INTRODUCING DIGITAL PLATFORMS AND NEW BUSINESS MODELS IN STEEL MANUFACTURING COMPANIES

Przemysław POMYKALSKI

Lodz University of Technology, Piotrkowska 266, 90-924 Lodz, Poland, EU
przemyslaw.pomykalski@p.lodz.pl

Abstract

Digital platforms are becoming the dominant business model in many industries. Platforms are a foundation for new value creation. Steel manufacturing companies are planning and implementing new solutions although managers struggle to determine their monetary impact. Most of these initiatives generate both expenses and benefits differently to "traditional" business models. In this paper I describe some of the ratios that should be used in preparing companies for the introduction of platforms and new business models.

Keywords: Digital platforms, innovation, management, ratios

1. INTRODUCTION

While growth in crude steel output in 2017 exceeded forecasts in many regions, the pressure on innovation remains strong as markets continue to evolve [1].

The World Steel Association reports that total crude steel production in 2016 was 1,628 million tones. The demand is fluctuating but its growth slowed in 2011. Production capacity is significantly higher than the output. OECD estimates that the nominal crude steel making capacity in 2016 was 2,381 million tones and is increasing [2].

There are many factors that directly or indirectly impact demand for steel. Currently additional factors affecting demand are recycling, sharing economy and pressures to extend the useful life of products. The use of Internet in these dynamic markets creates further opportunities and threats.

In this paper I start by discussing factors impacting demand and then move on to discuss digital platforms and new business models and their impact on measures and ratios characteristic for new business models. Digital technologies have their own metrics and ratios (e.g. monthly active users) but using traditional financial analysis ratios is beneficial as it allows managers to focus on markets, clients, users and forecasts instead of new measures and technological details.

2. RECYCLING, SHARING AND EXTENDING PRODUCT LIFE

Progress in recycling is remarkable. World Steel Association estimated that 30% of all new steel products are made of recycled steel.

Sharing economy started only recently in consumer products but it is growing in importance. Daimler initiated their car sharing program Car2Go in 2008, BMW AG started DriveNow in 2011. According to data from Daimler AG annual report for 2017 Car2Go operates 14000 vehicles at 26 locations worldwide and over 3 million users. In 2016 Car2Go created its first location in China. DriveNow operates 6000 vehicles in 13 locations and has over 1 million clients. In 2016 BMW established a separate company that will operate on the US market. Interestingly, sharing economy may develop faster in developing markets as some human behavioral patterns related to ownership maybe easier to change. Bicycle sharing his developing rapidly in China. About 60 firms have put as many as 18 million bicycles on China's streets. In Beijing alone, there are more than 40 times as many registered shared bike users as those who use New York City's Citi Bike, America's largest bike-sharing firm [3]. Although most bicycle frames are currently made of aluminum growth of the bicycle sharing market may be an indication for future rate of growth of car-sharing services in Asia. Automotive industry is a major customer for steel manufacturing. Accenture estimates that the automotive sector represents 15% of total global steel demand and over 50% of gross margins. The impact of car sharing is difficult to assess. Most car manufacturers became directly involved in car sharing by forming own subsidiaries or entering partnerships. Car sharing will decrease car ownership but early research indicates that the impact varies [4].

The European Parliament is promoting measures to make consumer products more durable and easier to repair. Recommendations include “minimum resistance criteria” and member state incentives to produce durable and repairable products.

Currently innovation in steel manufacturers moves beyond incremental changes to products, marketing and business performance improvements [5].

3. DIGITAL PLATFORMS AND THEIR ADOPTION

The term digital platform has been described by Parker, van Alstyne and Choudary [6] and by Reillier & Reillier [7]. Digital platforms in steel manufacturing companies are designed to facilitate more effective information sharing between various stakeholders from suppliers through to end-customers and users of steel products. Digital platforms can be used in sales and marketing, research and development.

Digital technologies are still relatively new and change rapidly. Managers in metal companies struggle to determine the monetary impact of benefits such as improved collaboration and decision making, or to quantify precisely how digital-enabled improvements affect the bottom line.

According to an online survey conducted by Accenture [8] 29% mining companies report widespread adoption of platform technologies within organization, 28% declare to have started pilot programs and 31% are developing or have already defined plans to implement these technologies. Only 12% of mining companies interviewed have no plan to employ digital platforms in the forthcoming 3-5 years.

Platforms are formed as either regional initiatives that may later expand to international or global reach or as global initiatives.

SteelOrbis is a platform that claims to be operating globally (it currently reports to service 90,000 users). A global platform was also established by Hong Kong based Steelavaliable.com. A platform for sale of finished and semi-finished steel products was announced by the steel ministry and a state-run company MSTC in India in 2016 and is operational. Klockner & Co SE from Duisburg announced its plans to operate a platform for sale of steel products. The company received Bundeskartellamt approval. The platform will operate alongside Klockner’s own online shop.

More general platforms are quickly growing in scale. Logintrade procurement platform is an example of a platform operating in Poland. The platform is intended to “simplify order transactions and order management”. It is also expected to simplify agreements as the platform exposes the pricing strategies of individual traders.

Platforms in steel manufacturing face barriers not only resulting from reluctance to change but also because of the need to standardize and simplify requests for proposal in procurement platforms. Typical requests require:

- description of the subject of the order;
- steel grade, technological process, technical drawings;
- order requirements (certificates, attestations);
- warranties;
- conditions for submission of proposals and payments.

Similar barriers have been earlier identified also in production networks in metallurgical clusters [9].

Many steel products are very specific and unique elements. Technical drawings require descriptions and this creates language barriers. Language barriers still force customers to enter traditional procurement negotiations with selected partners but this process is expensive and time consuming.

4. METHODOLOGY

Although more comprehensive sustainability indicators gain acceptance in most industries, including metals [10], for most companies maximizing shareholder value remains the main long-term objective.

In Discounted Cash Flow valuation method, value of equity is calculated by subtracting net debt from discounted Free Cash Flows (FCF).

$$V = \sum_{t=0}^{n} \frac{FCF}{(1+r)^t} - \text{Net debt} \quad (1)$$

FCF is profit after tax plus depreciation minus change in net working capital and capital expenditures (CAPEX).

Profits, net working capital, depreciation and capital expenditures are calculated using the percentage of sales method (**Figure 1**). Percentage of sales method assumes that ratios (profit margin, fixed assets turnover and net working capital in days) remain constant or their change is forecasted based on trends.

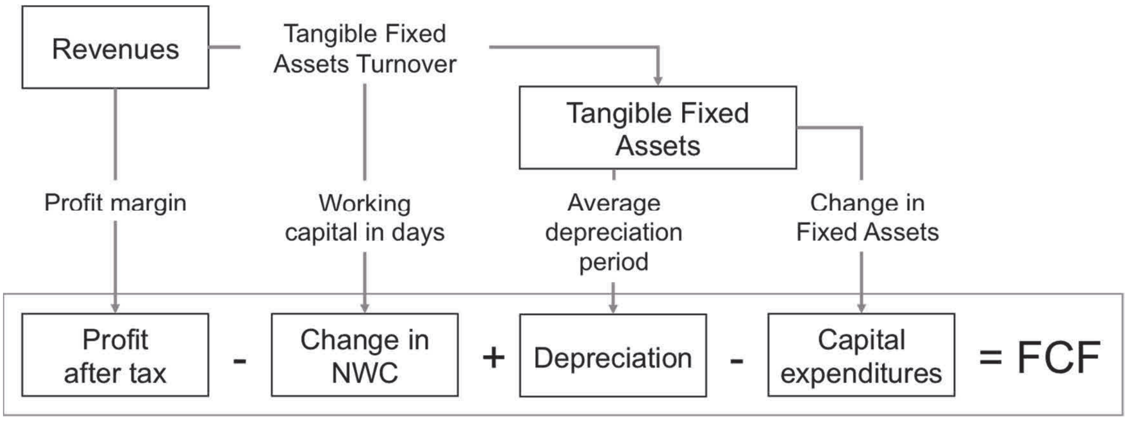

Figure 1 Free cash flow forecasting variables

Forecasted profit is calculated multiplying forecasted revenues by the assumed profit margin ratio and subtracting taxes. Change in Net Working Capital can be calculated using working capital in days. Forecasted fixed assets can be calculated multiplying forecasted revenues by Fixed Assets Turnover. Capital expenditures and depreciation can be calculated based on forecasted value of fixed assets. The process is explained in detail by various authors [11].

Tangible Fixed Asset Turnover (TFAT) is used to gauge the company's ability to generate revenues using tangible fixed assets at its disposal. As many companies currently hold considerable amounts of financial assets it may be justified to use Property Plant and Equipment instead of Tangible Fixed Assets. In the process several financial analysis ratios are used.

$$TFAT = \frac{Revenues}{Tangible\ Fixed\ Assets} \quad (2)$$

Days of Sales Outstanding (DSO) indicates how many days (on average) it takes the company to collect the money from its clients.

$$DSO = \frac{Receivables \times 365}{Revenues} \quad (3)$$

Days of Inventory Outstanding (DIO) indicates how many days (on average) the company keeps its inventory. In a production company this means raw materials, work in progress and finished goods.

$$DIO = \frac{Inventories \times 365}{Revenues} \tag{4}$$

Days of Purchases Outstanding (DPO) indicates in how many days (on average) the company pays its dues to suppliers. Trade payables are non-interest-bearing liabilities.

$$DPO = \frac{Trade\ Payables \times 365}{Revenues} \tag{5}$$

An alternative approach to calculating DIO and DPO ratios is to use cost of goods sold instead of revenues. In this case revenues are used to simplify further calculations.

Net working capital in days is calculated using the formula:

$$NWC\ in\ days = DSO + DIO - DPO \tag{6}$$

5. DATA

Dataset is based on survey data published by the Central Statistical Office of Poland (GUS). The survey covers economic entities with 10 and more people employed. To illustrate the model, I used data for 2513 companies manufacturing fabricated metal products (NACE rev. 2 section C division 25). In the following section I calculated ratios for Arcelor Mittal Plc. using data from the company's annual reports for the years 2006-2017.

6. RESULTS

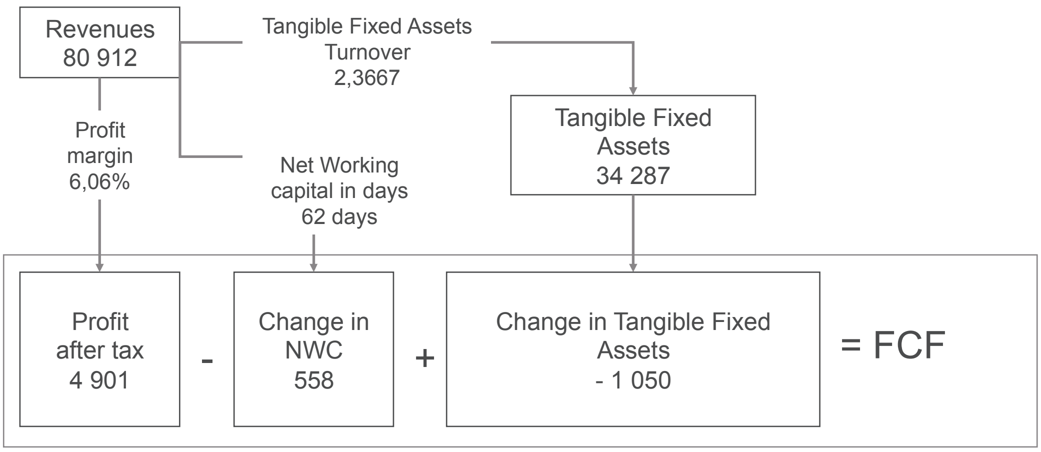

Figure 2 Free cash flow of companies manufacturing fabricated metal products in 2016 (in millions PLN)

Using the framework for FCF forecasting presented in Graph 1, the components of FCF for companies manufacturing fabricated metal products in 2016 were exemplified in **Figure 2**.

The total revenues (net sales) amounted to 80 912 million PLN, an increase of 3 297 million PLN compared to 2015.

This method is used to forecast FCF for individual companies. Calculating this for NACE division is interesting for benchmarking purposes and to exemplify the methodology.

The analysis for an individual company can be performed on a similar basis. In **Figure 3** I present results for Arcelor Mittal, the world's largest steel producer, based on its 2017 Annual Report. ArcelorMittal is a public limited liability company (société anonyme) that was incorporated for an unlimited period under the laws of the Grand Duchy of Luxembourg on June 8, 2001.

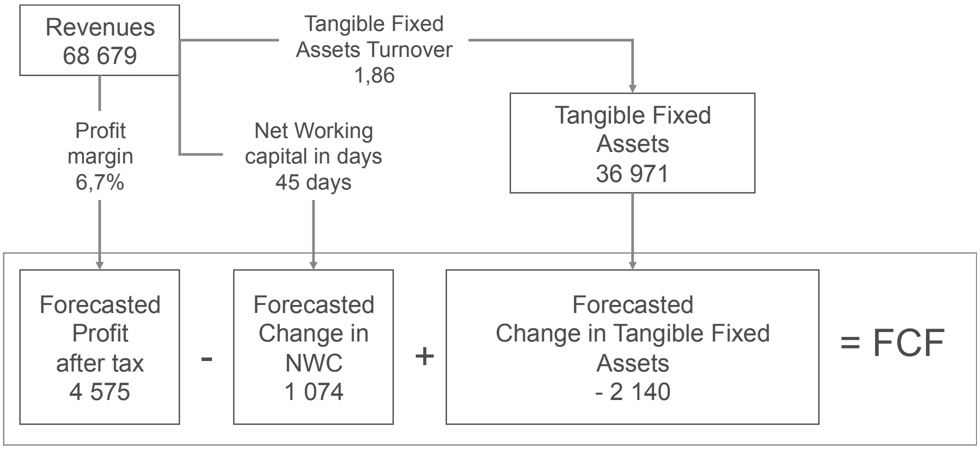

Figure 3 Free cash flow forecasting basis for Arcelor Mittal in 2017 (in millions USD)

It is of course essential to analyze at least the basic statistics for previous accounting periods (**Table 1**) and compare them to the values assumed for the purpose of creating a forecast. Volatility in NWC, Profit Margin and Tangible Fixed Assets Turnover followed the crisis in 2008. These results were observed in the entire sector [12] and other sectors [13].

Table 1 Arcelor Mittal ratios for the years 2006-2017

	Minimum	Maximum	Average	Median	Standard deviation
ROS	-0.13	0,11	0.02	0.03	0.1
FAT	1.01	2.07	1.59	1.66	0.3
DSO	15	54	26	22	10.7
DIO	72	119	88	86	13.1
DPO	31	75	57	55	12.4
NWC in days	39	103	57	56	17.3

Once assumptions are in place FCF becomes a function of changing revenues and investors can focus on analyzing clients, products and markets.

7. FORECASTING PLATFORMS

A platform not only creates its own cash flow but also alters the cash flows of the company's other business models. Although the FCF forecasting model remains useful in forecasting and consequently in analysis of project effectiveness and value creation it also exemplifies the problems in decision making. Forecasting is challenging even when some of the variables are assumed to be constant or change reflecting past trends. Introducing new business models changes all variables. This is visible as investors struggle to value platforms and look for non-quantitative explanations [14, 15].

The effects of introducing digital platforms are impossible to quantify at the present moment, but the impact on individual ratios can be estimated.

Platforms strategy implies changes to:

- revenues as business becomes an intermediary selling not only own products but also products of other manufacturers,

- profit margin as commission is calculated on sales of third party products and cost structure is altered, due to for example to platform advertising and IT personnel remuneration,
- net working capital in days as the company acts as an intermediary (retailer),
- tangible fixed assets turnover as new types of assets are required (IT hardware).

One of the main characteristics of digital platform models that has been observed is that tangible fixed assets turnover is substantial. Airbnb offers nearly 5 million lodgings in 81 000 cities without own real estate property. The tangible asset turnover ratio of Airbnb is much higher than the in the world's largest hotel network in Marriot International. In other words digital platforms require comparably low investments in tangible fixed assets.

Steel industry is likely to be disrupted by digital platform models because entry barriers are relatively low. The required investment, especially for companies with established brands and strong market presence, is limited and scalable as IT hardware and software can be provided as a service [16, 17]. The possibility of connecting different users from the market, including entities focusing on recycling and reusing creates the possibility to develop "steel as a service" concept.

8. CONCLUSIONS

Innovation moves beyond incremental changes to products, their marketing and business performance improvements. As Internet technologies mature, some solutions are adopted in other markets. Digital platforms are being introduced in steel manufacturing and are likely to succeed as required investments are limited and scalable and potential gains may be substantial. Adopting digital platform business model changes not only forecasted revenues but also financial ratios in DCF valuation model. The changes are reflected in fixed assets turnover, forecasted capital expenditures and net working capital requirements. While forecasting all those variables may prove very challenging the potential effect of changes to free cash flows can be estimated.

REFERENCES

[1] BAKALARCZYK, Sebastian. Managing of innovation in modern metallurgical companies, In *Metal 2017: 26th International Conference on Metallurgy and Materials.* Ostrava: TANGER 2017, pp. 2040-2044.

[2] OECD. *Capacity Developments in the World Steel Industry* [online], DSTI/SC(2017)2/Final. Directorate for Science, Technology and Innovation, Steel Committee, 24 p. [viewed: 2017-08-07]. Available from http://www.oecd.org/sti/ind/steelcapacity.htm.

[3] CAMPBELL, Charlie. The trouble with sharing: China's bike fever has reached saturation point [online]. Last updated: 2 April 2018. *Time.* [viewed: 2017-08-07]. Available from http://time.com/5218323/china-bicycles-sharing-economy/?iid=sr-link1.

[4] ZHANG Chen, KOLTE, Prajakta, KETTINGER, William. J. and SUNGJIN, Yoo. Established Companies' Strategic Responses to Sharing Economy Threats. *MIS Quarterly Executive*, 2018. 17(1), pp. 23-40.

[5] VILAMOVÁ Šárka, MIKLOŠÍK Andrej, OČKO Petr, JANOVSKÁ Kamila, ČECH Martin, BESTA Petr and ŠANDA Martin, Implementation of knowledge management in metallurgical company, *In Metal 2016: 25th International Conference on Metallurgy and Materials*, Ostrava: TANGER 2016, pp. 2069-2075.

[6] PARKER, Geoffrey G., VAN ALSTYNE, Marshal W. and CHOUDARY, S. P. Pipelines, Platforms, and the New Rules of Strategy. *Harvard Business Review*, 2016. 94(4), pp. 54-62.

[7] REILLIER, Laure C. and REILLIER, Benoit. *Platform Strategy: How to Unlock the Power of Communities and Networks to Grow Your Business.* Taylor & Francis, 2017. p. 221.

[8] CALLAHAN, Amy and LONG, *George, Digital Mining: Progress… and opportunity: Accenture Report* [online]. 2017. Accenture. 8 p. [viewed: 2018-04-10] Available from https://www.accenture.com/us-en/insight-digital-technology-mining.

[9] SANIUK, Sebastian, SAMOLEJOVA, Andrea, SANIUK, Anna and LENORT, Radim. Benefits and barriers of participation in production networks in a metallurgical cluster - research results. *Metalurgija*. 2015. R. 54, No 3. pp. 567-570.

[10] LENORT, Radim, STAS, David, WICHER, Pavel, HOLMAN, David and IGNATOWICZ, Katarzyna. Comparative Study of Sustainable Key Performance Indicators in Metallurgical Industry. *Rocznik Ochrona Środowiska*. 2017. vol. 19, pp. 36-51.

[11] DAMODARAN, Aswath. *Investment valuation: Tools and techniques for determining the value of any asset*. John Wiley & Sons, 2012. p. 992.

[12] POMYKALSKI, Przemyslaw, BAKALRCZYK, Sebastian and SMOLEJOVA, Andrea. Benchmarking Polish basic metal manufacturing companies. *Metalurgija*. 2014. R. 53 , No 1. pp. 139-141.

[13] POMYKALSKI, Przemyslaw. Assessing the impact of the Current Financial and Economic Downturn on the Textile and apparel Industry in Poland, *Fibres & Textiles in Eastern Europe*, 2013. Sept.-Oct., Vol. 21, Issue 5, pp. 13-18.

[14] KREJCAR, Ondrej, SPICKA, Ivo and FRISCHER, Robert. Micro operation system for microprocessor applications. Elektronika Ir Elektrotechnika. 2011. no. 8, pp. 83-88.

[15] SPICKA, Ivo and HEGER, M. Utilization mathematical and physical models derived therefrom real-time models for the optimization of heating processes. Archives of Metallurgy and Materials. 2013. vol. 58, no. 3, pp. 981-985.

[16] JONSTA, Petr, VLCKOVÁ, Irena, KRISTAK, Lubos, SPICKA, Ivo and JONSTA, Zdenek. Contribution to the thermal properties of selected steels. Metalurgija. 2015. vol. 54, no. 1, pp. 187-190.

[17] DAMODARAN, Aswath. *Narrative and Numbers: The Value of Stories in Business*. New York: Columbia University Press, 2017. p. 284.