of 4.39 (Range 1-7)**.

Competitiveness is defined by the WEF as **'the set of institutions, policies, and factors that determine the level of productivity of a country'**. The productivity level determines the rates of return obtained by investments in an economy, which in turn are fundamental drivers of its growth rates. In other words, a more competitive economy is one that is likely to grow faster over time. Innovation is considered as one of the main pillars of competitiveness. This can emerge from both new technological and non-technological knowledge. In the long run, standards of living can be largely enhanced by innovation. Innovation is particularly important for economies as they approach the frontiers of knowledge, and the possibility of generating more value by merely integrating and adapting exogenous technologies tends to disappear. Thus it is highly important that Policies which are aimed towards exploiting the full benefits stemming from high-quality innovation, including design, are set high on the agenda of policy makers. It is our view that policies which encourage a holistic integration of design processes in the production process have the potential of creating higher value added goods and services produced and thus providing scope for increased productivity and higher living standards.

2.2 Community Innovation Survey

In this paper the main aim is to provide a general overview of the state of design activity in Maltese firms by making use of the 2012 **EU Community Innovation Survey (CIS)**. This is benchmarked against the main 'innovation' leaders, namely Germany, Italy, Finland and Sweden. Unfortunately, the survey includes data on companies which employ more than ten employees and therefore excludes smaller enterprises which may be more prevalent in the design sector in Malta.

2.2.1 Total Enterprises

According to Eurostat Data, in 2012 there were **779 enterprises in the total Maltese population which employ more than 10 employees**. 616 of these firms employed between 10 and 49 employees, 133 firms employed between 50 and 249 employees while the remaining 30 companies were larger firms employing more than 250 workers. The Table 1 shows the total number of enterprises in the population of the other respective countries during the survey period. Malta's distribution of enterprises is not atypical, though one

Table 1: Total number of enterprises

	Malta		Germany		Italy		Finland		Sweden	
Total Enterprises	779		135,033		116,621		8,576		17,954	
of which:		%		%		%		%		%
10 - 49 Employees	616	79	100,798	75	100,548	86	6,586	77	14,380	80
50 - 249 Employees	133	17	27,801	21	13,779	12	1,577	18	2,929	16
250 + Employees	30	4	6,434	5	2,294	2	413	5	645	4

notes a relatively higher prevalence of medium and large enterprises in Germany and a relatively higher prevalence of smaller enterprises in Italy.

2.2.2 Enterprises carrying out Design by Type of Innovation

2.2.2.1 Product (Goods or Services) Innovation

Table 2 portrays the proportion of local enterprises which engaged in design activities to improve or change the shape or the appearance of goods or services. **Product innovation is less prevalent among Maltese firms compared to their European counterparts**. This is particularly evident in small firms employing between 10 and 49 employees. However this ratio is more aligned with the other countries for larger firms employing more than 250 employees. Indeed it is worth noting that **product innovation tends to rise with enterprise size**. This is a common feature in all four countries analysed. This suggests that there may be a relationship between design activity and economies of scale. To our knowledge, this statistical relationship has not been analysed explicitly in the economic literature. At this stage two hypotheses can be conjectured. The first hypothesis suggests the presence of large fixed costs involved in design. As a result larger companies can reduce the unit costs of design and thus make them more competitive as they benefit from economies of scale. The second hypothesis conjectures that larger companies who have already made full use of economies of scale through mass production will at some point increasingly venture into design to differentiate their product from their competition.

2.2.2.2 Marketing Innovation

When it comes to marketing innovation, the ratio of Maltese enterprises which introduced significant changes to the aesthetic design or packaging to total enterprises **is generally**

Table 2: Innovation – Shape or the appearance of goods and services

% of Total Enterprises	Malta	Germany	Italy	Finland	Sweden
Enterprises engaged in design activities to improve or change the shape or the appearance of goods and services of which:	9	17	12	13	17
10 - 49 Employees	7	14	10	10	15
50 - 249 Employees	15	24	18	17	20
250 + Employees	30	39	29	33	29

Table 3: Aesthetics of design or packaging

% of Total Enterprises	Malta	Germany	Italy	Finland	Sweden
Enterprises that introduced significant changes to the aesthetic design or packaging of which:	14	15	15	10	14
10 - 49 Employees	11	12	14	9	13
50 - 249 Employees	23	21	21	14	16
250 + Employees	37	29	26	26	23

more comparable to that observed among our European peers, with the exception of smaller firms employing between 10 and 49 employees. This is illustrated in Table 3. In fact, Maltese enterprises in general made significant changes to aesthetic design or packaging that is comparable to Germany and Italy, and ahead of Sweden and Finland.

The level of design activity is also observed to increase with firm size. However, caution is to be exerted here when interpreting such results as the major contributor of this development may possibly be attributed to the changes in packaging which are strictly speaking more of a marketing activity than a holistic design approach per se. When substance is supreme, and critical mass is surpassed, then packaging becomes secondary in the value added chain.

Table 4: Enterprises changing aesthetics of goods or services

% of Total Enterprises	Malta	Germany	Italy	Finland	Sweden
Enterprises engaged in design activities to improve or change the shape or the appearance of goods or services and that introduced significant changes to the aesthetic design or packaging of which:	24	32	26	23	31
10 - 49 Employees	19	26	24	19	28
50 - 249 Employees	38	45	39	32	36
250 + Employees	67	68	55	59	52

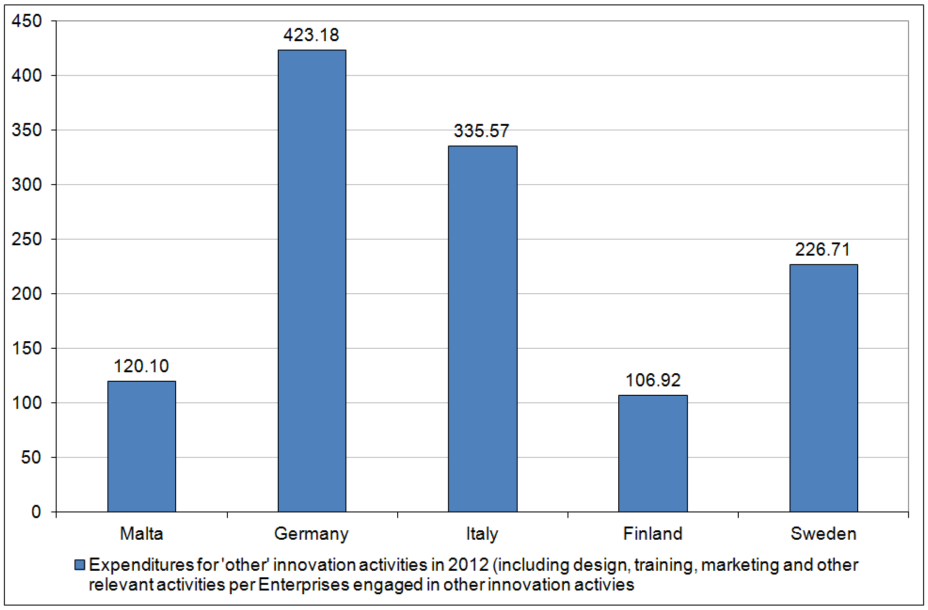
2.2.2.3 Product and/or Marketing Innovation

Both Product and Marketing Innovative firms were summed up together and their ratio as a percentage of total enterprises is shown in Table 4. The ratio for Malta is comparable to that of Finland, but is slightly lower than the one for Italy and notably lower than the ratios of Sweden and Germany. This is also reflective in the ratios for small businesses employing between 10 and 49 employees. On the other hand large Maltese firms employing more than 250 workers tend to engage more in design activities than the other Member States though this is predominantly due to marketing activities.

2.2.3 Design Expenditures

Figure 3 shows the level of expenditures per enterprise dedicated to 'other' innovation activities including design, training, marketing and other relevant activities. Unfortunately these statistics do not identify design expenditure on its own and therefore should only be treated as indicative. As can be seen the level of expenditure per firm in Malta, standing at €120,100, is comparable to Finland's spending per enterprise which is roughly estimated at €106,920. However, this is considerably lower than the expenditure per enterprise in Germany, Italy and Sweden which stand at €423,180, €335,570 and €226,710, respectively. Differences could be indicative of the extent of design activity undertaken but could also be related to different cost structures or due to different types of design activity demanded by varying industry set-ups within an economy. Unfortunately, it is not possible to identify clearly the cause of these wide divergences between countries from the limited information available, offering scope for future research.

Figure 3: Other Innovation Expenditure (including Design) per enterprise (€)



When analysing the level of innovation expenditure per firm by firm size, we get an equally diverse picture. As can be seen, in Figure 4, small firms in Malta employing between 10 and 49 employees spend more per capita on innovation activities when compared to most of their European peers. This could either mean that these firms are dedicating more effort in design or that design activity in Malta is more expensive. Given the lower proportion of small firms in Malta undertaking design activity suggests that the cost of design could be discouraging small firms to undertake design activity in Malta. This would be consistent with the economies of scale argument and would explain why less small firms engage in design activity in Malta which activity is relatively more expensive in Malta. This however remains at best a hypothesis which requires further study.

When taking into account enterprises which employ between 50 and 249 workers (Figure 5) the situation is slightly different. Expenditure per enterprise in Malta stands at €98,630, very similar to the level of expenditure of smaller Maltese enterprises. This is €46,170 more than the level of expenditure per firm in Finland. However, the big spenders in this category are Germany and Italy as their levels of expenditure per company stands at €212,410 and €374,680, respectively. No expenditure data was available for these medium-sized Swedish firms.

With reference to the economies of scale argument it is notable that the fixed unit cost element is a constraint which presumably diminishes with firm size, with variable costs

Figure 4: Other Innovation Expenditure (including Design) per enterprise (€) – 10 to 49 Employees

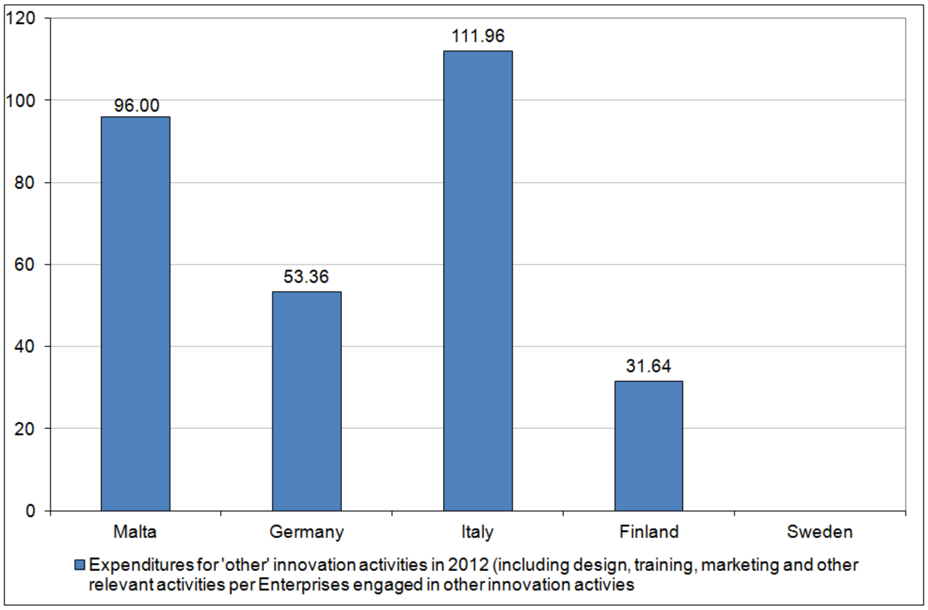


Figure 5: Other Innovation Expenditure (including Design) per enterprise (€) – 50 to 249 Employees

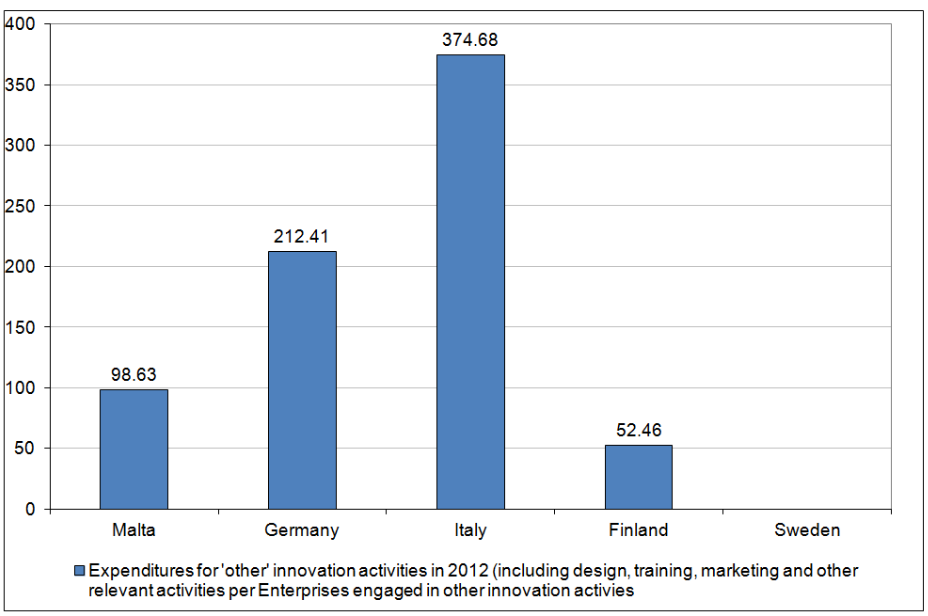
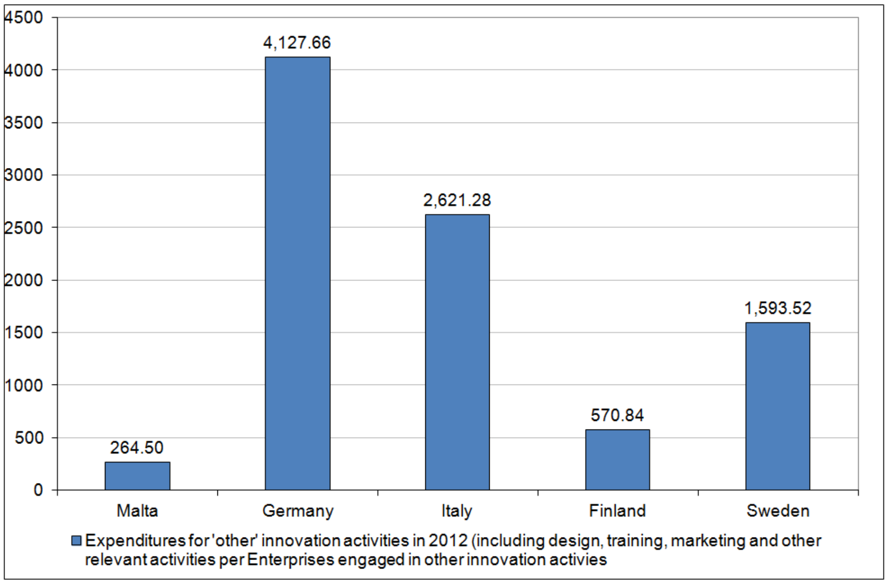


Figure 6: Other Innovation Expenditure (Including Design) per enterprise (€) – 250 or more Employees



of design becoming more important in the industrial process of larger firms. In this context more research would be needed to evaluate the hypothesis that Maltese medium-sized firms simply devote fewer resources to design activity compared to their European counterparts by way of choice versus the alternative hypothesis that lower design related expenditure is only due to lower unit variable costs (such as lower wages for Maltese designers, where wages would primarily be a variable cost) of design production. An element of both hypotheses is probably true in the case of medium sized firms though the fact that the proportion of medium-sized enterprises which engage in design is generally comparable with its European peers and that expenditure per capita among the medium sized enterprises is comparable to their smaller Maltese counterparts suggests that what we are observing is more related to lower variable cost of design production in Malta compared to its European peers.

Figure 6 indicates that large Maltese firms employing more than 250 employees spend significantly less on design, training, marketing and other relevant activities when compared to similar enterprises in other EU member states. Expenditure per enterprise in this category is highest in Germany standing at €4,127,660 followed by the levels of expenditure per firm in Italy and Sweden, standing at €2,621,280 and €1,593,520 respectively. This is significantly higher than €264,500 invested by large Maltese firms during the survey period[1]. The significant discrepancy suggests that this goes beyond arguments based on

[1]Due to the small number of large enterprises in Malta figures can easily be skewed by abnormally high/low

costs of design processes or economies of scale. Moreover the prevalence of larger enterprises engaging in design appears comparable with that of their European peers. This suggests that the lower average expenditure per enterprise is probably more indicative of a conscious decision to limit investment in design by larger enterprises. It is also worth keeping in mind that the majority of local firms employing more than 250 employees are foreign-owned, and most probably that the main design process is carried out abroad at the mother company suggesting constraints in technology transfer may be at play. Again this hypothesis offers scope for further research.

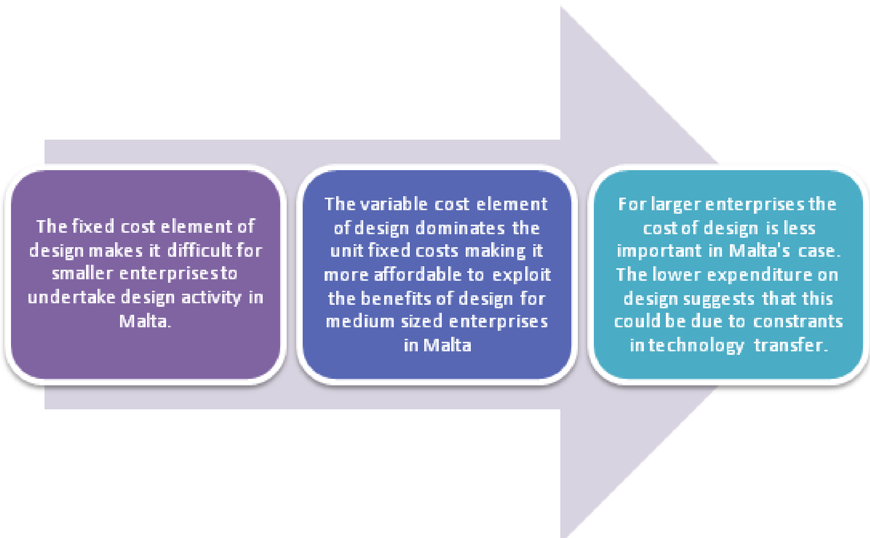
Whilst it is difficult to make concrete conclusions with a high degree of certainty given the limited information two tentative conclusions for further analysis may be appropriate at this stage. First, size matters given that an element of fixed costs may hamper smaller firms in engaging in design activity in Malta. At low volumes of output typically serviced by small firms, large initial fixed costs (such as sophisticated testing equipment or specialised design software licences) can increase the average costs of production and undermine the competitiveness of these firms. As companies grow, variable costs (such as hourly wages to employees engaged in design) make design activity more profitable as the more competitive variable costs become more relevant. At higher volumes of output average fixed costs are sufficiently competitive whilst variable costs such as hourly wages are likely to be very competitive in Malta compared to the comparable hourly wages in major design capitals in Europe. However, at some point larger Maltese enterprises may be encountering a different kind of constraint; foreign ownership of larger firms may hinder the technology transfer which may be required in design activity. Foreign firms in Malta may be reluctant to undertake design activity in Malta preferring to perform such higher value added production in their home country. This counterfactual of the constraints of design activity in Malta corresponding to the size of firms is illustrated visually in Figure 7 below.

2.2.4 Expenditure per enterprise by Sector

Figure 8 below illustrates the levels of innovation expenditure per enterprise engaged in 'other' innovation activities in the different sectors of the economy. The manufacturing sector in Malta dedicates the least resources to design and other related activities when compared to other Member States. It is also one of the sectors which dedicate the least amount of resources to design and innovation. This is in contrast to Malta's European peers where manufacturing is among the prime spenders in design and innovation. The level of such expenditure per enterprise in the local Manufacturing sector stands at €80,440 which is low when compared to €134,220 in Finland, €294,650 in Sweden, €342,450 in Italy and €516,710 in Germany.

expenditure of a single firm.

Figure 7: Design Constraints by Firm Size



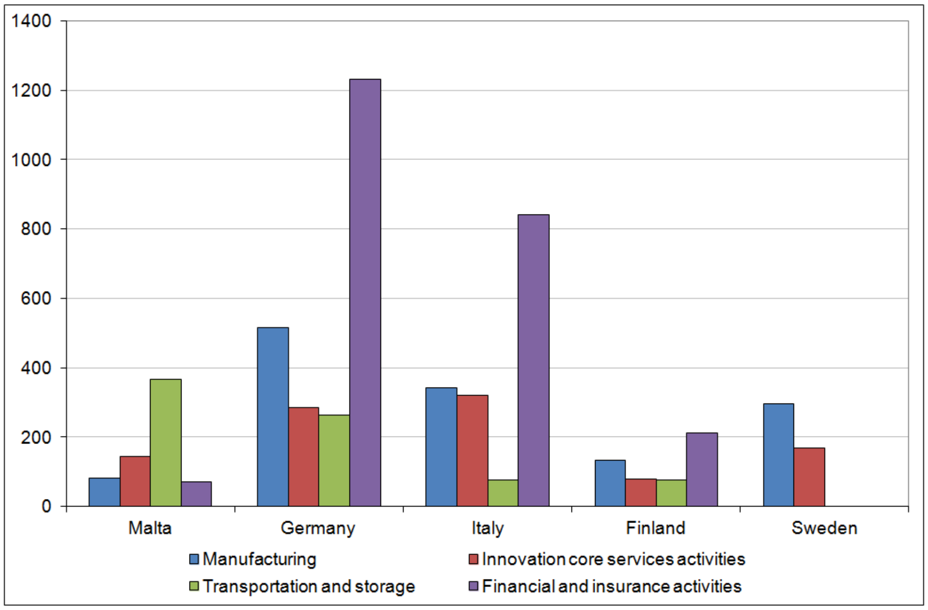
When it comes to services, Maltese companies also seem to be investing little in design. Although expenditure per firm in Malta (€143,130) is higher than Finland's (€79,790) it is lower than in the other countries. In Sweden, the level of expenditure per firm hovers around €167,200 while in Germany and Italy these stand at €284,430 and €319,830, respectively.

A relatively higher expenditure per enterprise in Malta is recorded in the transport and storage sector. In this sector, the level of expenditure per firm in Malta is the highest among the countries being reviewed. During the survey period local firms invested €367,200 per firm on transportation and storage activities. This is notably higher than €75,690 spent on average by each Italian company, €77,350 spent in Finland and €263,070 invested by German enterprises. No expenditure data was available for Sweden. It is to be kept in mind that given the size of Malta and the small scale of the local market, it is possible that the level of average expenditure per firm in other innovation activities is skewed by the activities of single firms, particularly in the domestic oriented sector characterised by high market concentration.

Innovation expenditure per enterprise in the financial sector is the lowest in Malta (€71,500) among the countries being assessed. It is also the lowest for Malta among the sectors analysed in the Survey. This is the highest in Germany, standing at €1,232,320 followed by €840,650 in Italy and €211,830 spent on average by each Finnish company during the survey period. Again no expenditure data was available for Sweden.

Figure 9 delves in further detail to show the relevant innovation expenditures by local

Figure 8: Innovation Expenditure per Enterprise engaged in 'other' innovation activities by NACE



firms in the respective sectors of the economy. As already stated, local manufacturing companies invest little in design, training and other related activities when compared to other Member States. To this end it can be noted that the top levels of average spending per manufacturing firm lies within the manufacturing of food products (€142,000) and the manufacturing of machinery and equipment (€100,000). And even in these two top-performing sectors in terms of design investment, the innovation expenditure per enterprise is way below the average per capita expenditure in manufacturing which exceeds €300,000 among European peers analysed in the present.

The average expenditure per firm in Malta within the innovation core services activities hovers around €143,000. This is also relatively low by European standards where average spending exceeds €200,000. It is however interesting to note that Maltese enterprises in retail, post and transport spend more than this European average. Also notable is the expenditure of €168,000 in computing and consultancy services. It can also be noted that expenditure per enterprise in professional, scientific and technical activities stands at €118,000 and the spending per firm in Architectural and engineering as well as Legal and accounting activities stand at €107,000 and €98,000 respectively. These levels exceed most manufacturing sectors though they are still low when compared to European standards evaluated in this analysis.

Another interesting feature is that the top performers are mostly in industries which are typically domestically owned. Alternatively, none of the industries which are typically foreign owned register innovation and design expenditure comparable to the European peers evaluated in this analysis supporting the hypothesis suggested earlier that constraints to technology-transfer may be a factor limiting design investment.

Given that 'other innovation' expenditure includes spending on design, training, marketing and other related activities, it is also interesting to observe that manufacturing is the sector which spends the least on other innovation activities including design, both when compared to other sectors in Malta as well as compared to manufacturing in other European countries. This is in contrast to Germany and Italy where manufacturing companies invest considerably in other innovation activities including design, just second to financial services firms. Also notable for its relatively low level is the spending on other innovation activities including design in financial services locally.

Moreover, the most notable spenders of other innovation activities including design, are unexpectedly found to be traditional sectors in services (Transport, Post, Retail) but also IT and consultancy services, as well as traditional manufacturing (Food, Electronics). Given the small size of Malta, a single firm in both the Transport, as well as the Postal services, could skew the level of average spending per enterprise, when compared to other industries in Malta or abroad.

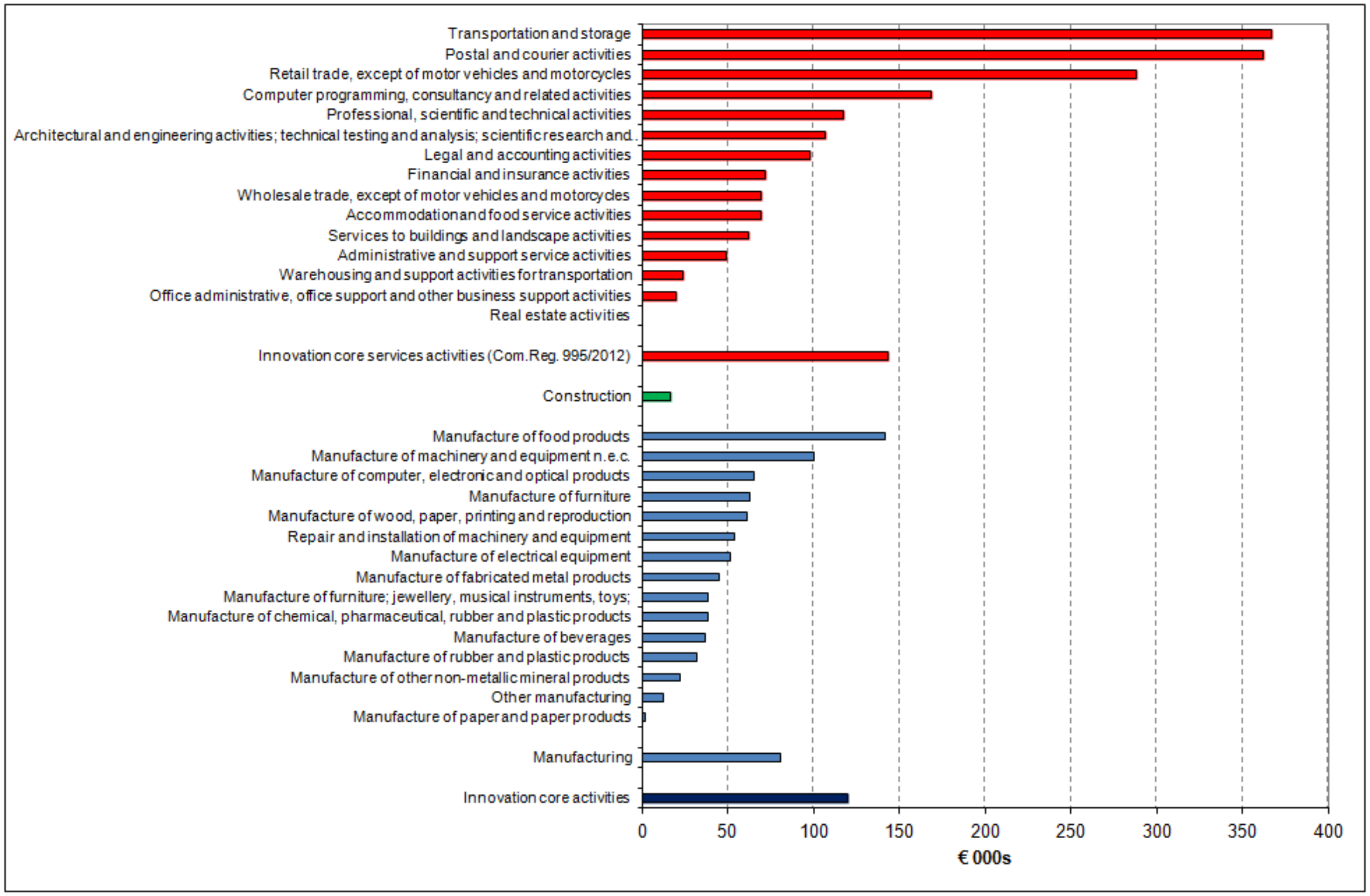
2.3 Multi-Country Analysis: Conclusions

Manufacturing is the sector which spends the least on other innovation activity including design both when compared to other sectors in Malta and compared to manufacturing in other Member States. This is in contrast to Germany and Italy where manufacturing spends considerably in other innovation including design (only second to financial services).

Also notable for its low level of average spending per enterprise is the spending on other innovation, including design in financial services in Malta. The most notable other innovation including design spenders are surprisingly found in traditional sectors in services (such as Transport, Post, Retail), long established manufacturing (such as Food, Electronics), and IT and consultancy services.

Only in transport, post and retail is the expenditure per enterprise comparable to that found in EU Member States though the limited size of the domestic market and thus the unavoidable market concentration often by a single firm in these industries (primarily in transport and post) limits the comparison with larger economies. In itself however, the study of market structures and its effect on design investment is another stream of research which could be explored further in the future.

Figure 9: Expenditure per Enterprise engaged in 'other' innovation activities



3. Input-Output Analysis of the Design Sector in Malta

With that comparative positioning of Malta in relation to reference EU economies leading in innovation (see Section 2), re-enacting the economic thinking discussed in Figure 1 in Section 1.3, recalling Malta's positioning on WEF competitiveness (see Section 1.4), and our discussion on the SBS understanding of design (see Section 1.5.2), we now turn our attention to the Creative Economy Report (EPD, 2014 Update), and its focus on the design sector as the combination of architecture, engineering and specialised design services, **our proxy for the present study**.

Undeniably design activity is intrinsically linked to many other sectors of the economy which use design as an input in their production process. Indeed around three-fourths of design activity in the UK is performed in non-design industries (UK Design Council; 2015). If such metrics were applicable for Malta, then it is clear that we are probably capturing a share of design activity by referring to architecture, engineering and specialised design services. Moreover, these design sectors probably make use of the output of other industries in order to generate design activity. The inter-industry linkages involving design activity as an input in production and delivery as an output in terms of design services can best be captured through an input-output framework.

This analysis is based upon the paper by Ian Cassar (2015), *"Estimates of output, income, value added and employment multipliers for the Maltese economy"*, which was published by the Central Bank of Malta. The **direct, indirect and induced impacts** of the design sector in the Maltese economy can be estimated through the use of input-output modelling. An Input-Output model is a quantitative economic technique that represents the interdependencies between the different sectors of an economy.

3.1 This Study's Proxy for the Design Sector in Malta

This analysis focuses mainly on **architectural and engineering activities** as this is the sub-sector which is closest to the design sector in Malta in the current state of economic development. In this regard it may be noted that national statistics do not identify a deliberate, explicit design sector; one with design recognised as an upstream activity running across industry verticals. At the current state of play, sector-specific designers would be designing new products and new services, adding upstream value. Ongoing EPD analyses point to the possibility of higher gross value added in sector after sector. That case has been argued incrementally, herein, and in subsequent EPD studies.

The division of architectural and engineering activities captures the provision of **architectural services, engineering services, drafting services, building inspection**

services, surveying, and mapping services. The architectural and engineering sector however does not include specialised design activities, which are also an important element of the design industry. In this respect the **other professional, scientific and technical activities sector** has also been chosen as part of this analysis. This sector includes **specialised design activities, industrial design, photographic activities and fashion design related to textiles, wearing apparel and furniture**.

Some comments are in order relating these activities to design activity in a broad but a strict literal sense. As for 'engineering services' and 'drafting services', it is fair to state that all of drafting, freehand drawing and engineering drawing (technical drawing) are design real-and-proper. As for 'inspection services'; in cases where this is verification of "as-built", "as-designed", this may include design viz. the design of testing, prior to test execution.

It is important to note that the design sector appears to be slightly overstated when compared to that presented in the 2014 Update of the CCIs report. The combination of architectural, engineering, and specialised design activities is overstated mainly due to a number of products and services that do not specifically pertain to the design sector, and that have been included within these sectors due to the their respective classifications.

Cassar (2015) constructed an industry-by-industry **Symmetric Input-Output Table (SIOT)** for Malta for the year 2008, based on the fixed production sales structure assumption, which follows the Eurostat Manual of Supply, Use and Input-Output Tables published in 2008. Under this assumption, each product has its own specific sales structure, irrespective of the industry where it is produced. The SIOT was derived from the Supply and Use Tables (SUTs) for the year 2008, published by the National Statistics Office of Malta in 2013. The SUTs are based on the concepts and definitions of the Eurostat System of National and Regional Accounts of 1995 (**ESA 95**). The SIOT for Malta for 2008 constructed by Cassar (2015) has a **59 industry level of disaggregation** which follows in large part the classification according to the **European Statistical Classification of Economic Activities (NACE) Rev.2** (2008).

In his paper, Cassar (2015) was able to derive industry specific multipliers based on the input-output methodological framework at a **highly disaggregated industry level**. The present study will be making use of the multipliers derived from Cassar (2015) to analyse the design sector in Malta, not only by analysing the size and interpretation of the multiplier relative to the sector concerned, but also by outlining the ranking of the multiplier of the design sector relative to other sectors.

We may anticipate that the findings represent both intuitive and somewhat surprising emergence. This EPD line of research is providing insights that are both novel and sometimes unknown, because design has not hitherto been a category of local economic discourse.

3.2 Multiplier Analysis

The multiplier measures the impact on the total economy as a result of an initial increase in the final demand of a specific industry. A significant advantage of using input-output multipliers is that the economic impact of the exogenous shock can be measured in terms of its **direct, indirect and induced effects**. The direct effects reflect the output produced, the value added, the income, and the employment generated from the architectural and engineering industry itself. The indirect effects represent the result of several rounds of spending after the first direct spending takes place. The latter rounds of spending capture the interlinkages between industries that result from the architectural and engineering sector. The induced effects capture the change in household consumption that is generated by changes in the labour income earned as a result of the direct and indirect effects of economic activity taking place within the architectural and engineering sector.

Multipliers are generated as either **Type I** or **Type II** multipliers. Type I multipliers reflect the **direct** and **indirect** effects on production as a result of a 1 Euro increase in final demand. Type II multipliers add the **induced** effects resulting from increased consumer spending, resulting from labour income. Industries with relatively high multipliers are indicative of strong economy linkages with other industries in the domestic economy and/or the absence of significant leakages abroad in the form of imports of goods and services necessary to produce a desired output.

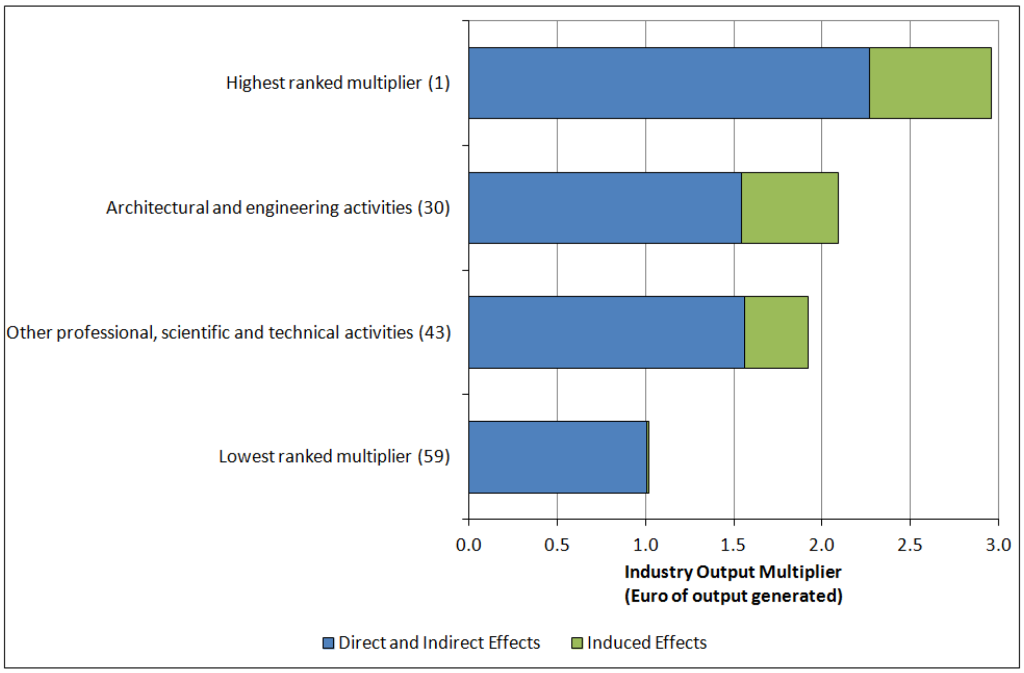
3.2.1 Output Multipliers

The output multiplier shows how a 1 Euro increase in the final demand of a particular sector would result into additional increases in the total value of production in all the sectors of the economy. The output multiplier is primarily an indicator of the degree of structural interdependence between industries in the economy.

As illustrated in Figure 10, design displays a relatively strong output multiplier effect compared to the other sectors of the Maltese economy. In fact, Type I output multiplier for architectural and engineering activities is equivalent to a value of **1.54**. Consequently, for every 1 Euro of new final demand for architectural and engineering activities, a total €1.54 of output is generated. Moreover, other professional, scientific and technical activities also display a relatively strong multiplier of **1.56**. It has to be noted that both the architectural and engineering activities and the specialised design activities have amongst the highest ranked (amongst the top 20 out of 59 industries) Type I output multiplier relative to the other sectors of the Maltese economy, indicating significant linkages with the rest of the economy.

Under the Type II output multipliers, the induced effects are included together with the direct and indirect effects. Within the architectural and engineering activities sector, the induced effects amount to **0.55**, resulting into a Type II output multiplier equivalent to **2.09**. The ranking of the Type II multiplier of the architectural and engineering activates has fallen, suggesting that the industry is either less labour intensive than others or that it pays relatively lower wages than other industries or that value added is mostly appropriated as profits rather than wages, it is still ranked amongst the median of the various industry multipliers in the Maltese economy. The same can be said of other professional, scientific and technical activities, which with the inclusion of the induced effects now ranks at the lower end of the economy, with a Type II multiplier equivalent to **1.92**.

Figure 10: Output Multipliers*



Source: *Estimates of output, income, value added and employment multipliers for the Maltese economy by Dr. Ian Cassar (2015)*

* *The numbers in the brackets represent the rankings of the Type II multiplier*

3.2.2 Value Added Multipliers

Although economic output measures the total quantities of goods and services produced by all the industries in the economy, it is more useful to look at the estimates of the impact on the economy as per change in GDP.

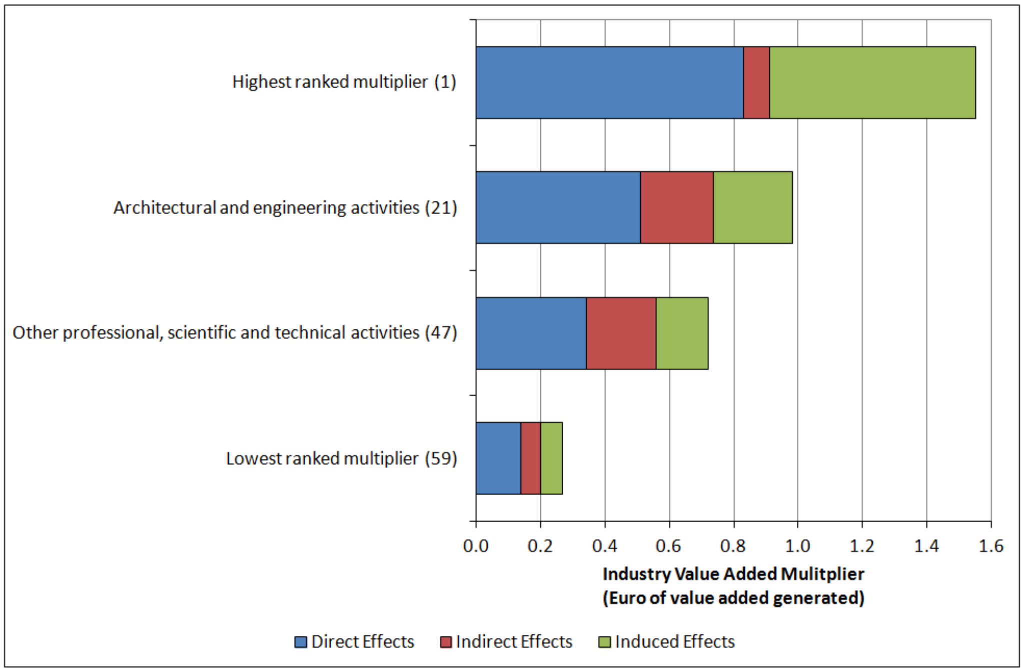
Value added multipliers tend to be more indicative since they measure how a 1 Euro increase in the final demand of a particular sector would generate value added in the economy. **Value added is defined as being economic output less intermediate consumption**. Value added generated by an industry is typically distributed between **wages and salaries, and profits**.

Value added multipliers for most industries tend to be below unity, because they exclude the inputs in the production process, whether these are imported raw materials or intermediate inputs. This is normally the case when Type I value added multipliers are computed. An increase in the final demand typically yields an increase in value added which is less than the initial change in exogenous expenditure. A proportion of the output is generated either directly by other industries, taxed, or produced by foreign firms and imported. Although a part of Malta's leakages are attributable to taxes and savings that may be re-spent in the economy at a later stage, most of Malta's leakages are attributable to imports.

Type I value added multipliers for Malta range from a maximum of 1.00 to just 0.18. Type I value added multiplier for architectural and engineering activities is relatively high at **0.74, ranking** 20^{th} **out of 59 industries in the economy**. This means that for every 1 Euro increase in the architectural and engineering sector would generate on average €0.74 of value added in the economy. From this amount, **€0.51** is coming from the direct spending by the respective sector whereas **€0.23** is generated from the purchases of design inputs from other sectors. The architectural and engineering sector displays a relatively low import content which means that most of the value added it creates remains in Malta, and therefore less is leaked out of the Maltese economy, contributing to a relatively high gross value added multiplier. In fact, the architectural and engineering sector displays amongst the highest ranked multiplier in the economy at a value of 0.74, which is indicative of strong economy linkages with the other industries of the Maltese economy.

Type II value added multiplier for architectural and engineering activities increases to a value of **0.98**. From this multiplier, **0.25** is attributable to value added arising from induced effects through the consumer spending as a result of labour income generated in this sector. The Type II value added multiplier for architectural and engineering activities is not only one of the highest ranked multipliers in the Maltese economy, but also the highest ranked amongst the creative economy sectors. Value added multipliers are illustrated in Figure 11.

Figure 11: Value Added Multipliers*



Source: *Estimates of output, income, value added and employment multipliers for the Maltese economy by Dr. Ian Cassar (2015)*

* *The numbers in the brackets represent the rankings of the Type II multiplier*

Type I value added multiplier for other professional, scientific and technical activities is equivalent to **0.56, ranking relatively low in** 43^{rd} **out of 59 industries in the economy**. Unlike the architecture and engineering sector, specialised design appears to require a significant amount of imports or is linked to industries whose production also has significant import content. In other words the product and service input necessary in carrying out design activity is imported from abroad and diminishing the value added of specialised design activities in the economy. With the inclusion of the induced effects of **0.16**, the ranking of this sector (47^{th} out of 59 industries) does not improve, displaying a Type II multiplier of **0.72**.

3.2.3 Income Multipliers

When analysing the impacts on the economy, the income component has a direct effect on household welfare and living standards since this represent the income of people in terms of wages and salaries. Indeed, the income multiplier reveals that portion of value added related to wages and salaries. The income multiplier represents the labour income generated in the economy following a 1 Euro increase in the final demand of a particular sector. Sectors which are more labour intensive tend to generate the highest income multipliers in the economy.

The architectural and engineering sector generated a Type I income multiplier of **0.32**. This means that labour income is expected to increase by €0.32 for every 1 Euro increase in the final demand for architectural and engineering activities. Type I income multiplier for the architectural and engineering sector is divided between direct effects of **€0.21** paid in form of wages to people employed directly within this sector, and indirect effects of **€0.11** paid to workers employed in other sectors of the Maltese economy as a result of the linkages between the different sectors. Although the income multiplier for the architectural and engineering sector is ranked approximately in the median of the various industry income multipliers, it is still amongst the highest within the creative economy sectors.

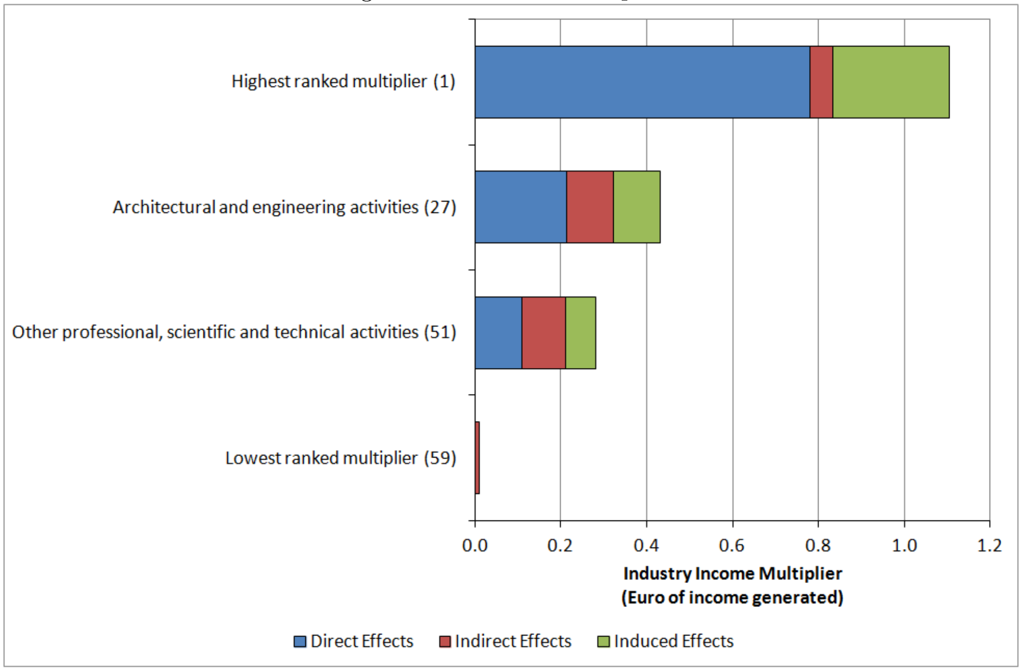
On the other hand, other professional, scientific and technical activities generated a relatively weak Type I income multiplier of **0.21**, which is amongst the lowest in the Maltese economy, and within the creative economy sectors. As we will see later in this analysis this low ranking of the income multiplier is observed despite the high ranking of the employment multiplier. This indicates that specialised design services are a relatively labour intensive but low wage sector or that income is appropriated more in the form of self-employment income or profits.

Type II income multiplier of the architectural and engineering sector has a value of **0.43**; with **0.11** attributable to the induced effects. Other professional, scientific and technical activities display a Type II income multiplier equivalent to **0.28**; with induced effects of **0.07**. It needs to be noted that as illustrated in Figure 12, these results indicate that the design sector is not necessarily one of the most labour-intensive industries in Malta or that most of the value added generated is appropriated as profits rather than labour income.

3.2.4 Employment Multipliers

A more direct indicator of labour intensity of production is measured by the employment multiplier. In computing the employment multiplier, it is assumed that the employment levels within an industry are closely tied to the amount of output generated. The employment multiplier represents the number of jobs created per 1 million Euro additional final demand of a particular sector.

Figure 12: Income Multipliers*



Source: *Estimates of output, income, value added and employment multipliers for the Maltese economy by Dr. Ian Cassar (2015)*

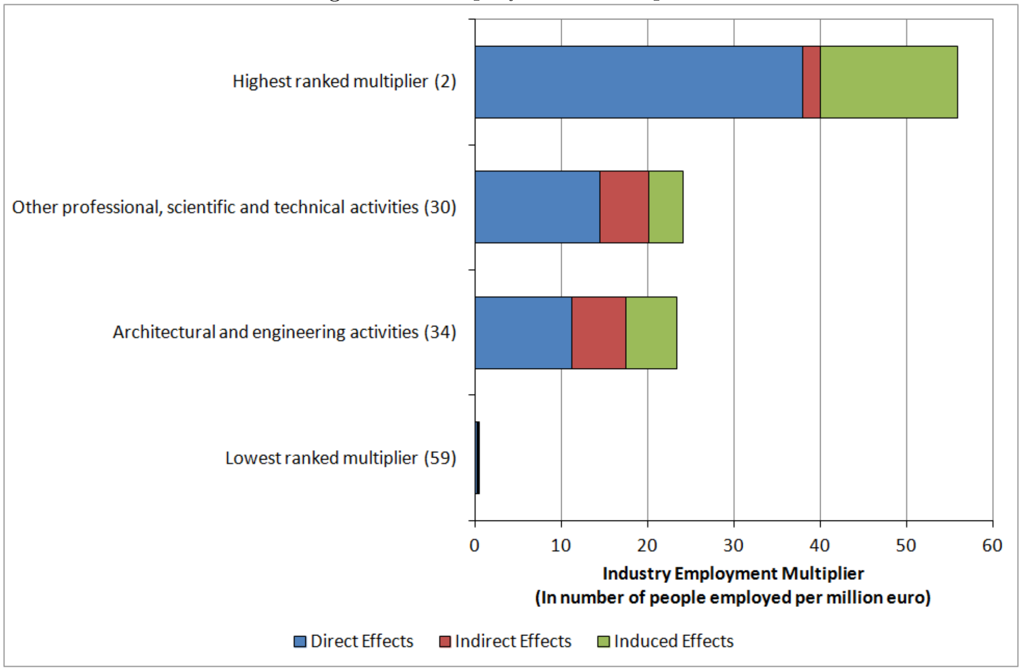
* *The numbers in the brackets represent the rankings of the Type II multiplier*

Type I employment multiplier for the architectural and engineering activities is equivalent to **17 jobs**, which is ranked amongst the median of all the sectors in the economy, in 33^{rd} **place**. Thus, on average, 17 jobs are being created for every 1 million additional final demand from the architectural and engineering sector. From these 17 jobs, **11 jobs** are being created through direct effects, whereas **6 jobs** are as a result of indirect effects. This ranking suggests that architecture and engineering design is not a particularly labour intensive form of production or that it is mainly made up of self employment.

On the other hand the Type I employment multiplier for other professional, scientific and technical activities is ranked higher than architectural and engineering activities, in 27^{th} **place** with a value of **20 jobs**. This indicates that specialised design activities are more labour intensive than architecture and engineering design services.

With the inclusion of an additional **6 jobs** being created through induced effects, the Type II employment multiplier for architectural and engineering activities has a value of **23 jobs**. The Type II employment multiplier for the specialised design industry is

Figure 13: Employment Multipliers*



Source: *Estimates of output, income, value added and employment multipliers for the Maltese economy by Dr. Ian Cassar (2015)*

** The numbers in the brackets represent the rankings of the Type II multiplier*

slightly higher with a value of **24 jobs**; **4 jobs** being created through induced effects. The employment multipliers are illustrated in Figure 13. It needs to be noted that in the analysis carried out for the employment multipliers, the highest ranked multiplier in the Maltese economy has been regarded as an outlier, and thus not considered in this analysis. As such, in Figure 13, the second highest employment multiplier in the economy is being illustrated as a means of comparison with the architectural and engineering sector multiplier.

3.3 Industry Interlinkages

Input-Output modelling also provides information on the interlinkages between different industries in the economy. The analysis that follows gives an indication of the industry interlinkages with the architectural and engineering sector in the Maltese economy. Figure 14 illustrates the industries from where the architectural and engineering sector purchases principally its inputs, whereas Figure 15 illustrates the industries to which it supplies most of its output produced.

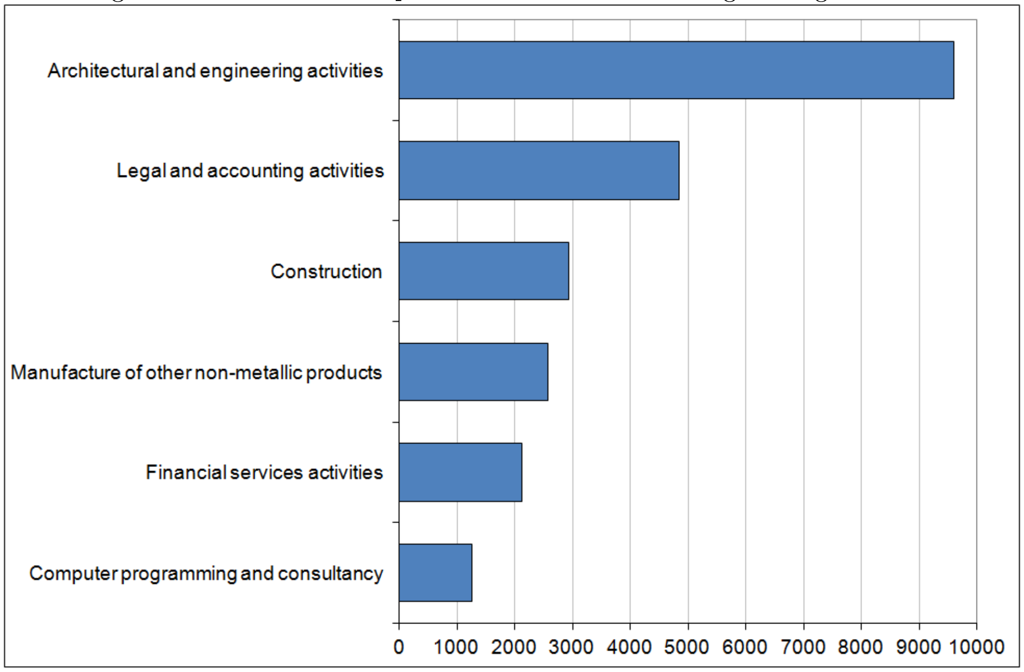
The architectural and engineering sector purchases most of its inputs from activities undertaken within its own industry. Thus, firms and companies engaged in design activities are important providers of intermediate products for the architectural and engineering sector itself. Although these inputs form a substantial part of the total inputs required by the architectural and engineering sector, other inputs from different sectors of the economy are required by the design industry.

The second largest sector from where these inputs are purchased is the legal and accounting sector; which includes preparation of legal documents such as articles of incorporation, partnership agreements, patents and copyrights, and preparation of deeds, which are important requirements when entering into building and engineering design projects. The other main sectors in the economy from where the architectural and engineering sector purchases its inputs are as follows; the construction industry which includes new work, repairs, additions, and alterations of general and specialised construction activities for buildings and civil engineering works, and the manufacture of other non-metallic products such as glass and glass products, ceramic products, tiles and baked clay products. The financial services sector and the computer programming, consultancy and related activities sector also serve, albeit to a lesser extent, as sources of inputs to the architectural and engineering sector. These inter-industry linkages provide a valuable source of information in the design of a design cluster such as the Valletta Design Cluster forming part of the Valletta 2018 portfolio of projects.

The architectural and engineering sector is mainly a supplier of outputs to its own self. Although a significant part of the outputs provided by the architectural and engineering sector are used by firms and companies engaged in design activities, there are other sectors of the economy that make notable use of these outputs. The main sectors in the Maltese economy to which output is supplied the most are as follows; the repair and installation of machinery and equipment including the provision of general or routine maintenance on such products, the mining and quarrying industry which includes the extraction of minerals occurring naturally as solids, liquids, or gasses, and the construction industry. Other sectors in the economy that demand architectural and engineering outputs, to a lesser extent, include the public administration and defence sector, and real estate activities.

Of notable importance by their exclusion among the top users of design activity are main manufacturing industries. This seems to support an earlier conclusion of this paper that much of the design activity carried out in manufacturing probably takes place abroad indicating constraints in technology transfer.

Figure 14: Purchases of Inputs – Architectural and Engineering Activities

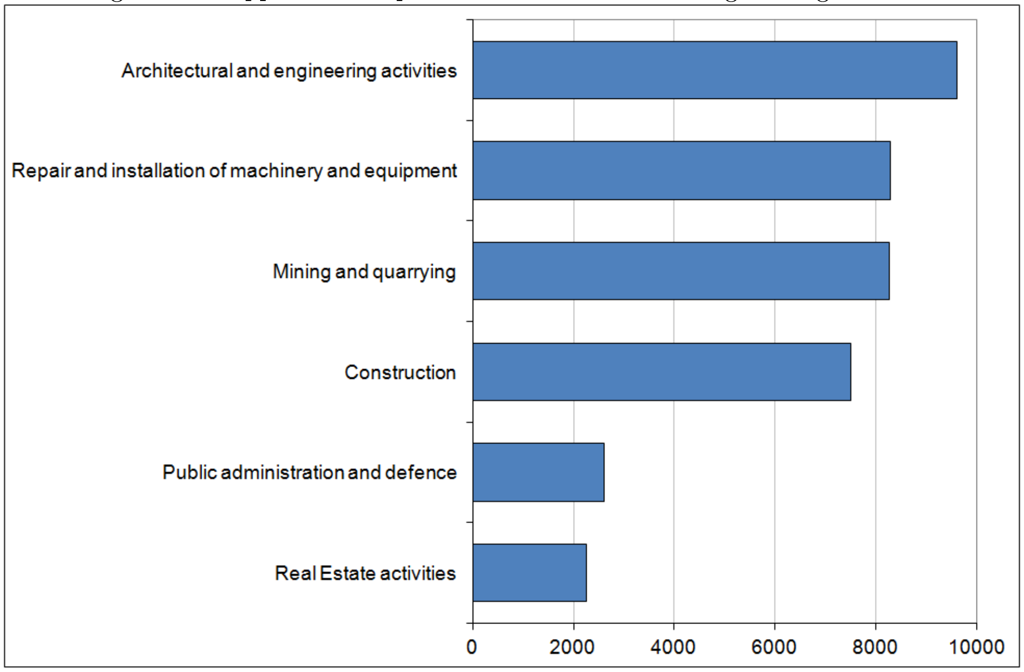


Source: *Dr. Ian Cassar (2015); in thousands of Euros*

Other professional, scientific and technical activities are one of the smaller sectors within the Maltese economy, but are of importance for the design industry due to the inclusion of specialised design activities, industrial design and fashion design within this sector. Other professional, scientific and technical activities purchases most of its inputs from legal and accounting activities; including preparation of legal documents such as articles of incorporation, partnership agreements, patents and copyrights. These are important since this sector deals with specialised design activities such as fashion design, industrial design and activities of graphic designers and interior decorators, and photographic activities which require the products provided by legal activities. The sector of other professional, scientific, and technical activities also purchases a number of inputs from its own self. Thus, when considering the creative element of this sector, firms and individuals involved in specialised design activities require intermediate products provided from similar sources of production.

There are other sectors in the economy that provide inputs to other professional, scientific and technical activities, albeit at a lesser extent. These are as follows; rental and leasing activities such as the renting and leasing of machinery and equipment used for business operations, printing and reproduction of recorded media, and the creative, arts

Figure 15: Supplies of Outputs – Architectural and Engineering Activities

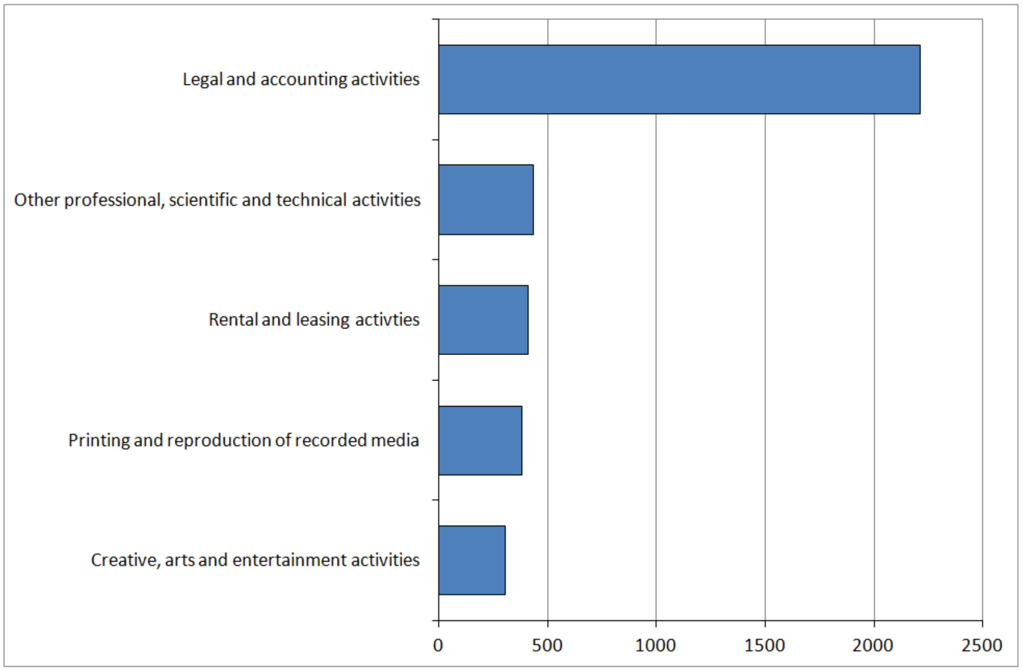


Source: *Dr. Ian Cassar (2015); in thousands of Euro*

and entertainment sector. The major sectors in the economy that provide inputs to other professional, scientific and technical activities are illustrated in Figure 16.

Other professional, scientific and technical activities supply most of their outputs to the creative, arts and entertainment; gambling and betting sector. This was to be expected since the creative, arts and entertainment; gambling and betting sector would make use of the products and services provided by other professional, scientific and technical activities, such as specialised design and photographic activities, for activities in the creative and performing arts such as live theatrical performances, concerts, and other artistic events. Specialised design activities include textiles, wearing apparel, shoes jewellery, furniture and other fashion goods. Specialised design is also required by the gambling and betting companies as well. Moreover, photographic activities (which are defined under visual arts rather than design in the CCI Report) include photography and videotaping of events. Other sectors to which the other professional, scientific and technical activities supply their outputs include; the mining and quarrying industry, public administration and defence, warehousing and support activities for transportation, and manufacture of furniture. It is interesting to note that the link with manufacturing is mostly missing except in the case of furniture manufacturing. This supports the findings emerging from

Figure 16: Purchases of Inputs – Other professional, Scientific and Technical Activities



Source: *Dr. Ian Cassar (2015); in thousands of Euro*

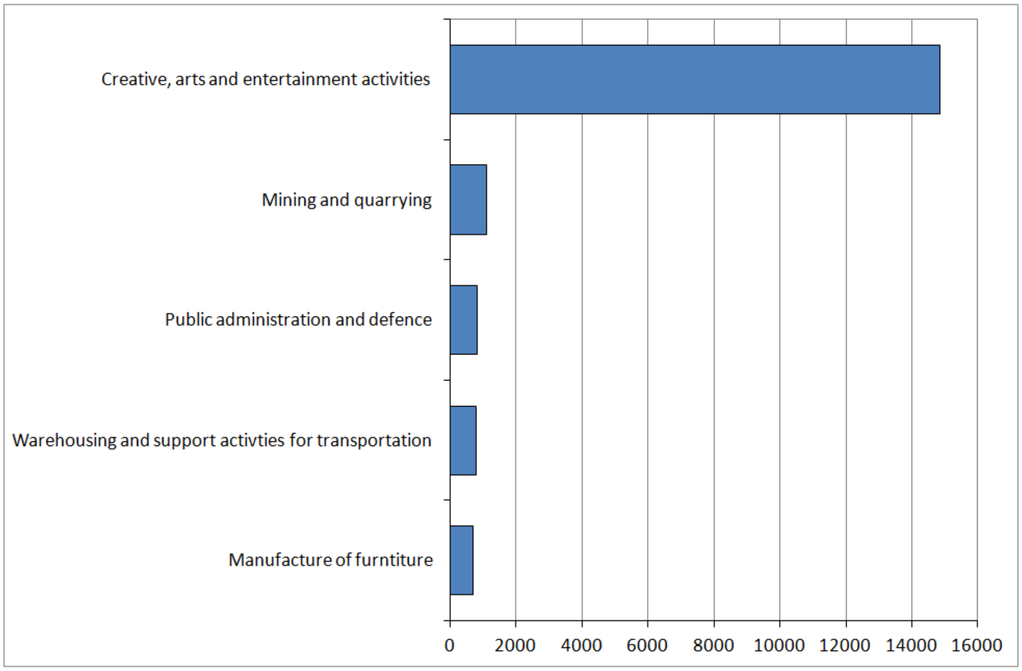
the CIS, albeit this analysis is also including micro enterprises of less than 10 employees. The sector to which other professional, scientific and technical activities 'outputs are supplied the most are illustrated in Figure 17.

3.4 Input-Output Analysis: Conclusions

This analysis has further strengthened the importance of the design sector in Malta. Although there is no specific 'design' sector identified in national statistics, the architectural and engineering industry and other professional, scientific and technical activities has been considered as the sub-sector closest to the design sector in Malta.

The multipliers have shown that the architecture and engineering design sector is positioned quite strongly with the rest of the sectors in the Maltese economy. In fact, value added multipliers for the architectural and engineering sector are amongst the highest ranked in the Maltese economy, indicating that the architecture and engineering design sector generates a lot of value added in the economy. The architecture and engineering

Figure 17: Supplies of Outputs – Other professional, Scientific and Technical Activities



Source: *Dr. Ian Cassar (2015); in thousands of Euro*

design sector is also a relatively important driver of income and jobs for Malta. However, it is relatively less labour intensive than other sectors of the economy and most of the income is in the form of profits or self-employment. Furthermore, the architectural and engineering design sector displays one of the most highly ranked value added multipliers amongst the creative economy sectors indicating significant linkages with the rest of the economy and limited leakages through imports.

The other design sub-sector included in this analysis is that of other professional, scientific and technical activities, capturing mainly specialised design activities, together with industrial and fashion design. Whilst specialised design activities are relatively strongly linked with the rest of the economy most of the products and services inputs involved in the production process is imported from abroad such that the domestic value added content left in the economy is relatively weak. The specialised design sector is more labour intensive than architecture and engineering design though it ranks rather poorly in terms of income multiplier effects suggesting that the sector does not pay high wages or that a higher proportion of income is distributed in the form of profits or self employment income.

The analysis has also shown scope for further linkages with the rest of the economy, particularly manufacturing which makes limited use of the design services provided by architecture and engineering. The absence of manufacturing industries as major consumers of design is also present amongst specialised design activities; with the only noted exception being the demand by the furniture industry. The absence of strong output links by specialised design activities with financial services is also notable. These findings support those obtained from the analysis of the CIS. The analysis has also identified the major inputs and outputs of the design industry which provide scope for their incorporation in a design cluster.

4. Overall Conclusion

The potential for **design innovation** to move Malta's productive capacity in manufacturing and services upstream towards higher productivity and value added provides the main justification for the research on design undertaken in this paper. Arguably this research has provided more questions and hypothesis than answers and proofs due to the lack of detailed information on design and a systematic and academic evaluation of design activity in Malta. Such research specifically on design is also to a certain extent lacking internationally despite the renewed interest in this subject in recent years. By making use of the limited information on design, often employing huge assumptions and proxies, this paper has drawn some tentative conclusions on design activity in Malta which however would benefit from further research.

Conscious of the data limitations surrounding this analysis the Economic Policy Department is currently embarking on a number of research projects, including data collection, and a dedicated survey on design in collaboration with NSO and other interested parties, in order to start addressing some of the research questions identified in this study with a view to guide policy formulation in this area. Nevertheless, some conclusions and hypothesis can still be drawn from the present research.

First, size matters and an element of fixed costs in design may hamper smaller firms in engaging in design activity in Malta. This may explain why smaller firms spend as much as their European counterparts on design but the proportion of firms engaging in design is lower. As companies grow, variable costs make design activity more profitable as the more competitive variable costs become more relevant. This explains why the situation in medium sized firms is more akin to that of European counterparts in terms of expenditure levels and predominance of design activity among firms. However at some point larger Maltese enterprises seem to encounter a different kind of constraint. Whilst the prevalence of design activity among larger firms is relatively comparable to European counterparts, the investment expenditure in design activity is far too low. The paper puts forward the hypothesis that constraints in technology transfer of the typically foreign owned larger firms, particularly in manufacturing could explain the relatively low investment in design activity. In this context there is further scope for further research on the costs of design processes, probably distinguishing by type of design and industry base. The constraints of technology transfer in design activity and the lack of design activity particularly in manufacturing but also in financial services which was identified by this research also presents a policy relevant research question.

At a sectoral level, manufacturing is the sector which spends the least on other innovation activity, including design, both when compared to other sectors in Malta and also when compared to manufacturing in other Member States. This is in contrast to Germany and Italy where manufacturing spends considerably more in other innovation including design (only second to financial services). Also notable for its low level of average spending per enterprise is the spending on other innovation, including design in financial services in Malta. These findings are corroborated both by the analysis of the CIS and also the input/output analysis of architecture, engineering and specialised design services. On the contrary, the most notable other innovation including design spenders are surprisingly found in traditional sectors in services (such as Transport, Post, Retail), traditional manufacturing (such as Food, Electronics), IT and consultancy services.

Only in transport, post and retail is the expenditure per enterprise comparable to that found in EU Member States though the limited size of the domestic market and thus the unavoidable market concentration often by a single firm in these industries (primarily in transport and post) limits the comparison with larger economies. In itself however, the study of market structures and its effect on design investment is another stream of research which could be explored further in the future.

An analysis on the potential economic impact of design and its sectoral linkages was carried out on the basis of research by Cassar (2015) on the input-output matrix for the Maltese economy. Although there is no specific 'design' sector identified in national statistics, the architectural and engineering industry and the other professional, scientific and technical activities were identified as the sub-sector closest to the design sector in Malta. These capture architecture, engineering and specialised design services. One can however discern some different characteristics in the different strands of design as defined in the CCI Report.

The multipliers have shown that the architecture and engineering design sector is positioned quite strongly with the rest of the sectors in the Maltese economy. In fact, value added multipliers for the architectural and engineering sector are amongst the highest ranked (top 20 out of 59 industries) in the Maltese economy, indicating that the design sector generates a lot of value added in the domestic economy and has established close linkages with the rest of the economy. On the other hand, the specialised design sector ranks strongly in terms of output multipliers but poorly in terms of value added multipliers. This indicates that although the specialised design sector has established close links with the rest of the economy, most of its production is imported from abroad rather than produced locally. This limits its contribution to the economy.

The architecture and engineering design sector is also a relatively low labour intensive sector probably reflecting a stronger element of self employment. Nevertheless, the income multiplier ranks more strongly than the employment multiplier suggesting that average wages in the architecture and engineering sector are higher than in the rest of the economy. On the other hand, the specialised design sector is shown to be a moderately labour intensive sector. Nevertheless, it ranks poorly in terms of the income multiplier suggesting relatively low wages per capita.

The analysis has also shown scope for further linkages with the rest of the economy, particularly manufacturing which makes limited use of the architecture and engineering design services. With the exception of furniture production, manufacturing is also making limited use of specialised design services in Malta. Also interesting from a policy perspective is the limited use of specialised design in the financial services sector. These results corroborate the findings of the CIS though generalising it for all enterprises including micro enterprises employing less than ten employees which are not covered by the CIS.

The analysis has also identified the major inputs and outputs of the architecture and engineering design industry which provide scope for their incorporation in a design cluster. In particular such linkages include various services such legal, accounting, financial services, IT and consultancy services but also manufacture of non-metallic minerals apart from the more traditional linkages with the construction, mining and real estate activities. In addition the specialised design sector's major inputs include financial services, rental and leasing, printing and reproduction of recorded media and also cultural and artistic services. These linkages would be important to consider in the development of policy initiatives aimed at encouraging design clusters in Malta.

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