

# **A. F. CRAIG & CO. LTD. OF PAISLEY c.1950-1970: A STRATEGY-FOCUSSED NARRATIVE**

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## **Abstract**

Scottish heavy industry declined in c.1950-1970, suffering *inter alia* from severe shortages of fuel, raw materials and skilled labour. Among a great number of heavy engineering firms closed in the 1980s was 114-year old A. F. Craig & Co. Ltd. of Paisley, a manufacturer of textile machinery, oil refinery equipment and sugar machinery. The firm survived economic recessions and two World Wars but not the period c.1950-1970. To understand how A. F. Craig reacted to its difficulties strategically, we explored its last years to investigate whether new strategies emerged in the firm and, if they did, their influence on the firm. Investigating archival data for the firm, we found that it adopted exploitative strategies without including explorative strategies in technological search and international diversification. The impact of these strategies was not effective enough to lead the firm out of its increasing difficulties.

## **Introduction**

Scottish industry suffered from severe shortages of fuel, raw materials, certain grades of skilled labour and the scarcity of dollars to purchase essential imports in the immediate post-war years from 1945 to 1947 (Slaven, 1975). Although in the 1950s it specialised in the heavy end of the market, many staple sectors, e.g., coal and shipbuilding, declined in the 1960s (Lenman, 1977). A great number of heavy engineering firms closed across the UK in the 1970s and the 1980s. Among them was a 114-year old manufacturer of textile machinery, oil refinery equipment and sugar machinery, A. F. Craig & Co. Ltd. of Paisley, Renfrewshire.

Founded by mechanical engineer Archibald Fulton Craig in 1868 with 20 employees, A. F. Craig established its reputation in Europe and then worldwide. The firm started as a manufacturer of cropping machines for removing surplus fibres from woven fabrics. It gained a prize at the Paris Exhibition in 1878. The business then extended to the whole UK. A. F. Craig expanded the business in Europe by appointing sales agents in Belgium and France. By 1890, the firm had established its reputation in textile machinery, including carpet looms, thread-polishers and spool-making, bleaching and dyeing machines. It became a private company in 1894. A second business of the firm, the manufacture of oil refinery equipment, was developed after the shale oil boom in Scotland. The firm built oil distilleries and refinery equipment in France and Spain. During the 1920s and 1930s, A. F. Craig adopted a modernisation scheme that allowed the firm to make boilers, cranes, condensers, filter presses, hoists, hydro-extractors, pumps and steam engines for its customers in the UK and in Europe. A. F. Craig entered a third business, i.e., sugar machinery, in 1930 by merging with H. W. Aitkin & Co. Ltd, a manufacturer of sugar machinery in Paisley, gaining access to the markets in Asia, the Middle East and South America.

Surviving economic recessions and two World Wars, A. F. Craig went into receivership in 1982 and no longer traded by 2002. The sales and profit of the firm since 1939 are displayed in Figures 1 and 2, both at actual (dotted lines) and 2017 (solid lines) levels<sup>1</sup>. Overall actual sales fluctuated from year to year and showed a slightly increasing trend. Based on the 2017 level, the increasing trend of sales is less clear. At 2017 value, sales in 1956 and 1965 were among the highest over the period, being almost £145 million and over £184 million, respectively. The average sales of the firm since 1939 reached almost £89

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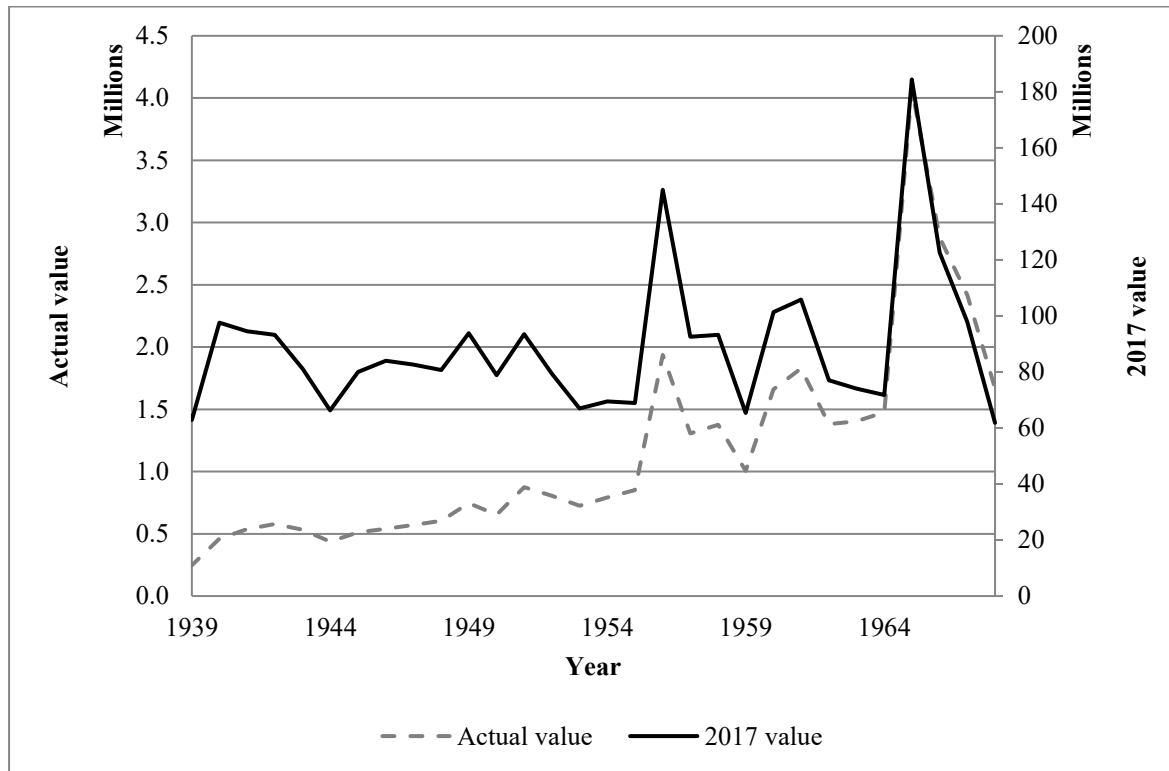
<sup>1</sup> The rates used to calculate the 2017 values from the original values come from MeasuringWorth (<https://www.measuringworth.com/index.php>), a service for calculating relative worth over time.

million. The firm's actual profit decreased over the period. The decreasing trend is clearer based on the 2017 level. At 2017 value, the year 1942 witnessed the highest level of profit over £41 million. The lowest was under £3 million in 1964. The average profit of the first decade from 1939 was slightly under £33 million, compared to the average of the last decade being under £8 million.

Simultaneously growing sales and declining profit, which A. F. Craig encountered from 1939 and specifically in c.1950-1970, indicates problems in a firm's development. Common explanations include increased costs, sales promotions and inflation. The lack of raw materials and skilled labour in c.1950-1970 contributed to the costs of A. F. Craig. The firm used sales agents and partnerships with large firms to increase its sales. The dotted lines in Figures 1 and 2 show the original financial figures, comparing these with rebased figures at 2017, in order to show the effects of inflation.

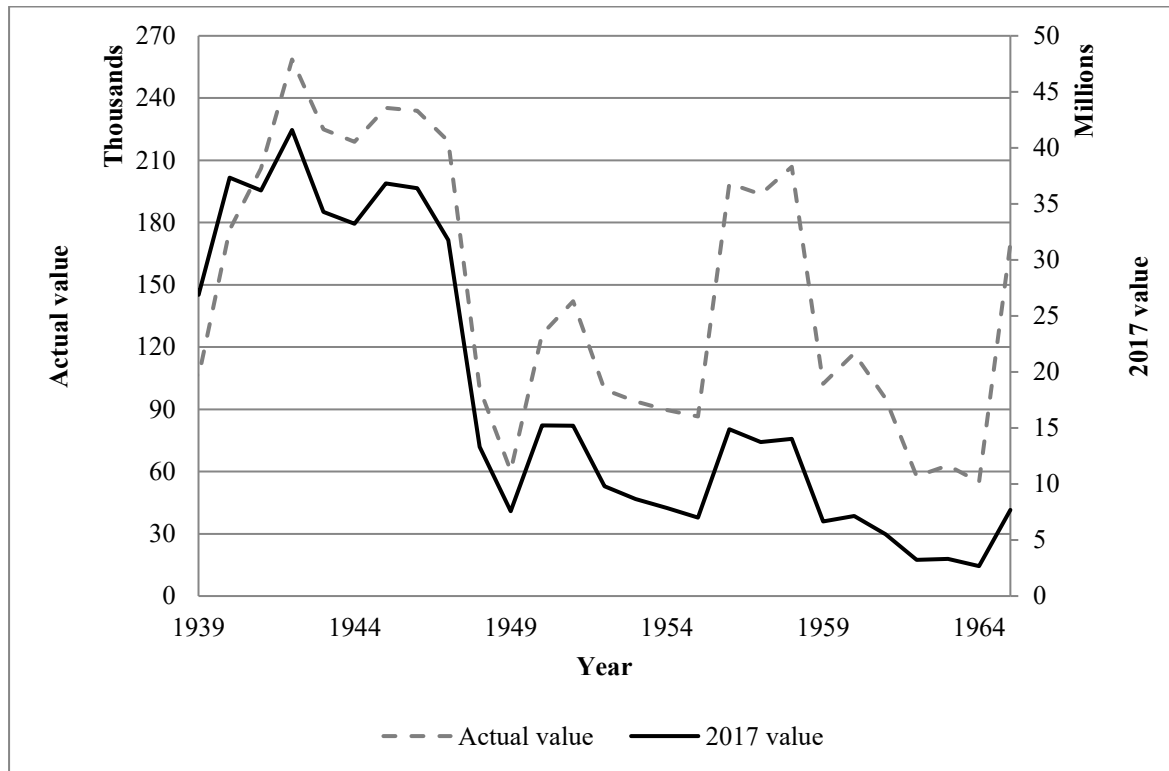
How did A. F. Craig react to the financial situation strategically? In this study we explore the last years of A. F. Craig, focusing on how the firm's strategy changed in reaction to the financial situation as well as to other survival issues. New strategies often emerge when a firm aims at long-term survival. For instance, Chandler (1962) studied four American conglomerates that dominated their industries over several decades and found that they adopted new strategies, e.g., diversification, to compete in multiple markets. When a firm's development is limited and its survival is challenged, it may or may not adopt new strategies and, if it does, the new strategies may not work. We are interested in whether new strategies emerged in A. F. Craig and, if they did, their influence on the firm.

**Figure 1 Sales of A. F. Craig & Co. Ltd., 1939-1968 at both Actual and 2017 Values**



Observations = 30. At 2017 value, min = £61,826,830.52; max = £184,437,107.76; mean = £88,892,468.91; median = £81,850,458.79. (Source: UGD 173)

**Figure 2 Profit of A. F. Craig & Co. Ltd., 1939-1965 at both Actual and 2017 Values**



Observations = 27. At 2017 value, min = £2,670,865.44; max = £41,607,319.39; mean = £17,705,155.49; median = £13,735,576.01. (Source: UGD 173)

To address our research question, we conducted a case study based on A. F. Craig for the years c.1950-1970. Case study research is a powerful way of investigating phenomena that are widely unknown (Eisenhardt, 1989). We collected archival data for the firm, covering the period 1945-1974 which included 220 monthly board meeting minutes, 20 records of annual general meetings and financial reports. The archival records amounted to about 880 pages (UGD 173).

The next section introduces the economic context in which the firm operated after the Second World War and particularly in c.1950-1970. This is followed by an analysis of the firm's strategy in the period studied. We then discuss whether new strategies emerged in the firm and whether these strategies were effective.

## **The Firm in the Changing Scottish Economy in C.1950-1970**

### **Works of national importance**

The Second World War made heavy engineering firms extremely busy with government works of national importance. A. F. Craig had been

*'compelled to turn over to what is described as war work, that is, machinery required by the various government departments. The foundry is almost exclusively engaged on work of this description. The engineering shop will be for the rest of this year [1940] almost exclusively engaged on machine tool work. The boiler shop has again been turned over to marine boiler work with a considerable amount of*

*steel plate work for various munition factories. The textile department is largely engaged in the production of aeroplane engine parts.'* (UGD 173)

A. F. Craig completed government contracts, e.g., planing machines, bending rolls, corvette engines and marine boilers. The firm completed a limited number of foreign orders during the war, e.g., for petroleum equipment for Anglo-Iranian Oil Company (one of the antecedents of the modern British Petroleum plc), as well as for oil coolers and stabilising towers for Shell and exchangers and coolers for Trinidad Leaseholds (one of the antecedents of the modern Texaco, Inc.).

The period 1945-1950 witnessed increased profit for the firm, shown in Figure 2. Profit increased from under £27 million (at 2017 value) to over £41 million in 1942. It then decreased to over £34 million in 1943 but remained at this level until 1948, when it dropped to over £13 million, half of the level before the war. Profit was halved again in the following year, being about £7.5 million (UGD 173).

### **The decline of heavy industry**

In the 1950s Scottish industry specialised in the heavy end of the market, e.g., ships, locomotives, heavy iron and steel products. Scotland produced a good deal of plates, wrought iron, steel tubes, alloy steel and heavy rolled products. Scottish steelmakers produced almost 500,000 tons of finished steel, while consuming 60 per cent of the domestic production. Scotland was a net exporter of heavy steel products and a net importer of light steel products, e.g., strip steel, tinsplate, wire, tyres, wheels and axles. By 1960 Scotland had lost out on the main British developments in fields such as aircraft, vehicle production and electrical engineering (Lenman, 1977).



Many staple industries in Scotland declined in the 1960s. In the coal industry, the Scottish Division of the National Coal Board planned the closure of 50 of Scotland's 98 pits around 1965, mainly due to competition from oil and from more favourably-situated British pits. Coal prices increased, leading to the adoption of more oil-fired machinery. In shipbuilding there was a steady fall in demand for the products of British shipyards. Meanwhile, in contrast, the world's seaborne trade increased from 460 million tons in 1939 to over 2,000 million tons in 1969. The world's new tonnage produced by the UK dropped from 31 per cent in the 1950s to 13 per cent in the 1960s. Many Clyde yards operated at a minimum level and made little profit (Lenman, 1977).

A. F. Craig's trading profit in the period c.1950-1970, shown in Figure 2, dropped to its lowest level in 1964, being below £3 million (at 2017 value). It was recorded in the Annual General Meeting in April 1960 that

*'The trading profit for the past year [1959] reflects the recession in the heavy engineering industries to which attention was drawn in the Report to the Members last May [May 1959] and which persisted throughout 1959.'* (UGD 173)

The situation persisted through the following years as well. For instance,

*'During that year [1961] the Company's factory capacity was well employed but the trading profit was lowered through a general fall developing in the prices for engineering products of the medium heavy type. Notwithstanding the severe competition the volume of orders in hand is reasonably satisfactory.'* (UGD 173)

### **Lack of raw materials**

In Scotland the war increased demand for coal, iron, steel and all the products of its heavy industries. The shortage of steel affected manufacturing and engineering firms and the production of foundries. Due to the shortage of steel in Scotland after the war, many steel factories shut down (Slaven, 1975).

The closing of the Suez Canal in 1956 created difficulties in transporting oil from the Middle East to the UK, restricting the UK's oil supply in c.1950-1970 (Johnman & Murphy, 2002). The Suez Crisis caused recession in all industrial sectors across the UK. The UK's export business declined from 22 per cent of world trade in 1955 to 7 per cent in 1960. The Scottish tanker trade dropped from 52 per cent to 39 per cent during the same period (Slaven, 1975).

In 1961, the British government banned American coal in UK factories. It was widely used in British foundries as the primary source of energy in the first half of the 20<sup>th</sup> century. Following the ban, the shortage of iron and steel became acute in the British manufacturing industry. In Scotland this shortage was made worse by diminished natural resources, e.g., ores (Slaven, 1975).

Although A. F. Craig resumed their peacetime activities in 1946 and were able to devote their whole attention to the products which they were accustomed to manufacture previously (UGD 173), the firm experienced great difficulty in getting reasonable delivery of necessary raw material. As noted in the Annual General Meeting of 1947,

*'The future is clouded by the very uncertain supply of our necessary raw material, and we are still being hampered in many directions with government regulations and restrictions. It is difficult for our customers overseas to appreciate the difficulties in which we are placed in an endeavour to adhere to our delivery dates when they do not fully realise the difficulties with which we have to content at the present time.'*

*Conditions of trading and manufacturing at the present time are not easy and we do not think that they will become easier during the next few years under the present form of government and their numerous regulations and restrictions.’ (UGD 173)*

Also noted in the Annual General Meeting of 1948,

*‘The greatest difficulty is getting sufficient supplies of our necessary raw material, and the inadequate supply of suitable skilled labour. Government regulations and restrictions have become part of our daily experience, which cause a great deal of additional work to our commercial office department.’ (UGD 173)*

The lack of necessary raw materials might be a major contributor to the sharp decrease of the firm’s trading profit in 1948 and 1949, at £13 million and £7 million, respectively, dropped from over £31 million in 1947 (at 2017 value). These changes are depicted in Figure 2.

### **Lack of skilled labour**

In the short term, the war eased the unemployment problem in Scotland. Many men and women joined the armed forces. The traditional heavy industries employed 16 per cent of the employed population in 1939 and 25 per cent by 1945. On the other hand, many men went to the war and did not return or returned injured and unfit for work (Slaven, 1975). Many engineers retired. Some moved to Europe and the US (Moss & Hume, 1983). By 1945 national agreements regulated terms and conditions of employment in well-organised industries and services. In an established industry in Scotland, increased wages increased the costs of the product, making it difficult to attract work to a region (Lenman, 1977).

Shortage of skilled labour and increased wages in this period contributed to the input costs of A. F. Craig. The firm established sales representation in India, Mauritius and South Africa. To complete the orders from these areas, the firm introduced a bonus scheme to retain enough skilled labour for the foundry and to attract new employees.

*‘Consideration was given to the question as several applications had been received for advances on account of the increased cost of living through War Conditions. The time workers in the whole industry have been conceded a national advance of 5/- [about £35 at 2017 value] per week. It was agreed therefore to pay a special War Bonus of 10% to each member of the staff to date from 1st January [1940]’ (UGD 173).*

It was not clear whether the national advance of 5 Shillings was included in or extra to the special War Bonus paid at the firm. In either case, this effort helped A. F. Craig to maintain a full order book that kept the firm active in the post-war period, although in 1947 the firm’s foundry production was still ‘limited by the lack of a sufficient supply of suitable skilled labour’ (UGD 173).

## **The Firm’s Strategy in C.1950-1970**

### **Technological search**

Technological search beyond the boundary of an organisation, or ‘external boundary-spanning’ search, ‘integrates knowledge from other organizations that is close to the technology of interest’ (Rosenkopf & Nerkar, 2001). The search may increase technological evolution of the whole sector but may not enhance innovative abilities of the firm that adopts the new technology. This type of

search is *exploitative* in terms of technology because new technology is similar to what the firm has (March, 1991). Exploitation includes ‘refinement, choice, production, efficiency, selection, implementation, execution.’ This may be compared to *exploration*, which includes ‘search, variation, risk taking, experimentation, play, flexibility, discovery, innovation,’ returns from exploitation are more certain, less remote in time and less distant from the locus of action and adaptation. There should be a balance between both search activities conducted by a firm. A firm that engages in one to the exclusion of the other is likely to be trapped in ‘suboptimal stable equilibria’ (March, 1991).

Among the three businesses of A. F. Craig, the textile machinery business was likely to be the most innovative one because technologies used in machinery were pulled by various demands on textile products in c.1950-1970, when there was great innovation in synthetic yarns. To search for technologies, A. F. Craig obtained manufacturing rights from the inventors of looms. For instance, in March 1950, the firm negotiated with a German manufacturer John T. Hardaker Ltd. for the manufacture of the Gusken Loom for face-to-face weaving of carpets. The board of directors suggested that a director of the firm visit Gusken Co. in Germany to discuss the new design of loom. John T. Hardaker agreed only on assembling the machinery in the UK. The German manufacturer exported the components and sent technical representatives to A. F. Craig to help with the assembly. The two firms jointly developed carpet looms in the following years. This collaboration was among the first partnerships that A. F. Craig had after the war.

In February 1953, A. F. Craig obtained the manufacturing rights in Britain for spool Axminster looms from Crompton & Knowles Inc. In exchange Crompton & Knowles received A. F. Craig’s development of wide Wilton looms. The negotiation lasted a decade with several visits by A. F. Craig to Crompton &

Knowles. Achieving an agreement in 1964, A. F. Craig was eventually able to manufacture and sell spool looms in Europe afterwards.

In another example in November 1963, the board of the firm approved a proposal to undertake the design of a two-shot gripper loom incorporating improvements invented by Eric Potter of Carpet Weavers Ltd., Stourbridge. Potter's terms for the rights to use his improvement included a royalty of 5% on each loom sold for the period of the 15-year patent. This was among several cases in the 1960s that A. F. Craig sought the manufacturing rights via royalty payment.

### **International diversification**

International diversification is 'expansion across the borders of global regions and countries into different geographic locations or markets' (Hitt, Hoskisson, & Kim, 1997). The level of international diversification should be at a modest level to benefit firm performance. Diversification and its effects on performance vary across time periods (Geringer, Tallman, & Olsen, 2000). A firm's choices of international diversification are driven by its the firm's desire to exploit its set of unique resources and competencies. The impact of international diversification on firm performance can be moderated by product diversification, which is expansion into product markets new to a firm (Hitt et al., 1997). The relationship between international and product diversification can be substitution or complementarity (Bowen & Sleuwaegen, 2017). The performance of multinational firms with international diversification can be positively moderated by related product diversification and negatively moderated by unrelated product diversification (Chang & Wang, 2007). Only the most productive or differentiated firms will be successful in international

markets. This applies only to a subset of products and countries (Bowen & Sleuwaegen, 2017).

Foreign agents worked for A. F. Craig to obtain local orders in their countries. For instance, Tekig-Invest Import and Export Undertaking was an important agent of A. F. Craig's textile machinery business in Yugoslavia. A. F. Craig obtained an order of four looms from the agent in the late 1960s. The order was at the price of £100,817 (about £3,427,000 at 2017 value) and was dispatched successfully in 1970. Another order of nine looms via the same agent arrived in 1971 at the price of £230,000 (about £4,586,000 at 2017 value). A. F. Craig allowed 80% of the price to be paid in instalments over five years.

International diversification at A. F. Craig was enhanced by Craig-Crabtree (Contracts) Ltd., a company formed between A. F. Craig and David Crabtree & Sons Ltd. in 1968 to attract large contracts overseas and to boost the textile machinery business. Through this new company, A. F. Craig developed the loom business in Eastern Europe, e.g., supplying looms to Poland and Romania. In Poland A. F. Craig submitted a tender to Varmex for fourteen spool gripper looms at £737,390 in 1971 (about £16,104,000 at 2017 value). Varmex revised the specifications of the looms. A. F. Craig was not able to make the looms according to the new specifications and lost the tender. However, Varmex placed an order of ten looms in 1972. This time the business was successful with the order completed in late 1972.

A. F. Craig also supplied carpet looms to Anatolia Carpet Company SA, Greece in 1972. The Greek representative requested to be the sole buyer of the Gripper-Axminster loom in Greece. During the negotiation, Anatolia Carpet Company proposed to purchase two looms per year in the following five years. The agency agreement was then established in 1972.

In 1973 A. F. Craig obtained an order of seven looms at £267,000 (about £4,555,000 at 2017 value) from Romsit, Romania via Craig-Crabtree (Contracts) Ltd. The client demanded a manufacturing guarantee against the failure of delivery. A. F. Craig and Craig-Crabtree (Contracts) Ltd. agreed on a counter-guarantee via the Bank of Scotland. A. F. Craig requested the confirmation of the Letter of Credit for the instalment from the client and delivered the looms in the following years.

A. F. Craig pursued simple export as international strategy with a low level of product diversification. The firm manufactured its products in Scotland and exported them via independent sales agents in different countries. Compared to other international strategies, e.g., multi-domestic and global strategies that require activities dispersed overseas, this may be described as ‘exploitative’ in character. The firm maintained this international strategy in its last years.

#### The role of ECGD

The Export Credits Guarantee Department (ECGD) played an important role in internationalisation of British firms. There were occasions when it was in the UK’s interest to take on export contracts which could not be insured on commercial grounds. ECGD introduced guarantees to banks providing export finance for large contracts, including the supply of capital goods in 1954, ‘whole turnover’ cover for engineering goods sold on credit up to five years in 1955 and ‘buyer credit’ guarantees in 1961. The value of buyer credit guarantees reached £483 million in 1973-1974 and £617 million in the following year (Anonymous, 1976). ECGD also introduced an insurance investment scheme in 1972 to cover equity and debenture holdings in new investment overseas, mainly in developing countries. In 1975 ECGD introduced guarantees for performance bonds where these could not be obtained in the



commercial market, providing partial insurance against cost escalation and bank guarantees for pre-shipment finance for large capital goods contracts. ‘The heart of ECGD’s services to UK exporters is to provide them with an assurance that if the customer does not pay then ECGD will reimburse them’ (Anonymous, 1976): p. 57. During the post-war period ECGD’s total coverage of UK exports has grown from £218 million (i.e., 11.5 per cent of UK exports) in 1949-50 to £6,535 million (i.e., 35 per cent of UK exports) in 1974-75 (Anonymous, 1976).

With the aid of ECGD, A. F. Craig was able to negotiate large contracts with customers from Greece, Poland, Romania, Indian, Iran, Yugoslavia, etc. For instance, A. F. Craig approached ECGD with a view to their underwriting the credit risk of £100,000 (about £7,626,000 at 2017 value) on the firm’s contract with Industrie Chimiche Italiane del Petrolio in 1951. In 1952, in a contract with a Brazilian customer, the unpaid shipments insured by ECGD amounted to £103,027 (about £7,213,000 at 2017 value).

In Brazil A. F. Craig supplied textile looms to Tabacow Ltd. in 1974. Through a supply agreement with ECGD, A. F. Craig provided a manufacturing guarantee for the looms. Tabacow Ltd. signed the contract at £88,600 (about £1,286,000 at 2017 value). The financial agreement was finalised. A. F. Craig received the confirmation letter and delivered the machinery.

Parracchi (G) & Company in Italy placed one loom order through Craig-Crabtree (Contracts) Ltd. in 1970 but later cancelled the order due to bankruptcy after some parts had been manufactured. A. F. Craig claimed the cancellation charges at the amount of £2,034 (about £49,480 at 2017 value), which was refused by the client. Trying to settle down the dispute, A. F. Craig discussed the matter with ECGD. ECGD suggested that the loss was uninsured

under the policy in the absence of bankruptcy. A. F. Craig discontinued the case in 1971.

## **Discussion**

A declining industry often features minimum product preference, price competition, decreasing profit, excess capacity and higher fixed costs of firms. This phase of an industry requires a firm to adjust its strategy carefully if it continues to operate in the declining market. There are several strategies the firm can choose. First, if the firm makes profits in the declining phase of the industry, it can choose to invest in another market as an exit. Second, the firm can maintain its existing customers while controlling costs. Third, the firm can gain market share when other firms exit the market. Last but not least, the firm can focus on a niche market with growing demand and be an exclusive supplier to the market.

The heavy industries in Scotland declined during c.1950-1970. A. F. Craig had three businesses all in the declining phase. The firm made several strategic changes to compete in the market. First, it pursued exploitative technological search (March, 1991) by obtaining manufacturing rights from other firms and new designs of machinery from inventors. For instance, A. F. Craig obtained the manufacturing rights for spool Axminster looms from Crompton & Knowles Inc. and undertook the design of a two-shot gripper loom incorporating improvements invented by Eric Potter of Carpet Weavers Ltd. This technological search saved A. F. Craig skilled labour and development time when there was lack of skilled labour and costs of production were high. New and improved products helped the firm enter foreign markets.

Entering foreign markets in return contributed to the firm's international diversification and the economies of scale in production. International diversification at A. F. Craig started with exporting products to foreign countries. It was a simple export strategy, that is, manufacturing products in the country of the firm's origin and exporting products to loosely connected geographical markets. This level of international diversification benefited A. F. Craig because the firm's sales increased during the period studied. To reduce the costs, the firm pursued economies of scale by entering multiple markets with the same products. The firm did not show differentiation in its products. This disadvantage limited its performance in the international markets.

While increasing international diversification, A. F. Craig, with the help of ECGD, offered financial flexibility to enhance customer loyalty. For instance, the firm allowed Carpet Weavers Ltd. to pay in instalments over a year at interest rate 10 per cent instead of cash payment of £15,750 in 1969 (about £429,800 at 2017 value).

The strategies that A. F. Craig selected, e.g., low cost, exploitative technological search and simple export in international diversification, might have helped prolong the life cycle of the firm among the declining heavy industries. Figure 3 shows A. F. Craig's orders in hand in oil equipment, sugar machinery and textile machinery during a period of 17 months from late 1972 to early 1974 (at 2017 value). Oil equipment orders decreased from over £12 million to under £2 million in the first seven months, increased to over £10 million in the following seven months, and jumped to over £27 million in the last two months of the period. Sugar machinery orders decreased gradually with a sharp drop in mid-1973. Textile machinery orders fluctuated over the period. Total orders increased steadily in 1973 and increased sharply in early 1974.

These changes in orders in hand in the three businesses arose from the strategic choices of the firm, but did not reverse its fate. Although information on the firm's trading profit is not available for the period after 1964, it is reasonable to assume that the firm's profit in c.1965-1975 remained at a low level, given its subsequent fate. A main reason for this is that the strategic options followed by the firm were exploitative in nature. Exploitative strategies may bring a firm relatively certain and low returns in the short term but may not help the firm with survival in the long term (March, 1991).

A possible explorative strategy for A. F. Craig might have been a global initiative with highly coordinated activities involving the value chain in various geographical locations. J. & P. Coats of Paisley, although much larger than Craig, serves as an example of a successful explorative strategy of this type. Founded in 1825, the thread maker became the third largest industrial company in the world by 1910. The company survived the two World Wars and a period of radical change of fashion and technology. The company lost plants in Eastern Europe, including Bulgaria, Hungary, Latvia and Yugoslavia after the Second World War. It withdrew from France but recovered in Germany. Major development occurred in the US and Mexico then South America, including Argentina, Brazil, Chile, Colombia, Peru, Uruguay and Venezuela. By the 1960s Coats had 51 mills in 25 countries, a dominant position in the thread market worldwide (Coats, 2013).

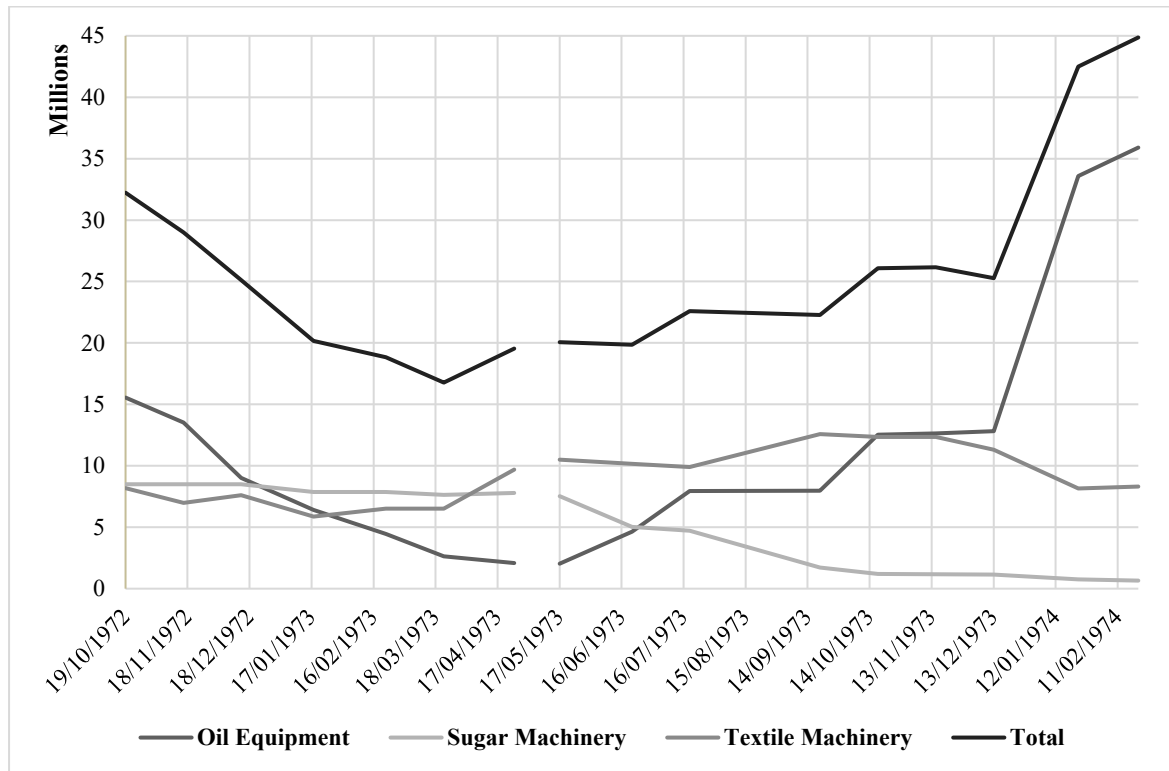
Explorative search for new technologies might have been another possible strategy for A. F. Craig. J. & P. Coats is again a successful example. Notable among its post-World War 2 non-thread strategic changes was its expansion into the emerging field of zip-fasteners, with its demanding, new, non-thread related technologies. The Research Department of Coats also exploited innovative materials, e.g., polyester and cotton-covered core-spun, to develop

new textured thread products. Coats in addition developed the automation of colour measurement to measure and transmit the required colour to any factory in the world. It is noteworthy that thread and zip-fasteners remain a mainstay of the company's business today, which was refocussed on these products after decades of acquisitions and subsequent divestments of miscellaneous, often ailing UK textile businesses across the 1960s to 1980s. It also based its later international expansion on its extensive capacity in developing countries, going on to include China, India, Mauritius, Morocco and Vietnam. The company also acquired thread makers in Bangladesh, Finland, France, Malaysia, Sri Lanka and South Korea (Coats, 2013).

## **Conclusion**

During the period of the decline of heavy industry in Scotland in c.1950-1970, A. F. Craig, a manufacturer of textile machinery, oil refinery equipment and sugar machinery, pursued several strategies to survive major difficulties. The impact of its exploitative strategies was not effective enough to lead the firm out of its increasing difficulties. The firm went into receivership in 1982, ending its 114-year history. It is not clear why explorative strategies did not emerge in A. F. Craig. Understanding the reasons requires further research.

**Figure 3 Orders in hand of A. F. Craig & Co. Ltd., October 1972-February 1974 (at 2017 value)**



(Source: UGD 173)

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