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"The ways of increasing the jewelry brands competitiveness"

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ANOTACE

Majetek a hodnota obchodní značky jsou ukazatele, které měří hodnotu obchodní značky.

Rozdíl mezi nimi je, že hodnota značky se vztahuje na finanční aktivum, které společnost zapíše ve své rozvaze a hodnota značky ukazuje významnost a hodnotu značky pro klienta společnosti, spotřebitele a další zúčastněné strany.

V této studii se autor domnívá, že tržní hodnota obchodních značek v mezinárodním měřítku, zejména v klenotnictví, poskytuje vysokou poptávku po konkurenceschopnosti, záleží to však nejen na image značky nebo vnější strance zboží, ale také na osobním přístupu ke značce, její historii, společenské odpovědnosti, významu společnosti / výrobce v udržitelném vývoji a odpověď na otázku, co přesně ovlivňuje vnímání značky a ochotu zaplatit stanovenou cenu.

Abychom mohli studovat chování značky v konkurenčním prostředí, které odpovídá mezinárodní tržní hodnotě společnosti a pečlivě zkoumat případy klenotnického průmyslu, autor této studie předkládá stručný popis klenotnického průmyslu, hodnotí činnost klenotnického průmyslu v mezinárodním měřítku, navrhuje ekonomické a makroekonomické analýzy a také konkurenční analýzu relevantního trhu, provádí analaýzu prodejní výkonnost a popisuje výsledky SWOT analýzy komkretnich výrobku nebo služby.

Předmětem výzkumu je klenotnický průmysl ve Spojených státech. Předmětem studie je analýza a hodnocení metod, ktere se vyuzivaji ke zvýšení konkurenceschopnosti obchodnich značek šperků ve světě.

V teto publikaci autor použil metody ekonometrického modelování a prognozovani jako modelování pomocí regresních rovnic, hlavních makroekonomických ukazatelů klenotnictví a prognózování pomocí regresních rovnic hlavních makroekonomických ukazatelů v klenotnictví. Kromě toho autor implementoval měření pomocí Panel Data Set, amerických proměnných trhu s

klenoty, aby zpracoval a určil nejrelevantnější algoritmy pro ekonometrický modelovací proces a predikoval nezávislé proměnné pomocí časových řad.

Cílem studie bylo posoudit efektivitu značky šperků v konkurenčním prostředí pomocí metod ekonometrického modelování a vytvoření modelu (sady nástrojů), který by mohli být cenově dostupný, proveditelný a spolehlivý při výpočtu hlavních ekonometrických ukazatelů v mezinárodním měřítku, včetně fáze zavádění nových startupů v klenotnictví a již praktikujících podnikatelu v Ruské federaci.

CONTENTS

INTRODUCTION

Relevance and novelty. Brand equity and brand value are measures that estimate how much a brand is worth. The difference between the two is that brand value refers to the financial asset that the company records on its balance sheet, while brand equity refers to the importance of the brand to a customer of the company. Therefore, in the research the author implies that the market value of brands on an international scale, especially in the jewelry industry, performs high demanded competitiveness, however, it depends not only on brand image or exterior attractiveness of commodities rather than personal attitudes to the trademark, its history, perception and willingness to pay.

Assessment of the current state of the scientific problem being solved. To study the options that goes within the market value of brands on an international scale while considering the example of jewelry industry thoroughly, the author present a brief performance of the jewelry industry. Furthermore, it is being evaluated the kinds of its activity in an international scale, pursued an economical and macro-economic analysis, as well as made a competitive analysis of the related market, analyzed the efficiency of sales and conduct SWOT-analysis about the targeted markets of products or services the industry provides.

Basis and baseline for writing work. Theoretical and practical aspects of the ways of increasing the jewelry brands competitiveness, the notions of brand equity and brand value at different times were discussed and evaluated with versatile sense of clarity in the works of foreign researchers and scientists, such as D. Aaker, P. Barwise, R. Brennan, P. Baines, K.S. Cravens, N.R. Draper, H. Smith, N. Hennig-Thurau, D. Jobber, M. McDonald, P. Mouncey, N. Munn, A. Seetharaman, F. Völckner, H. Sattler J. Wilcox, S. Whitwell, and others.

Object of the research is the jewelry industry in the USA.

Subject is an analysis and evaluation of methods toward increasing the jewelry brands competitiveness in a contemporary world performance.

Purpose of the study includes the evaluation of the jewelry brand effectiveness in a competitive environment by using the econometric modeling methods and setting up a model (a toolkit) which could be available, feasible and reliable in an international scale.

To achieve the main purpose the following objectives have been stated:

– to conceptualize theoretical bases of the brand's market value as well as the market value of brands on an international scale (at the international level);

– to assess evaluation methods of the brands' market value;

– to provide methodology for assessing the market value of brands in the jewelry industry;

– to analyze the concepts and objectives of econometric modeling techniques;

– to observe the methods of the regression analysis;

– to review the methodology of evaluating the effectiveness of jewelry brand by using econometric modeling techniques;

– to conduct the analysis of the jewelry industry and market;

– to evaluate the competitive environment for the jewelry brand;

– to construct a regression model of the US jewelry market condition;

– to forecast the market's state using time series.

Objectives and methods of research. In the research, we applied such methods of econometric modelling and forecasting as: modelling using regression equations of basic macro-economic indicators of jewelry industry and forecasting using regression equations of basic macro-economic indicators of jewelry industry. Besides, the author implemented the measurements of Panel Data Set of the US jewelry market variables for processing and determination of the most relevant, algorithms of the Econometric Modeling Process, the prediction of the independent variables using the time series.

Theoretical and practical significance of the work. Theoretical and methodological approach includes scholar and scientific works of foreign scientists on the problems of forecasting basic macroeconomic indicators of jewelry industry. As for

the empirical base of the research, it is made up of statistic books, balance reports, various open statistic links, and corporate web sites.

Firstly, in the paragraph 1.1 we investigated the nature of the market brand value, difference between brand equity and brand value. Therefore, brand equity and brand value are similar, but not the same. Brand equity is a set of assets or liabilities in the form of brand visibility, brand associations and customer loyalty that add or subtract from value of a current or potential product or service driven by the brand. It is a key construct in the management of not only marketing, but also business strategy. Brand value, on the other hand, is the financial worth of the brand. To determine brand value, businesses need to estimate how much the brand is worth in the market. It is important to note that a positive brand value does not automatically equal positive brand equity.

Secondly, in the paragraph 2.1 we scrutinize evaluation methods of the brands' market value. Popular valuation methods and approaches include cost based brand valuation, market-based brand valuation and income approach brand valuation. The main idea is that it is important to identify the objective of the valuation and use the appropriate method and assumptions to determine a fair value.

Within the paragraph 3.1, we described methodology for assessing the market value of brands in the jewelry industry. Here we can distinguish three main steps. The first one, which consists of two parts, is "Calculating financial value". In part "A" we multiply corporate earnings by the attribution rate to arrive at branded earnings, the amount of corporate earnings attributed to a particular brand. In part "B" we take the branded earnings and multiply that number by the brand multiple to arrive at what we call financial value. The next step is "Calculating brand contribution". Now we identify the purchase volume and any extra price premium delivered by these brand associations. We call this unique role played by brand, Brand Contribution. And the last step is "Calculating brand value", where we take the financial value and multiply it by brand contribution, which is expressed as a percentage of financial value and get our brand value.

Thus, all brand valuation methodologies are similar – up to a point. All methodologies use financial research and sophisticated mathematical formulas to calculate current and future earnings that can be attributed directly to a brand rather than to the corporation.

The possibility of using the results. In order to conduct a dignified research within the framework of writing a dissertation, the thesis includes conducting an analysis on jewelry market and doing an Econometric Modeling. So, let us get acquainted with the main findings.

Jewelry is a part of luxury industries, which include luxury fashion accessories, luxury jewelry, luxury watches, etc. Jewelry industry is highly cyclical in its nature and that is mostly driven by the increasing wealth. This fact affects the industry in the world economy both in good and bad times. Tiffany & Co. has been the world's premier jeweler and America's house of design since 1837. Today Tiffany's keeps step with the American economy and expands across the United States and into South America, Europe, Asia and Australia. That is why we are mostly interested in analyzing the US jewelry market condition.

The first paragraph of the third chapter was dedicated to build the simple linear regression. As the result we've got the equation: $y = 0,1016x + 0,7012$. The determination coefficient of this model $R^2 = 0,7287$ which means that more than almost 73% of the sample can be described by the gotten equation.

Thus, using the equation we can affirm that the change by one unit of x will cause the change value $0,1016$ of y. When the x's value is equal zero, y will be equal $0,7012$.

After acquiring the simple regression model, the multiple one was constructed. The line was described by the equation: $y = 3,661 - 0,008x_1 + 0,005x_2$.

Where y – "Personal Consumption Expenditures on Jewelry", billions of dollars, x_1– "Personal saving", billions of dollars, x_2– "Personal Income", billions of dollars.

Knowing the regression line, we can predict the values of y – personal consumption expenditures on jewelry for the next periods. According to the tendency (decreasing or increasing), based on the model, the figures were added to the time line. The forecast was conducted up until the 2025 year.

To study that options thoroughly the author presents a brief performance of the jewelry industry, kinds of its activity in an international scale, pursue an economical and macro-economic analysis, as well as make a competitive analysis of the related market, analyze the efficiency of sales and conduct SWOT-analysis about the targeted markets of products or services the industry provides.

According to the findings, we assume that presented data would be beneficial for both sides: for current business entities and for those who is eager to establish a start-up in jewelry industry. Moreover, the model captured from the calculations could be implemented as a draft or a toolkit, which might take a ubiquitous tendency among entrepreneurs in the USA, as well as in the European Union or the Russian Federation.

The structure of this paper includes an introduction, three chapters, conclusion and list of the literature used in the research.

1 MARKET VALUE OF BRANDS: THEORETICAL IMPLICATIONS

1.1   Theoretical bases of the brand's market value

1.1.1 The market value of brands on an international scale

Brand equity and brand value are measures that estimate how much a brand is worth. The difference between the two is that brand value refers to the financial asset that the company records on its balance sheet, while brand equity refers to the importance of the brand to a customer of the company. Brand value is easier for a company to estimate [50, p. 13]. The company can determine the fair market value of the brand by asking other companies what price they would pay to purchase the brand. The company can also add up its costs of hiring marketers, consultants and advertising experts to develop a brand it already owns, or estimate the cost for the company to produce a new brand for its products.

Brand equity is more difficult to estimate because it relies on customers' beliefs. The company does not know whether a customer makes a purchase because he recognizes the company's brand or whether the customer uses other criteria, such as price and convenience, to make his decision. According to the findings of the University of Georgia, the company can attempt to estimate its brand equity by sending surveys to its customers to see if they recognize the brand [48].

A brand may have a positive value on the company's books and still lack brand equity [2]. When the company begins a new branding project, the company pays its employees while they work on the brand, but customers do not know about the brand yet. The company records these brand value development costs, establishing brand value before the brand gains equity. A company needs to develop brand equity past a certain point in a customer's mind before it becomes effective. The customer may watch several advertisements on television and radio, see the product in the store and buy the product several times before he recognizes the brand.

This threshold effect complicates the valuation of brand equity because the equity suddenly goes from zero value to a high value [1].

Once the company establishes brand equity, it can increase the value of the brand. If the customer likes a shirt because of its brand name, he/she might also purchase a pair of pants with that brand name or buy cologne that uses the brand name. The company can use the future revenue it expects to collect by using the brand on these other products because of this equity to calculate the current brand value. Brand equity refers to the importance of a brand in the customer's eyes, while brand value is the financial significance the brand carries. Both brand equity and brand value are educated estimates of how much a brand is worth [3].

Brand equity and brand value are similar, but not the same [22, p. 9]. Oftentimes, there is confusion around how each differs so let us look at exactly what each means. Brand equity is a set of assets or liabilities in the form of brand visibility, brand associations and customer loyalty that add or subtract from value of a current or potential product or service driven by the brand. It is a key construct in the management of not only marketing, but also business strategy. In the late 1980s, brand equity helped create and support the explosive idea that brands are assets that drive business performance over time. That idea altered perceptions of what marketing does, who does it, and what role it plays in business strategy [2]. Brand equity also altered the perception of brand value by demonstrating that a brand is not only a tactical aid to generate short-term sales, but also a strategic support to a business strategy that will add long-term value to the organization.

Brand value, on the other hand, is the financial worth of the brand. To determine brand value, businesses need to estimate how much the brand is worth in the market – in other words, how much would someone purchasing the brand pay? It is important to note that a positive brand value does not automatically equal positive brand equity [57].

While measuring brand value is straightforward, the process for brand equity is not quite so simple. Brand equity is a set of assets or liabilities in the form of brand

visibility, brand associations and customer loyalty that add or subtract from value of a current or potential product or service driven by the brand [3].

Brand visibility means that the brand has awareness and credibility with respect to a particular customer need — it is relevant. If a customer is searching for a buying option and the brand does not come to mind, or if there is some reason that the brand is perceived to be unable to deliver adequately, the brand will not be relevant and not be considered [15]. Brand associations involve anything that created a positive or negative relationship with or feelings toward the brand. It can be based on functional benefits but also a brand personality, organizational values, self-expressive benefits, emotional benefits or social benefits [11].

Customer's loyalty provides a flow of business for current and potential products from customers that believe in the value of the brand's offerings and will not spend time evaluating options with lower prices. The inclusion of loyalty in the conceptualization of brand equity allows marketers to justify giving loyalty priority in the brand building budget [15].

The value of a brand represents its impact on the short-run and long run flow of profits that it can generate. With respect to short-term profitability, the problem is that programs that are very good at driving short-run products – like price promotions – can damage brands [57].

Looking at the ways a brand can help drive short-term financial performance can help mitigate this tendency:

a) brand loyalty:
− reduced marketing costs,
− trade leverage,
− attracting new customers via awareness & reassurance,
− time to respond to competitive threats;

b) brand visibility:
− anchor to which other associations can be attached,
− familiarity which leads to liking,
− visibility that helps gain consideration,

− signal of substance/commitment;

c) brand associations:

− helps communicate information,

− differentiate/position,

− reason-to-buy,

− create positive attitude/feelings,

− basis for extensions [48, p. 243].

One of the ongoing challenges of brand equity proponents is to demonstrate that there is long-term value in creating brand equity [11]. The basic problems are that brand is only one driver of profits, completive actions intervene, and strategic decisions cannot wait for years. There are, however, some perspectives that can be employed to understand and measure the long-term value of brand equity.

Brand value approach #1: estimate the brand's role in business. One approach is to estimate the brand's role in a business. The value of a business in a product-market such as the Ford Fiesta in the UK market is estimated based on discounting future earnings. The tangible and intangible assets are identified and the relative role of the brand is subjectively estimated by a group of knowledgeable people, taking into account the business model and any information about the brand in terms of its relative visibility, associations and customer loyalty [12]. The value of the brand is then aggregated over products and markets countries to determine a value for brand. It can range from 10 percent for B2B brands to over 60 percent for brands like Jack Daniel's or Coca-Cola.

Brand value approach #2: observe investments in brand equity. A second approach is to observe that, on average, investments in brand equity increase stock return, the ultimate measure of a long-term return on assets. Evidence comes from a series of studies conducted by Professor R. Jacobson of the University of Washington, using time series data which included information on accounting-based return-on-investment (ROI) and models that sorted out the direction of causation. The consistent finding was that the impact of increasing brand equity on stock return was nearly as great as that of an ROI change, about 70 percent as much. In contrast,

advertising, also tested, had no impact on stock return except that which was captured by brand equity [2].

Brand value approach #3: reflect on other valuable brands. A third approach is to look at case studies of brands that have created enormous value. Consider, for example, the power of the Apple personality and innovation reputation, BMW's self-expressive benefits connected to the "ultimate driving machine," and the ability of Whole Foods Market brand to define an entire subcategory. Alternatively, the fact that from 1989 to 1997 two cars were made in the same plant using the same design and materials and marketing under two brand names, Toyota Corolla and Chevrolet (GEO) Prism. The Corolla brand was priced 10% higher, had less depreciation over time, and had sales many times more that the Prizm. Moreover, consumers and experts both gave it higher ratings. The same car – only the brand was different [14].

Brand value approach #4: consider the conceptual model [14]. It is important to consider the conceptual model surrounding a business strategy. What is the business strategy? What is the strategic role of the brand in supporting that strategy? How critical is it? Is price competition the alternative to creating and leveraging brand equity? What impact will that have on profit streams going forward?

To sum up, brand equity continues to be a driver of much of marketing, indeed business strategy. For it to work, it needs to be understood conceptually and operationally. In addition, it is important that it be tied to brand value in credible way.

1.1.2 Evaluation methods of the brands' market value

First, the result of brand valuation should be a monetary value, because this will lead to a higher motivation to increase this value. Besides, a monetary figure provides a basis for communication with shareholders and financial markets. Furthermore, a monetary brand value will demonstrate impressively that a brand is an investment that will create future cash flows. Only a monetary brand value makes

it possible to compare investments in brands with other investments. However, a monetary figure is not enough. The parameters that caused the increase or decrease of the figure are important as well since they show potential for improvements. Thus, the method should enable the analysis of different aspects of brands, qualitative marketing aspects (brand power) as well as quantitative financial aspects (brand value). This requires financial and marketing information. Therefore, brand valuation methods should not only include a monetary valuation but also show the influencing parameters of brand power [13].

Before using a valuation method, it should be clear if the net value or the gross value including the value of other characteristics of the branded product(s) such as design, packaging, etc. should be determined. Since the value of the intangible asset is supposed to be controlled, net brand value seems to be more suitable as performance measure. However, most brands are powerful because they are associated with a good product. Then brand value is also based on product characteristics, which should be considered in brand valuation as well because an improvement in product characteristics might improve brand power and brand value, too. Consequently, whether net or gross value makes more sense depends on the situation. If the brand depends on the underlying product characteristics, gross value will be relevant (e.g. if a certain product with a certain quality is associated with the brand). If the brand could be sold without the product, only net value will be relevant (e.g. if exclusivity or other benefit-oriented characteristics are associated with the brand). In short, for the controlling of brands all indicators that directly or indirectly influence brand power and brand value have to be considered in the valuation [13]. Still, the valuation method should make it possible to separate effects of the brand from the effects of other product characteristics. When analyzing earnings, only earnings that were achieved with the brand should be considered. Earnings that could have been achieved with a no-name product as well are not relevant in brand valuation. Likewise, only costs that were caused by the brand are relevant. Product cost should be left out because the cost situation of the firm does not influence brand

value. However, if some types of cost (e.g. cost for quality improvements of the product) indirectly influence brand value they should be considered [10].

Furthermore, the method should be valid and really evaluate the brand. Since this is difficult to prove, it should be at least clear what concept stands behind the method and the method should be transparent. Therefore, the evaluation process should be documented in detail. Obtained results should be reliable. However, this is also difficult to prove and no valuation method has been tested for reliability yet. Besides, the method should be objective. Nevertheless, according to P. Barwise, "subjective judgement is required at every stage in the brand valuation process ... any process which claimed to be totally objective or mechanical would be incapable of generating credible values" [9]. The methods should also deliver exact results. This requirement causes problems as well since the methods are future-oriented and based on predictions, which already reduce the possible precision. The methods have to be consistent, i.e. lead to the same results no matter who evaluates, what brand is evaluated and when the evaluation is done. In addition, the method should not be restricted to certain industries but be applicable for all kinds of firms. The process of brand valuation should be somewhat easy to handle and cause not too much effort. Otherwise, firms will be reluctant to use the method. Firms rather want methods that reduce complexity. The method should also be future-oriented and based on a long-term period because brand strategies often last for a couple of years. It is very important for brand controlling that the valuation method provides the possibility for a cause- and effect-analysis. Thus, the effect of brand activities, e.g. brand investments, cannot be analyzed which is, however, necessary for brand controlling [9]. In addition, brand valuation methods should consider the value of transfer potentials of a brand. A powerful brand can be suitable for other products and markets as well and create additional value. The valuation of a transfer potential is difficult though. It is already hard enough to estimate brand value for the current product and market. To estimate additional value of all transfer potentials of the brand would require the knowledge of all possible transfer products and markets and the estimation of the profit potential achievable with the brand [23]. Evidently, the

valuation process would soon become very complex and the results would be rather unstable and hypothetical. Hence, trying to include all possible transfer potentials does not seem to make sense. Still, if a concrete transfer is taken into consideration as part of a brand strategy, the profit potential of this transfer should be estimated and be included in brand valuation. Then the monetary effect of the transfer can be analyzed and controlled.

Several methods are available for valuing brand power. H. Sattler [54, p. 18] gives a comprehensive overview. Generally, well-known market research methods are used to measure the relevant factors influencing brand power (e.g. measurement of image, brand loyalty, etc.). To measure the monetary value of brands, several methods have been developed in the past.

1) Cost-based method. One method to determine the value of brands is to sum up all costs that have been caused by the brand since its development, e.g. development, marketing, or advertising costs. Although this method seems to be relatively easy at first sight, there are several problems involved with it. First, the time has to be specified for which the costs have to be summed up. If a brand has existed for several decades, such as for example Coca-Cola, it is hardly possible to determine all costs attributable to the brand. Furthermore, the problem of cost allocation to certain products is difficult, allocation of costs that have only been caused by a brand and not by the whole product is even more difficult to solve. One assumption that stands behind the cost-based method is that brands that caused high costs have a high brand value as well. However, this is not necessarily true. Using this method can therefore lead to underestimation of brands that caused relatively low costs even though they have a high brand power and good future prospects. Since this method is using data of the past, there is no evaluation of future prospects of the brand. It is obvious that there is no direct connection between accrued costs and future profits [54]. In summary, the cost-based method is useless in brand controlling. In fact, it could be rather harmful for the controlling of brands since it would become attractive for brand managers to spend huge sums in the brand since

brand value increases when costs increase. However, the efficiency and effectiveness of brand measures will not be controlled.

Another cost-based method is to evaluate a brand according to its re-creation value, e.g. the cost for building up a comparable brand. However, this method has similar problems as the method described before. Furthermore, the method is not applicable when it is not possible to recreate a brand (e.g. because the market has changed or because of the nature of brands to be special and not easy to copy). Even if it was possible to recreate a brand, it is difficult to estimate the necessary expenditures for it. Besides, there is a high risk that a recreated brand is not as successful as the original brand [15].

Therefore, cost-oriented methods focus on the input of brands, whereas the value of the brand lies in the output, the expected future returns. Hence, these methods are not applicable as performance measures in brand controlling [7].

2) Price-premium method. A plausible way to determine brand value seems to be the comparison of prices of branded and non- branded products. The price premium o f a branded product can be determined either by a customer survey (additional willingness to pay for branded goods) or by taking the average of demanded prices at the retailers. To determine brand value, brand sales are calculated by multiplying the price difference between a branded and a non-branded product with the number of products sold and subtracting brand-induced cost. Brand value consequently is the profit that is earned only because of the brand. It is the additional profit of a corporation that sells branded products in comparison to the profit of corporation that sells no-names [25].

Even though this method seems to be reasonable as well as easy to use, there are several problems involved with it. First, it is a static method. Only present additional profits are taken into account whereas the future profit potential is not considered at all. Besides, brand value determined with this method is only valid for the present products that carry the brand. Possible brand extensions that would lead to an increased brand value are not taken into account.

Furthermore, brands on products that do not have comparable no-names cannot be valued with this method. Often branded products have a higher quality than no-names or the higher price is based on higher acquisition or distribution costs. In addition to that, a price often has nothing to do with the brand since branded products can have low prices as well and are sometimes hardly more expensive than no-names. Another problem is that some brands are undervalued when the branded products do not have higher prices than no-names but have higher sales. Even though branded products have the same profit margin as no-names, their productivity is higher because of higher sales. Furthermore, prices can vary over time and across different size packs. Prices can also vary according to the customer because of rebates, discounts for volume, etc. In conclusion, the price-premium-method does not seem to be adequate to determine brand value.

3) Market value method. According to the market value method, brand value is the price usually paid for a brand. If there were a market for brands, it would be possible to determine brand value according to the price of similar brand transactions in the market. However, this method fails when there are no comparable transactions, which certainly will be the case for most brands. Even if there were, the price of a similar brand would not consider the special situation of each brand transaction, e.g. because of synergies of the brand buyer. In most cases, brands are not sold and bought separately but together with the whole firm. Briefly, this method does not seem suitable for brand valuation as well [25].

According to the research called "Conceptualizing and Measuring the Monetary Value of Brand Extensions: The Case of Motion Pictures", the authors draw on a theoretical conceptualization of brand extension success and present an approach to measure the monetary value of brand extension rights in the context of motion pictures, and reveal another measurement: to apply regression analysis and calculate the risk-adjusted monetary brand extension value by comparing success predictions for both sequels and matched original movies. The usefulness of their approach is illustrated by calculating the monetary brand extension value for an actual movie title [30, p. 167].

To sum up, the methods presented are not complete but a choice was made according to a supposed suitability for brand controlling. It is obvious that cost-based methods are not adequate for brand controlling since they are based on the past and do not give any idea about the future profit potential of brands. The price-premium method is not appropriate to determine brand value either. Beside the problems mentioned in the chapter, it is also not possible to analyze the reasons for changes in price-premiums with the method. The market value method does not work because there usually is not market for brands.

1.2 Applied measurements for assessing the brand value

1.2.1. Methodology for assessing the market value of brands in the jewelry industry

Value is the monetary worth that an informed and willing buyer and seller would accept for the sale of an item taking into consideration the given market conditions. Fair market value – the dollar value that a willing buyer would pay and a willing seller would accept in an open and unrestricted market, time not being of the essence and where the parties are acting independently of each other (arm's length transaction) [5].

Liquidation market represents the most probable price at which an item will change hands if sold with a very important time constraint, without regard to the most appropriate market. Other value – there are circumstances that require other levels of value and this must be clearly defined in the appraisal document.

The two most frequently used approaches to arriving at values are [47]:

1.   Cost Approach – The perceived direct costs of producing the articles (stones, metal, labor, hidden taxes, etc.) are totaled and a markup is applied to the cost.

2.   Market Data Approach – The systematic research in the market place to find pricing for comparable items.

In arriving at values, the appraiser must use a good range of price sources and the following is a list of sources of pricing, both general and specific [25]:

−   wholesale dealers of colored stones, on and off shore;

−   wholesale dealers of diamonds, on and off shore;

−   suppliers of jewellery metals;

−   suppliers of findings and mountings;

−   suppliers of finished gold items;

−   antique and vintage jewelry dealers;

−   auction catalogues;

−   internet;

−   standardized price listings: (use as reference only, not as a sole source of information).

When the item being appraised is a «branded» or a unique designer/goldsmith item and trademarked and/or a known registered design, the exact cost of replacing the item from the designer or company should be obtained. The appraiser should contact the designer, jeweler, or manufacturer to determine the selling price, as that is the only location to replace the item. If the exact item is no longer produced, or not available for other reasons, then the appraisal should provide a statement of price for replacing the item with the nearest equivalent item currently available from the same manufacturer, designer, or retailer. If the exact brand name item is no longer produced or not available for other reasons and a current auction price is not available, then the appraisal should provide a statement of price for replacing the item with the nearest equivalent item of like kind and quality produced by a designer, jeweler, or workshop of similar renown, quality and status.

Methodology of branded jewelry assessment [29, p. 35]:

1. Visual examination.

a) Type of jewelry including, but not limited to:

−   ring - solitaire, cluster, band, family ring, eternity band;

− earrings - stud, drop, hoop;

− necklaces – link, bead;

− neck chains - link chains of various styles;

− bracelets - bangles, charm bracelets, link bracelets of varying

− styles;

− brooches/Pins - bar brooches, stick pins;

− pendants.

b) Quantity of piece (s)

Terms used in describing quantity of items usually include: one,single, pair, set, matching set.

c) Gender style or age group

If jewelry is known to be a woman's, man or child's style of jewelry, a reference to this may be noted.

d) Age or antiquity

If the age or circa date of a piece of jewelry is known or can be estimated it should be indicated in the appraisal description by an indication of the approximate date of production, or by referring to the period to which it belongs: (eg: modern, contemporary, Art Deco, Art Nouveau, Retro, Edwardian, Victorian, etc.) The appraiser should also state whether the piece is a reproduction of a certain period if it is known.

e) Mounting:

− type of setting;

− karatage;

− colour;

− metal type;

− quality mark and trademark;

− type of manufacture;

− dimensions.

f) Gems (specify if mounted or loose):

− identification;

-        shape;

-        cutting style;

-         dimensions in millimetres for each stone;

-         colour grade or colour description (tone, saturation, hue);

-         clarity grade;

-         weight (individual weight of major stone(s), combined weight for secondary stones);

-         cut grade.

Jade, include: texture or patterning; transparency; polish.

Opal, include: potch percentage; play of colours involved; intensity; pattern; background colour.

Pearl, include: cultured or natural; fresh water or salt water; shape; color and overtone; luster; nacre thickness; blemish; number of pearls; approximate millimeter sizing.

Gemstones are considered natural unless otherwise stated. Gemstones are assumed to be treated by processes not detectable by the standard appraising laboratory when such treatment is typical for that species and variety. Any detectable process other than cutting and polishing that alters the color, clarity phenomenon and/or durability of a gem shall be disclosed.

g) Watch, include (if available):

-        description;

-        manufacturer;

-        style;

-        serial number;

-        movement description (eg. type of movement, serial number, number

-        of jewels, features and options);

-        case information (manufacturer, style and serial number); strap/bracelet information (description, manufacturer and style number);

-        bezel and dial information;

-        crystal description.

h) Gross weight. The appraisal should include any other relevant information i.e.: condition of item.

2. Photographs. A photograph or digital image of the item should accompany the appraisal but should not be depended upon to take the place of a detailed description. The appraisal should state if the photo or digital image is or is not to scale.

Status, style, and quality are the three attributes that luxury jewelry brands are known for. Jewelry brands or designers have a high standard to live up to or they are abandoned. There is no excuse for poor execution, and most deliver the style and quality their followers expect [33].

1) Style: jewelry styles must look good and be wearable. A particular piece may be very well made and last for years, but if it goes out of fashion; people will not generally want to wear it. It is important that a jewelry brand change to avoid becoming dated. Some jewelry designers can adapt, others cannot. When a designer brand cannot keep up with the times, they simply fade away and become less relevant. What makes a top jewelry designer is staying in style from year to year and decade to decade.

2) Quality: luxury brand jewelry must keep its promise to the customer to deliver a superior product. This is a no compromise area. The jewelry must meet the most stringent of quality standards. Jewelry brands must use quality, first-rate gems, and highly skilled jewelers to meet their obligation.

3) Status: when a jewelry brand reaches a level of excellence in style and quality of workmanship it attains a level of status. Brands like Tiffany & Co., Rolex, Cartier, and the like grant status to the wearer. The benefits from status symbols are hard to put a price on.

That is why these brands command a high premium for their jewelry, and their customers are happy to pay the price. These designers foster a loyalty that goes beyond image. It becomes the identity of the person. Personas' are formed by what we wear, and top jewelry brands provide value that goes beyond jewelry for many people.

2 ANALYSIS OF THE JEWELRY INDUSTRY USING ECONOMETRIC MODELING TECHNIQUES

2.1 Nature of econometric modeling techniques in evaluation of the jewelry brands effectiveness

2.1.1 Concepts, objectives of econometric modeling techniques

Econometrics is based upon the development of statistical methods for estimating economic relationships, testing economic theories, and evaluating and implementing government and business policy [37]. The most common application of econometrics is the forecasting of such important macroeconomic variables as interest rates, inflation rates, and gross domestic product. Whereas forecasts of economic indicators are highly visible and often widely published, econometric methods can be used in economic areas that have nothing to do with macroeconomic forecasting [6]. The development of econometric methods has proceeded at an unprecedented rate over the last forty years, spurred along by advances in computing, econometric theory and the availability of richer data sets [17].

The econometrics methods are used to obtain the values of parameters, which are essentially the coefficients of mathematical form of the economic relationships. It may be pointed out that the econometric methods can be used in other areas like engineering sciences, biological sciences, medical sciences, geosciences, agricultural sciences etc. [6]. In simple words, whenever there is a need of finding the stochastic relationship in mathematical format, the econometric methods and tools help. The econometric tools are helpful in explaining the relationships among variables. Applied econometric methods will be used for estimation of important quantities, analysis of economic outcomes, markets or individual behavior, testing theories, and forecasting [7].

Econometric methods are relevant in virtually every branch of applied economics. They come into play either when we have an economic theory to test or

when we have a relationship in mind that has some importance for business decisions or policy analysis [39].

1. An empirical analysis uses data to test a theory or to estimate a relationship. It may seem obvious, but it is worth emphasizing that the first step in any empirical analysis is the careful formulation of the question of interest. The question might deal with testing a certain aspect of an economic theory, or it might pertain to testing the effects of a government policy. In principle, econometric methods can be used to answer a wide range of questions.

2. A formal economic model is constructed to test economic theories. An economic model consists of mathematical equations that describe various relationships. Economists have used basic economic tools, such as the utility maximization framework, to explain behaviors that at first glance may appear to be noneconomic in nature [28]. In general, one of the objectives in modeling is to have a simple model to explain a complex phenomenon. Such an objective may sometimes lead to oversimplified model and sometimes the assumptions made are unrealistic. In practice, generally all the variables, which the experimenter thinks are relevant to explain the phenomenon, are included in the model. Rest of the variables is dumped in a basket called "disturbances" where the disturbances are random variables. This is the main difference between the economic modeling and econometric modeling.

An econometric model consists of [53]:

– a set of equations describing the behaviour. These equations are derived from the economic model and have two parts – observed variables and disturbances;

– a statement about the errors in the observed values of variables;

– a specification of the probability distribution of disturbances.

There are several types of data which we use in the estimation of the model:

1. Time series data give information about the numerical values of variables from period to period and are collected over time. For example, the data during the years 1990-2010 for monthly income constitutes a time series data [40].

2. The cross section data give information on the variables concerning individual agents (e.g., consumers or produces) at a given point of time. For example, a cross section of sample of consumers is a sample of family budgets showing expenditures on various commodities by each family, as well as information on family income, family composition and other demographic, social or financial characteristics.

3. The panel data are the data from repeated survey of a single (cross-section) sample in different periods.

4. Dummy variable data – when the variables are qualitative in nature, then the data is recorded in the form of indicator function [41]. The values of the variables do not reflect the magnitude of data. They reflect only the presence/absence of a characteristic. For example, the variables like religion, sex, taste, etc. are qualitative variables. The variable 'sex' takes two values – male or female, the variable 'taste' takes values-like or dislike etc. Such values are denoted by dummy variable. For example, these values can be represented as '1' represents male and '0' represents female. Similarly, '1' represents the liking of taste and '0' represents the disliking of taste [38].

One of the very important roles of econometrics is to provide the tools for modeling on the basis of given data. The regression modeling technique helps a lot in this task. The regression models can be either linear or non-linear based on which we have linear regression analysis and non-linear regression analysis. We will consider only the tools of linear regression analysis and our main interest will be the fitting of linear regression model to a given set of data [38].

The linear regression model is the single most useful tool in the econometrician's kit. Though to an increasing degree in the contemporary literature, it is often only the departure point for the full analysis, it remains the device used to begin almost all-empirical research [45].

Below we will focus on 2 basic methods of linear regression: simple linear regression model and multiple linear regression model, which are most suited to the selected topic of my research.

2.1.2 Methods of econometric modeling

First, we believe that it is necessary to introduce the basic concepts of "regression" and "correlation", in order to understand the essence of linear regression techniques better.

The correlation between two variables measures the degree of linear association between them. If it is stated that y and x are correlated, it means that "y" and "x" are being treated in a completely symmetrical way. Thus, it is not implied that changes in "x" cause changes in "y", or indeed that changes in "y" cause changes in "x". Rather, it is simply stated that there is evidence for a linear relationship between the two variables, and that movements in the two are on average related to an extent given by the correlation coefficient [45].

In regression, the dependent variable ("y") and the independent variable(s) ("x"s) are treated very differently. The "y" variable is assumed to be random or 'stochastic' in some way, i.e. to have a probability distribution. The '"x" variables are, however, assumed to have fixed ('non-stochastic') values in repeated samples. Regression as a tool is more flexible and more powerful than correlation.

Now we are going to reveal the essence of linear regression model [43]. Suppose the outcome of any process is denoted by a random variable y, called as dependent (or study) variable, depends on k independent (or explanatory) variables denoted by $X_1, X_2, ..., X_k$. Suppose the behaviour of y can be explained by a relationship described by formula 1:

$$y = f(X_1, X_2, \ldots, X_k, \beta_1, \beta_2, \ldots, \beta_k) + \varepsilon, \qquad (1)$$

where f is some well defined function;

$\beta_1, \beta_2, ..., \beta_k$ are the parameters which characterize the role and contribution of $X_1, X_2, ..., X_k$, respectively.

The term ε reflects the stochastic nature of the relationship between y and X_1, $X_2, ..., X_k$ and indicates that such a relationship is not exact in nature. When $\varepsilon = 0$, then the relationship is called the mathematical model otherwise the statistical

model. The term "model" is broadly used to represent any phenomenon in a mathematical framework [53].

A model or relationship is termed as linear if it is linear in parameters and nonlinear, if it is not linear in parameters. In other words, if all the partial derivatives of y with respect to each of the parameters $\beta_1, \beta_2, ..., \beta_k$ are independent of the parameters, then the model is called as a linear model. If any of the partial derivatives of y with respect to any of the $\beta_1, \beta_2, ..., \beta_k$ is not independent of the parameters, the model is called as nonlinear. Note that the linearity or non-linearity of the model is not described by the linearity or nonlinearity of explanatory variables in the model [45].

For example (Formula 2):

$$y = \beta_1 X_1^2 + \beta_2 \sqrt{X_2} + \beta_3 logX_3 + \varepsilon, \tag{2}$$

is a linear model because $\partial y/\partial \beta i$, $(i = 1,2,3)$ are independent of the parameters βi, $(i = 1,2,3)$. On the other hand (Formula 3):

$$y = \beta_1^2 X_2 + \beta_2 X_2 + \beta_3 logX + \varepsilon, \tag{3}$$

is a nonlinear model because $\partial y/\partial \beta_1 = 2\beta_1 X_1$ depends on β_1 although $\partial y/\partial \beta_2$ and $\partial y/\partial \beta_3$ are independent of any of the β_1, β_2 or β_3 [35].

When the function f is linear in parameters, then $y = f(X_1, X_2, ..., X_k, \beta_1, \beta_2, ..., \beta_k) + \varepsilon$ is called a linear model and when the function f is nonlinear in parameters, then it is called a nonlinear model. In general, the function f is chosen to describe a linear model as the equation 4:

$$f(X_1, X_2, ..., X_k, \beta_1, \beta_2 ..., \beta_k) = \beta_1 X_1 + \beta_2 X_2 ... + \beta_k X_k, \tag{4}$$

Since $X_1, X_2, ..., X_k$ are pre-determined variables and y is the outcome, so both are known. Thus the knowledge of the model depends on the knowledge of the parameters $\beta_1, \beta_2, ..., \beta_k$.

The statistical linear modeling essentially consists of developing approaches and tools to determine $\beta_1, \beta_2, ..., \beta_k$ in the linear model (Formula 5):

$$y = \beta_1 X_1 + \beta_2 X_2 ... + \beta_k X_k + \varepsilon, \tag{5}$$

Given the observations on y and $X_1, X_2, ..., X_k$.

Different statistical estimation procedures, e.g., method of maximum likelihood, principle of least squares, method of moments etc. can be employed to estimate the parameters of the model. The method of maximum likelihood needs further knowledge of the distribution of y whereas the method of moments and the principle of least squares do not need any knowledge about the distribution of y [26].

The regression analysis is a tool to determine the values of the parameters given the data on y and X_1, X_2 ,..., X_k. The literal meaning of regression is "to move in the backward direction" [26]. Before discussing and understanding the meaning of "backward direction", let us find which of the following statements is correct: "S"$_1$ - model generates data or "S"$_2$ - data generates model.

Obviously, "S"$_1$ is correct. It can be broadly thought that the model exists in nature but is unknown to the experimenter. When some values to the explanatory variables are provided, then the values for the output or study variable are generated accordingly, depending on the form of the function f and the nature of phenomenon. So ideally, the pre-existing model gives rise to the data. Our objective is to determine the functional form of this model. Now we move in the backward direction. We propose to first collect the data on study and explanatory variables. Then we employ some statistical techniques and use this data to know the form of function f. Equivalently, the data from the model is recorded first and then used to determine the parameters of the model. The regression analysis is a technique which helps in determining the statistical model by using the data on study and explanatory variables. The classification of linear and nonlinear regression analysis is based on the determination of linear and nonlinear models, respectively [43].

Consider a simple example to understand the meaning of "regression". Suppose the yield of crop (y) depends linearly on two explanatory variables, viz., the quantity of a fertilizer (X_1) and level of irrigation (X_2) as (Formula 6):

$$y = \beta_1 X_1 + \beta_2 X_2 + \varepsilon, \qquad (6)$$

There exist the true values of β_1 and β_2 in nature but are unknown to the experimenter. Some values on y are recorded by providing different values to X_1 and X_2. There exists some relationship between y and X_1, X_2 which gives rise to a

systematically behaved data on y, X_1 and X_2. Such relationship is unknown to the experimenter. To determine the model, we move in the backward direction in the sense that the collected data is used to determine the unknown parameters β_1 and β_2 of the model. In this sense such an approach is termed as regression analysis [18].

The theory and fundamentals of linear models lay the foundation for developing the tools for regression analysis that are based on valid statistical theory and concepts.

2.1.3. Methodology of evaluating the effectiveness of jewelry brand by using econometric modeling techniques

Methodology is the study of how research is done, how we find out about things, and how knowledge is gained. In other words, methodology is about the principles that guide our research practices. Methodology therefore explains why we're using certain methods or tools in our research.

Speaking about methodology that we used in our research, in general, it is a step-by-step approach consisting of the following steps [34, p.10]:

1) Statement of the problem under consideration. The first important step in conducting any regression analysis is to specify the problem and the objectives to be addressed by the regression analysis. The wrong formulation or the wrong understanding of the problem will give the wrong statistical inferences. The choice of variables depends upon the objectives of study and understanding of the problem.

2) Choice of relevant variables. Once the problem is carefully formulated and objectives have been decided, the next question is to choose the relevant variables. It has to keep in mind that the correct choice of variables will determine the statistical inferences correctly.

3) Collection of data on relevant variables. Once the objective of study is clearly stated and the variables are chosen, the next question arises is to collect data

on such relevant variables. In order to select the data for our model, we used the method of simple linear regression.

So, the simple regression model can be used to study the relationship between two variables. Linearity of the model means that, in the simple bivariate case, the relationship between variables "x" and "y" must be capable of being expressed diagrammatically using a straight line. More specifically, the model must be linear in the parameters (α and β), but it does not necessarily have to be linear in the variables ("y" and "x"). By 'linear in the parameters', it is meant that the parameters are not multiplied together, divided, squared, or cubed [60].

Substituting the data in this model, we obtained the dependent variable "y" with different R^2, where the R-squared value is the square of the correlation coefficient [60].

Given a set of data with "n" data points, the slope, y-intercept and correlation coefficient, "r", we could determine due to the following equation 7:

$$y = m \times x + b, \tag{7}$$

where slope=m,

y-int=b,

And m can be found this way (Formula 8)

$$m = \frac{n \sum(x \times y) - \sum x \times \sum y}{n \sum x^2 - (\sum x)^2}, \tag{8}$$

And b can be calculated the following way (Formula 9):

$$b = \frac{\sum y - m \times \sum x}{n}, \tag{9}$$

To check the model we can use the following equation (Formula 10):

$$r = \frac{n \sum(x \times y) - \sum x \times \sum y}{\sqrt{[n \sum(x^2) - (\sum x)^2] \times [n \sum(y^2) - (\sum y)^2]}}, \tag{10}$$

Using these formulas, we will carry out the selection of data in the model. The correlation coefficient gives us a measure of the reliability of the linear relationship between the "x" and "y" values (values close to 1 indicate excellent linear reliability).

4) Drafting of multiple regression model. Selected factors by using the simple linear regression model will be included in the multiple regression model [31].

The multiple regression model is still the most widely used vehicle for empirical analysis in economics and other social sciences. In the simple regression model, only one function of a single explanatory variable can appear in the equation [31]. As we will see, the multiple regression model allows for much more flexibility. Once we are in the context of multiple regression, there is no need to stop with two independent variables. Multiple regression analysis allows many observed factors to affect y.

The general multiple linear regression model (also called the multiple regression model) can be written as equation 11:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_n x_n + u, \tag{11}$$

where β_0 is the intercept;

β_1 is the parameter associated with x_1;

β_2 is the parameter associated with x_2 and so on.

It is assumed that the error "u" is independent with constant variance (homoscedastic).

Now we are going to estimate the regression line (Formula 12):

$$y = b_1 + b_2 x_2 + b_3 x_3, \tag{12}$$

by using the Data analysis Add-in and Regression.

Interpretation algorithm of the multiple linear regression model implemented by various tests.

5) Prediction and evaluation of the results. We will use the trend line function and the equation of simple linear regression to predict the values of the factors in the future. Then, these predicted values of factors in the future will be substituted in the model of multiple linear regression. Thus, we obtain the value of the resultant factor, or the dependent variable "y" [29].

2.2 Analysis of the jewelry industry

2.2.1 State of the jewelry industry

It is natural to begin with describing the jewelry industry itself. What is it essentially about? What are the key characteristics? It goes without saying that jewelry is a part of luxury industries. In addition, the businesses that are involved in jewelry are often dealing with other luxury products or vice versa. Speaking about this fact, it could easily cause any confusion. First, in order to get a holistic view on luxury industry, we have decided to include the following list, which gathers all products in the category [33]: luxury clothing & apparel; luxury fashion accessories; luxury beauty, cosmetics & fragrances; jewelry; watches; wine & spirits; automobiles (and other vehicles, such as yachts).

As we can see from the list above, luxury is a complex filed. Secondly, it is important to admit that often the confusion is related to watches: some refer them to jewelry while others do not. Therefore representing of numbers must remain critical.

Jewelry industry is highly cyclical in its nature and that is mostly driven by the increasing wealth [47]. This fact affects the industry in the world economy both in good and bad times. Recently, several factors have affected the performance of both Tiffany's and the luxury goods industry. Typically, spending in general and on luxury goods in particular depends greatly on consumer confidence in the economy as a whole. With the economic slowdown of 2008, Tiffany & Co as well as the luxury jewelry industry has experienced dramatic decline, captured in a particularly poor holiday season. Facing further anticipated economic softening, the firm has decided to open an alternative store model in the Los Angeles area that focuses exclusively on its lower-end sterling silver jewelry whose average price point is $200. Tiffany & Co is also focusing on growth opportunities in non-Japanese Asian markets as well as opening its first store in the Middle East [16].

Despite this fact, there are positive long-term growth trends, as well as the different estimates of the size of international jewelry industry. Some experts have

put this number in 25 billion USD, while industry specific research companies suggest considerably bigger size of 236 billion USD. For comparison, it should be noted that the diamond supply giant De Beers company with their 40% world market share, mark with their turnover solely the World diamond supply to 18,5 billion USD in 2015. Therefore, the 236 billion USD estimate for world jewelry market seems rather more convincing [42].

Tiffany & Co has been the world's premier jeweler and America's house of design since 1837. Throughout its history, Tiffany & Co has been a luxury jewelry brand associated with romance, quality, and style. Originally gaining fame as a silversmith and later for its association with engagement rings and diamonds, Tiffany & Co now reaches a wide market through its sale of high-end jewelry, watches and glassware. Tiffany's keeps step with the American economy and expands across the United States and into South America, Europe, Asia and Australia. The firm offers a wide array of price points in its pieces, from sterling silver items under $100 to quarter of a million dollar signature pieces covered in diamonds and other gems. The supplier power on DeBeers and others is critical to shaping the industry's dynamics and future [51].

Tiffany & Co. operates in many countries, with 313 company-operated stores. Its Americas segment, is the largest one, includes sales from company-operated retail stores in the United States, Canada, Mexico, and Brazil [44]. It also includes sales in these markets through business-to-business, Internet, catalog, and wholesale operations. At the end of fiscal 2017, ended January 31, 2017, Tiffany operated 122 retail stores in the Americas: 95 in the United States, 11 in Canada, 11 in Mexico, and 5 in Brazil. This included 12 company-operated stores within department stores in Canada and Mexico [4]. At the end of fiscal 2017, the Americas segment had a total gross retail square footage of 710,000. Tiffany's Americas segment accounted for 48% of the company's total revenue in fiscal 2016 and 2017, while sales in the United States accounted for 88% and 89% of revenue in the Americas in the respective periods. This revenue is further divided into the following categories:

- statement, fine, and solitaire jewelry – items containing diamonds and gemstones, contributing 23% of sales in the Americas;

- engagement jewelry and wedding bands – items containing diamonds, contributing 23% of sales in the Americas;

- fashion jewelry – non-gemstone, sterling silver, gold, and metal items, accounting for 44% of sales in the Americas, with sterling silver contributing more than 50% of total fashion jewelry sales [41, p. 254].

Earnings from operations for the Americas segment represented 19.4% and 18.8% of the company's net Americas sales for fiscal 2016 and 2017, respectively. The Tiffany's major peer in the jewelry industry is the Signet Jewelers. This company has presence mainly in the United States, which represented 86.8% of its total revenue in fiscal 2017. However, Tiffany's peer Fossil has a presence in the United States, the Asia-Pacific region, Japan, Europe, and other countries [24].

It is clear that Tiffany has a presence in many international regions such as: the Americas, the Asia-Pacific region, Japan, Europe and the United Arab Emirates. Let us look some of them more particularly (Picture 1).

Asia-Pacific
- Sales come from company-operated stores, internet sales, and wholesale distribution;
- 73 retail stores, mainly in China, Korea, and Hong Kong, as of the end of fiscal 2017;
- Represented 24% of total revenue in fiscal 2017, with Greater China contributing more than 50% for the region;
- Earnings from operations represented 25.8% and 27.5% of net Asia-Pacific sales for fiscal 2016 and 2017, respectively.

Japan
- Sales come from company-operated stores, internet sales, business-to-business sales, and wholesale distribution;
- 56 company-operated Tiffany stores at the end of fiscal 2017;
- Accounted for 13% of total company revenue;
- Earnings from operations represented 37.3% and 35.4% of net Japan sales for fiscal 2016 and 2017, respectively.

Europe
- Sales come from company-operated stores and internet sales;
- 38 company-operated stores at the end of fiscal 2017, mainly in the United Kingdom, Germany, and Italy;
- Accounted for 12% of total revenue, whereas the United Kingdom represented 40% of total European sales;
- Earnings from operations represented 21.5% and 21.7% of net Europe sales for fiscal 2016, and 2017, respectively.

Picture 1 – Tiffany & Co.'s International Segments

The company's other segment includes operations in emerging markets, which represent 75% of the segment's total sales. It also includes wholesale sales of diamonds, which involves the purchasing and conversion of rough diamonds to polished stones. Sales of rough diamonds have been reducing Tiffany's overall gross margin [16].

Tiffany's major peer in the jewelry industry, Signet Jewelers, has a presence mainly in the United States, which represented 86.8% of Signet's total revenue in fiscal 2017. Tiffany's peer Fossil has presences in the United States, the Asia-Pacific region, Japan, Europe, and other countries [44]. After Tiffany & Co.'s market situation has become clear, it is necessary to analyze efficiency of the Company's sales and present it in the Table 1 [32, p. 160].

Speaking about Return on assets (ROA), it is an indicator of how profitable a company related to its total assets. ROA gives a manager, investor, or analyst an idea as to how efficient a company's management is at using its assets to generate earnings [60]. When Profit Margins are expressed as a percentage and, in effect, measure how much out of every dollar of sales a company actually keeps in earnings. So, as we can see from the Table 1, in 2016 ROA was 3,87%, but in 2017 it increased by 5,88%. It means that Tiffany & Co.'s assets became more productive. Thus, it is obvious that the higher ROA number is, the better, because the company is earning more money on less investment [44].

Table 1 – Analysis of the efficiency of Tiffany & Co. sales

Year	Sales, $ millions	Profits, $ millions	Assets, $ millions	Asset Turnover	Profit Margin, %	ROA, %
1	2	3	4	5	6	7
2016	4,105	2,374	5,122	0,80	11,30	9,00
2017	4,002	2,233	5,098	0,78	11,13	8,72

In order to have a good understanding of Tiffany & Co.'s competitive advantages, a SWOT-analysis has been conducted and reflected in the Pic. 2 [36].
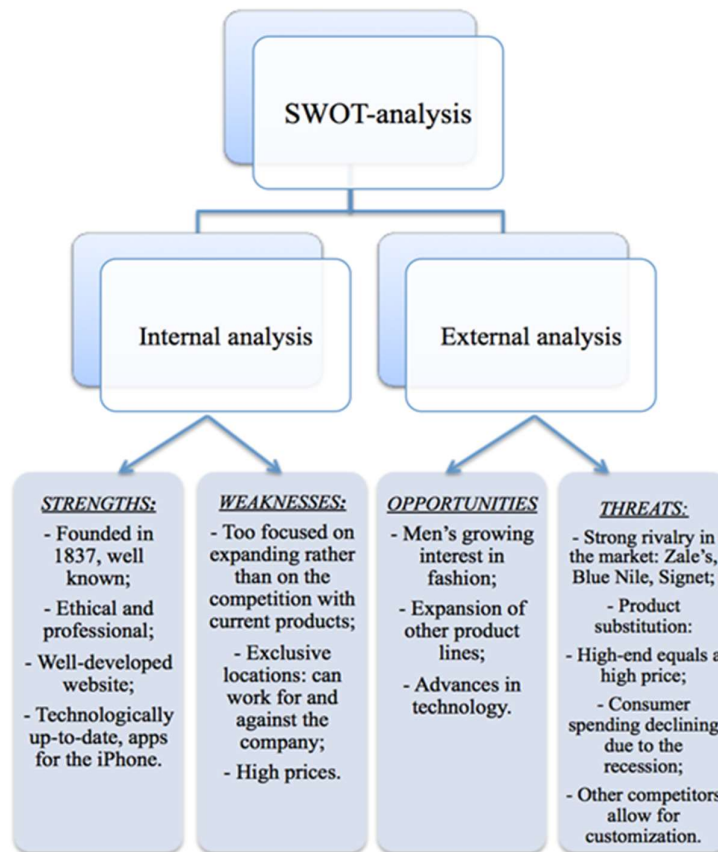
Picture 2 – SWOT-analysis of Tiffany & Co

As it is captured from the research, growth rate of all indicators has an increasing tendency. Despite this fact, positive dynamics of growth rate in case of Short-term borrowings and long-term debt defines that Company's debts became bigger almost twice. Speaking about Total assets, as one of the most important indicator of Tiffany & Co.'s prosperity, due to positive percentage rate, which is equal 23,3%, it is obvious that the Company is expanded on the market of jewelry. Furthermore, growth rate of Stockholders' equity per share and Cash dividends paid per share, 24,6% and 41,1% accordingly, shows that earnings of Tiffany & Co. have increased [44].

Now taking into consideration the fact that Tiffany & Co. mostly presented in the USA we are going to describe the state of the jewelry industry in 2015 there. So, According to the U.S. Department of Commerce, between 2010 and 2015, total jewelry and watch sales in the United States have grown at a CAGR (compounded annual growth rate) of 4.4%, reaching $74.7 billion in 2014 [36].

The United States, the most mature jewelry market, reported a 7% rise in jewelry sales in 2014, followed by China and India with rises of 6% and 3%, respectively. Tiffany & Co. has a strong presence in all these mature and growing markets.

In the Picture 3 below we can see division of all jewelry sales in the USA by category.
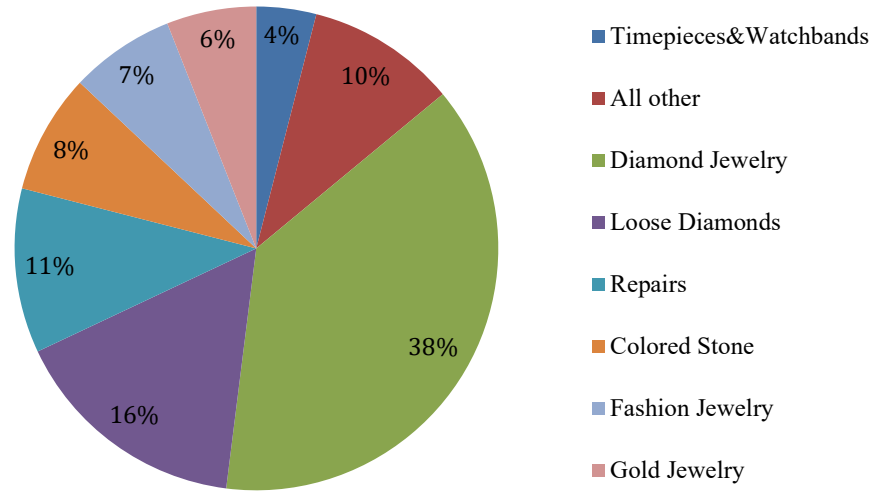
Picture 3 – USA jewelry sales by category [36]

In-house credit facility represents 35%–50% of total jewelry sales. However, Tiffany and its peer Fossil do not offer credit facility to their customers, unlike Signet Jewelers, where credit sales account for 41.9% of total sales.

According to the Survey of America, 37.9% of jewelry sold is diamond jewelry, with loose diamonds contributing another 16% of sales. Fashion and gold jewelry account for 7% and 6% of total sales, respectively. Therefore, now we are going to describe sate of consumption in the USA jewelry industry from 2015 to 2017 (Table 2) [36].

Table 2 – The main consumption indicators of the jewelry industry in the USA

#	Indicator	Years			Growth from 2015 to 2017, %
		2015	2016	2017	
1	Personal Consumption Expenditures	75,3	77,0	77,2	2,52
2	Real Personal Consumption Expenditures, index	111,266	117,819	121,068	8,81
3	Real Personal Consumption Expenditures, Chained Dollars	67,0	71,0	73,0	8,95
4	Price Indexes for Personal Consumption Expenditures	112,352	108,509	105,778	-5,85

All the indicators presented in the table 2 (except Price Indexes which are naturally inversely proportional to all mentioned) demonstrate growth during the period from 2015 to 2017. Such tendency has been proved by several of the top U.S. retail jewelry brands, including Tiffany & Co, reported increased sales and revenues in 2017.

Talking about main trends shaping the jewelry industry as a whole, we can deduce the following [47]:

1. Increasing demand for branded jewelry due to distinctive designs, credibility, and quality.

2. Increase in jewelry shops in developing countries of Asia.

3. Increased focus on e-commerce sales in both developed and developing markets.

Furthermore, when a jewelry brand reaches a level of excellence in style and quality of workmanship it attains a level of status. Brands like Tiffany & Co., Rolex, Cartier, and the like grant status to the wearer. The benefits from status symbols are hard to put a price on. That is why these brands command a high premium for their jewelry, and their customers are happy to pay the price. These designers foster a loyalty that goes beyond image. It becomes the identity of the person. Individuality is formed by what we wear, and top jewelry brands provide value that goes beyond jewelry for many people [48].

According to the figures, the firm's return on capital (ROC) is an excellent indicator of the size and strength of its moat. If a company is able to generate returns of 15-20% year after year, it has a great system for transforming investor capital into profits. However, as we could see this indicator has not risen above 13.7% recently. That is why the Company's management should direct efforts to improve its ROC [4].

A similar situation is observed with respect to Return on equity. For Tiffany & Co. the ROE indicator showed decline in 12%. Return on assets (ROA), which indicates how profitable a company is relative to its total assets, unfortunately shows decreasing tendency either. We could see the same tendency with operating profit margin ratio, also expressing as a percentage of sales and then showing the efficiency of a company controlling the costs and expenses associated with business operations. Thus, it can be concluded that the company's management should make the most effort to improve the above-mentioned indicators.

2.2.2 Analysis of the jewelry market

To illustrate the key markets we have selected the top ten jewelry markets in respect to the population. You can see the results in the Picture 4 [58].

It is clear which countries are, in fact, the major markets for jewelry. According to the fact that Tiffany's has grown steadily alongside the American economy, we are mostly interested in analyzing Tiffany's Americas segment as its largest one.
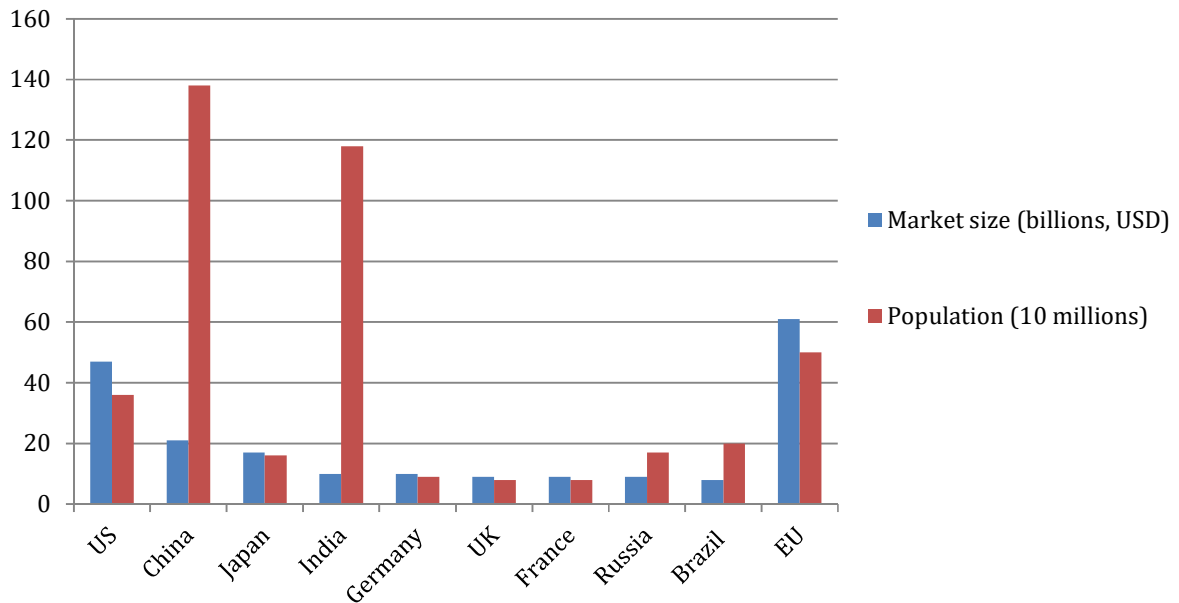
Picture 4 – The key world jewelry markets [58]

To evaluate state of the US jewelry market in general we examined some of the basic indicators, which are presented in the Table 3 below.

Table 3 – The key US jewelry market figures

#	Indicator	Years			Growth from 2015 to 2017, %
		2015	2016	2017	
1	Fine Jewelry Market Share, %	88,2	88,3	88,3	0,10
2	Fine Jewelry Sales, $ billions	65,2	65,8	66,5	1,98
3	Specialty Jewelers' Sales, $ billions	30,3	30,5	30,5	0,65
4	Average Expenditure On Fine Jewelry Per Household, $	428	434	417	-2,56

From the table 3 we can see that most of all indicators demonstrate growth during 3-years period. Despite this fact, it is important to emphasize that these figures are a modest improvement between 2015 and 2017. Moreover, rate of growth shows that expenditures of each US household on fine jewelry have declined on 2,56% and become $417 in 2017 in comparing with $428 in 2015 [36].

As for Tiffany's presence within the American jewelry market, at the end of fiscal 2017, ended January 31, 2017, Tiffany operated 122 retail stores in the Americas: 95 in the United States, 11 in Canada, 11 in Mexico, and five in Brazil. This included 12 company-operated stores within department stores in Canada and Mexico. At the end of fiscal 2017, the Americas segment had a total gross retail square footage of 710,000 [4].

Tiffany's Americas segment accounted for 48% of the company's total revenue in fiscal 2015, 2016, and 2017, while sales in the United States accounted for 88%, 88%, and 89% of revenue in the Americas in the respective periods. This revenue is further divided into the following categories (Picture 5) [36].
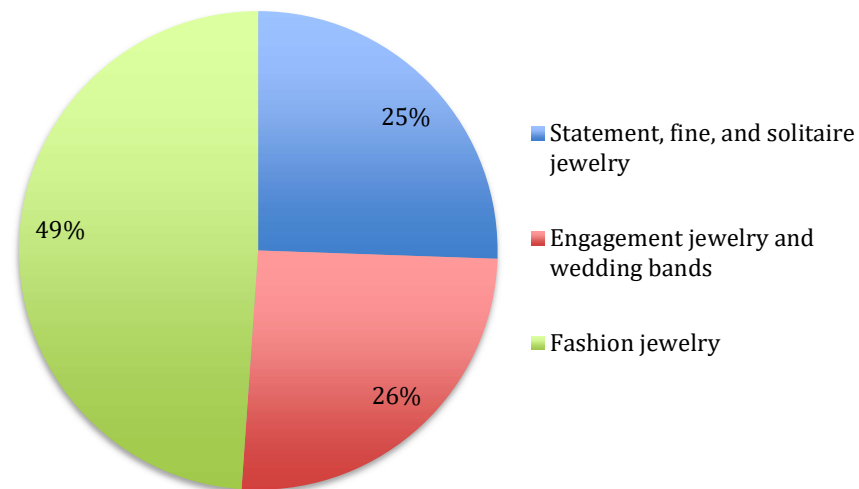
Picture 5 – The composition of Tiffany's Americas segment revenue [36]

1) Statement, fine, and solitaire jewelry – items containing diamonds and gemstones, contributing 25% of sales in the Americas.

2) Engagement jewelry and wedding bands – items containing diamonds, contributing 26% of sales in the Americas.

3) Fashion jewelry – non-gemstone, sterling silver, gold, and metal items, accounting for 49% of sales in the Americas, with sterling silver contributing more than 50% of total fashion jewelry sales.

Earnings from operations for the Americas segment represented 21.4%, 19.4%, and 18.8% of the company's net Americas sales for fiscal 2015, 2016, and 2017, respectively [42].

Speaking about Tiffany's long-term strategies, the most powerful of them is to improve its store base through store openings in key markets, renovations, relocations, and closings. The company has set a long-term goal to increase its worldwide square footage close to 2% per year. Tiffany has planned the majority of its expansions in the Asia-Pacific region.

2.2.3 Evaluation of the competitive environment for the jewelry brand

In order to evaluate Tiffany's competitive position, we are going to conduct a comparative analysis of Tiffany & Co and its closest competitor – Signet Jewelers Ltd, based on the key indicators of companies' activity. These indicators are shown in the tables 4, 5 and 6 below.

Table 4 – The key figures of Tiffany & Co

#	Indicator	Years			Growth from 2015 to 2017, %
		2015	2016	2017	
1	Revenue, $ millions	3,79	4,03	4,25	12,14
2	Net Income, $ millions	416	181	484	16,35
3	Total Current Assets, $ millions	3,15	3,22	3,61	14,60
4	Return on Sales (ROS), %	18.4	7.5	21.0	14,13
5	Return on Assets (ROA), %	9.47	3.87	9.75	2,96

All the indicators in the table 4 demonstrate growth during 3-years period. It means the Tiffany & Co's revenue increased by 12,14% in 2017 compared to 2015. As for net income and total current assets these indicators increased by 16,35% and 14,6% respectively during the same time period. The increased ROS means that in 2017 the company began to generate its profit by 14.13% more efficiently than it did in 2015. While increased ROA means that Tiffany & Co in 2017 began to convert

the money it had to invest into net income by 2,96% more effectively than in 2015 [42].

Now we will evaluate the same indicators of Signet Jewelers Ltd's performance.

Table 5 – The key figures of Signet Jewelers Ltd

#	Indicator	Years			Growth from 2015 to 2017, %
		2015	2016	2017	
1	Revenue, $ millions	3,98	4,20	5,73	43,97
2	Net Income, $ millions	360	368	381	5,83
3	Total Current Assets, $ millions	3,03	3,25	4,40	45,21
4	Return on Sales (ROS), %	14.1	13.6	10.1	-28,37
5	Return on Assets (ROA), %	9.82	9.50	7.36	-26,05

In the Table 5 we can see that some of the indicators have increasing tendency but the others have decreased their values. It means that despite the fact the revenue, net income and total current assets of Signet Jewelers Ltd increased in 2017, ROS and ROA fell by 28,37% and 26,05% respectively compared to 2015. Such a sharp decline in these coefficients indicates a non-efficient financial management in the company and the presence of financial difficulties in it [42].

Table 6 – Comparative analysis of companies' growth rates

#	Indicator	Growth from 2015 to 2017, %	
		Tiffany & Co	Signet Jewelers Ltd
1	Revenue, $ millions	12,14	43,97
2	Net Income, $ millions	16,35	5,83
3	Total Current Assets, $ millions	14,60	45,21
4	Return on Sales (ROS), %	14,13	-28,37
5	Return on Assets (ROA), %	2,96	-26,05

From the Table 6, which is based on the figures from Table 4 and Table 5, we can deduce that during 3-years period Tiffany & Co is more profitable company than Signet Jewelers Ltd. Despite the fact that Tiffany & Co has lower revenue and total current assets growth rates, its net income, ROS and ROA rates of growth are even

higher in contrast with Signet Jewelers Ltd. Growing ROS of Tiffany & Co means that company is generating profits from its top-line revenue very efficiently. The higher the ROA number of Tiffany & Co means that the company earns more money on less investment than Signet Jewelers Ltd does.

Moreover, in order to evaluate Tiffany's competitive position better, we are going to apply Porter's five forces analysis [36]. Graphically the results of Porter's five forces analysis are shown below in the Picture 6.
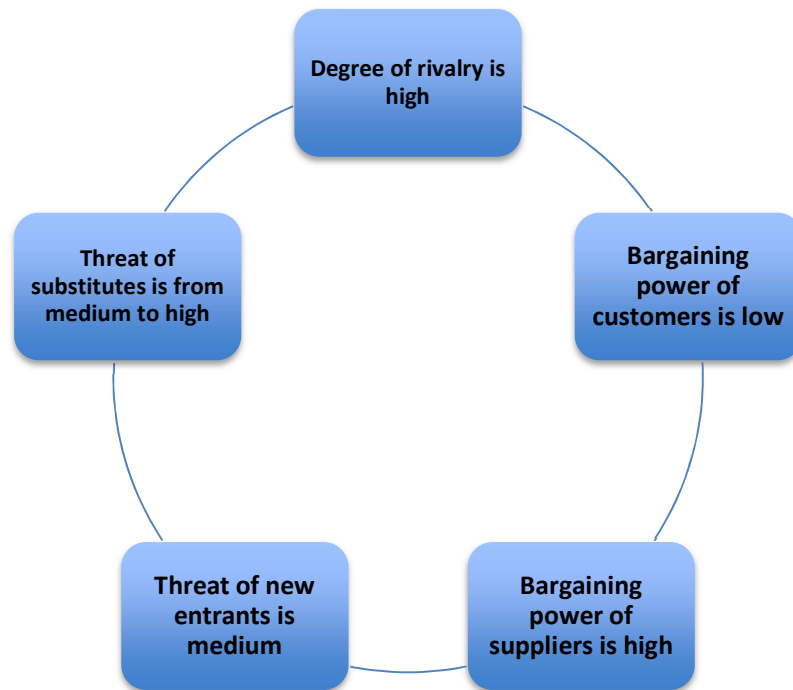
Picture 6 – Porter's five forces analysis of Tiffany & Co

Speaking about rivalry, the luxury jewelry market is characterized by several competitors with a select few firms having the brand recognition to command large potions of the market. High-end competitors such as DeBeers, Signet Jewelers Ltd, Bulgari, Mikimoto, online jewelers such as Blue Nile. Additionally, local and regional boutiques that feature equally stunning pieces typically play well in local markets because of the personalized experience buyers seek when purchasing high-end jewelry. While many of these high-end competitors specialize within the luxury jewelry industry – DeBeers with diamonds, Mikimoto with pearls, Cartier with

watches – each competitor produces a variety of pieces and styles with various stones and metals and competes with Tiffany & Co to varying degrees within its three core consumer groups. Within the jewelry shopper consumer group, Tiffany & Co faces additional competitors. Jewelers such as James Avery in Texas specialize in silver and gold jewelry in the $65- $300 price range. While many of these regional players exist, Tiffany's high-end reputation allows the firm to maintain a national and international presence in the jewelry shopper demographic [36].

As for entry, the luxury jewelry industry is a mature market where buyers look for established and reputable brands. Tiffany & Co reports that the single greatest asset it owns is its brand recognition. The iconic image of the little blue box or well-known DeBeers slogan "a diamond is forever" are types of brand recognition that take decades to establish.

Additionally, firms need to have a significant amount of startup capital to enter into this industry. Luxury jewelers typically turn over their inventory once a year, meaning they must invest up front in all metals and gems without initially being able to create a profit [16].

New entrants may also have difficult procuring raw materials. Large diamond producers will only sell in bulk to buyers, leaving smaller jewelers the leftover gems the large companies deem unsuitable for their needs. These secondary diamonds are frequently of inferior quality, meaning new entrants either need to have a connection with diamond distributors or find a way to compete with lower-quality gems. Alternatively, new entrants may find a specialty beyond diamonds, such as David Yurman has done with high-quality metals with occasional gem accents [16].

However, once a firm has established itself with suppliers and in at least one market, expansion into new geographic regions has proven successful for many firms. Tiffany's in particular has experienced strong international growth in Latin America, Europe, and Asia.

Now we are going to describe substitutes and complements. The luxury jewelry market has few substitutes, as it is the "symbol of romance". The timeless

marketing strategy of all jewelers – and diamond jewelers in particular – is that luxury jewelry is a timeless, tangible symbol of love.

Yet within the luxury jewelry industry, substitutes exist between different types of products. While Tiffany & Co sells all types of jewelry – from diamond necklaces to pearls to watches – certain retailers certainly specialize in different styles or designs. Tiffany & Co is seen as the dominant player in engagement ring and silver, while Mikimoto is the leader in luxury pearls and Rolex is the leader in luxury watches. Additionally, while brand recognition is paramount for luxury jewelers, brand loyalty is limited as many retailers can produce relatively similar high-end products. For example, there is little to distinguish a traditional diamond tennis bracelet from Harry Winston, Tiffany & Co, or DeBeers. To combat this, Tiffany & Co has asked its designers to create a fresh approach to many traditional pieces, giving them a distinct Tiffany & Co look. Customers may retain a certain degree of brand loyalty if they develop a relationship with a clerk at a store, but other than that there are no switching costs associated with movement among luxury jewelers [36].

Speaking about supplier power, in addition to DeBeers, Tiffany & Co purchases diamonds from 6 other suppliers. With diamond mines being controlled progressively more by local companies and governments, worldwide diamond supply is becoming increasingly contingent on the political stability and situations in diamond-producing countries. Tiffany & Co reports that if distribution from one or more of its seven suppliers were to be cut off, it would dramatically and adversely affect its sales. However, the risk of such a disruption is low, and will continue to decrease as the diamond industry becomes controlled by a growing number of players. Because the diamond industry is controlled by a limited number of players and availability of diamonds is decreasing, Tiffany & Co reports that it is has had increased difficulty acquiring diamonds for its engagement business. As a result, some stores are not able to maintain a comprehensive selection of diamonds of various cuts, clarity grades, sizes and colors [36].

Tiffany & Co purchase finished jewelry from over 90 manufactures. While many of these relationships are well-established, Tiffany & Co does not enter into long-term contracts with suppliers. Within the other gem and precious metal category, it does not appear as though suppliers exert a dramatic amount of supplier power [44].

As for buyer power, Tiffany & Co exerts little to no buyer power in the luxury goods industry. However, because it purchases both rough and finished diamonds in bulk from its suppliers, certain diamonds do not meet Tiffany & Co's standards and must be sold to third parties. Tiffany & Co resells these diamonds at market prices, and is unable to make any significant profit from these sales [58].

3 SUGGESTIONS FOR IMPROVING THE BRAND VALUE FOR JEWELRY INDUSTRY

3.1 Econometric Modeling and Forecasting of the US jewelry market condition

3.1.1 Panel Data Set of the US jewelry market variables for processing and determination of the most relevant

In this paragraph we are going to conduct a panel data set analysis. We have some data about the US jewelry market conditions and about the factors which, we assume, influence it.

Therefore, the set of variables includes the following:

– personal consumption expenditures on jewelry: personal consumption expenditures (PCE) measure price changes of consumer goods and services. Expenditures noted on the index include actual expenditures and expenditures that are attributed to households in the United States. The PCE is broken down into two large categories: goods and services [8]. The major component of these two – goods – is then further broken down into durables and non-durables. Durable goods are items that last a household more than three years and typically carry larger price tags. Non-durable goods are labeled "transitory", meaning their life expectancy is typically not more than three years [18];

– personal saving: savings, according to Keynesian economics, consists of the amount left over when the cost of a person's consumer expenditure is subtracted from the amount of disposable income he earns in a given period of time. For those who are financially prudent, the amount of money left over after personal expenses have been met can be positive; for those who tend to rely on credit and loans to make ends meet, there is no money left for savings. Savings can be turned into further increased income through investing in different investment vehicles [55];

– personal income: personal income refers to all of the income collectively received by all of the individuals or households in a country. Personal income includes compensation from a number of sources including salaries, wages and bonuses received from employment or self-employment; dividends and distributions received from investments; rental receipts from real estate investments and profit-sharing from businesses [49].

Personal income is often compared to personal consumption expenditures (PCE). PCE measures the changes in the price of consumer goods and services. By taking these changes into account, analysts can ascertain how changes in personal income truly affect spending. To illustrate, if personal income increases significantly one month but PCE also increases, consumers collectively may have more cash in their pockets, but they may have to spend more on basic goods and services [19].

The panel data variation is presented in the Table 7.

Table 7 – Variation for the dependent variable "Personal Consumption Expenditures on Jewelry" and regressors

Id	Time	Variable	Individual mean	Overal mean	Overall deviation	Between deviation	Within deviation	Within deviation (modified)
i	t	x_{it}	$\bar{x}_t$	$\bar{x}$	$x_{it} - \bar{x}$	$\bar{x}_t - \bar{x}$	$x_{it} - \bar{x}_t$	$x_{it} - \bar{x}_t + \bar{x}$
1	2000	49,1	57,1	304,7	-255,6	-247,6	-8,0	296,7
1	2001	47,6	57,1	304,7	-257,1	-247,6	-9,5	295,2
1	2002	49,1	57,1	304,7	-255,6	-247,6	-8,0	296,7
1	2003	51,9	57,1	304,7	-252,8	-247,6	-5,2	299,5
1	2004	56,6	57,1	304,7	-248,1	-247,6	-0,5	304,2
1	2005	59,8	57,1	304,7	-244,9	-247,6	2,7	307,4
1	2006	64,2	57,1	304,7	-240,5	-247,6	7,1	311,8
1	2007	67,2	57,1	304,7	-237,5	-247,6	10,1	314,8
1	2008	65,3	57,1	304,7	-239,4	-247,6	8,2	312,9
1	2009	60,3	62,8	304,7	-244,4	-241,9	-2,5	302,2
1	2010	62,6	189,2	304,7	-242,1	-115,5	-126,6	178,1
1	2011	69,4	189,2	304,7	-235,3	-115,5	-119,8	184,9

The rest of the table 7

1	2012	72,4	189,2	304,7	-232,3	-115,5	-116,8	187,9
1	2013	75,3	189,2	304,7	-229,4	-115,5	-113,9	190,8
1	2014	77,0	189,2	304,7	-227,7	-115,5	-112,2	192,5
1	2015	77,2	189,2	304,7	-227,5	-115,5	-112,0	192,7
2	2000	307,7	189,2	304,7	3,0	-115,5	118,5	423,2
2	2001	335,2	523,3	304,7	30,5	218,6	-188,1	116,6
2	2002	405,3	523,3	304,7	100,6	218,6	-118,0	186,7
2	2003	409,6	523,3	304,7	104,9	218,6	-113,7	191,0
2	2004	409,4	523,3	304,7	104,7	218,6	-113,9	190,8
2	2005	243,1	523,3	304,7	-61,6	218,6	-280,2	24,5
2	2006	331,4	523,3	304,7	26,7	218,6	-191,9	112,8
2	2007	309,8	523,3	304,7	5,1	218,6	-213,5	91,2
2	2008	536,7	523,3	304,7	232,0	218,6	13,4	318,1
2	2009	667,4	523,3	304,7	362,7	218,6	144,1	448,8
2	2010	630,0	523,3	304,7	325,3	218,6	106,7	411,4
2	2011	710,1	523,3	304,7	405,4	218,6	186,8	491,5
2	2012	946,7	523,3	304,7	642,0	218,6	423,4	728,1
2	2013	620,1	523,3	304,7	315,4	218,6	96,8	401,5
2	2014	726,0	523,3	304,7	421,3	218,6	202,7	507,4
2	2015	783,6	523,3	304,7	478,9	218,6	260,3	565,0

The individual means let us have a look at the variables without time dimension.

Overall variation means the variation over time and individuals, between variation – only between individuals and within variation – within individuals over time. Overall deviation shows how the variables differ from the mean [21].

After analyzing the data set, we come up to the next step – the construction of the Simple Linear Regression Model. We do not know yet which regressor will give us the best results. Therefore, we are going to construct several simple linear regression models and then will choose the best of them [20].

There is the first set of variations in the Table 8 below. Y there stands for "Personal Consumption Expenditures on Jewelry" in billions of dollars and X stands for "Personal saving".

Table 8 – Variables for the construction of the Simple Linear Regression Model 1

Observation	Y	X	Observation	Y	X	Observation	Y	X
1	4,0	75,0	17	21,1	265,1	33	47,6	335,2
2	4,1	96,1	18	24,3	269,4	34	49,1	405,3
3	4,4	110,1	19	26,2	252,1	35	51,9	409,6
4	4,8	109,2	20	28,3	294,8	36	56,6	409,4
5	6,0	131,8	21	29,2	316,5	37	59,8	243,1
6	7,0	141,7	22	30,3	335,4	38	64,2	331,4
7	8,1	159,0	23	30,2	365,9	39	67,2	309,8
8	9,8	147,3	24	31,6	426,0	40	65,3	536,7
9	11,0	148,2	25	33,9	367,6	41	60,3	667,4
10	12,3	166,6	26	36,0	331,4	42	62,6	630,0
11	13,0	177,5	27	37,8	352,9	43	69,4	710,1
12	15,0	213,2	28	39,9	345,2	44	72,4	946,7
13	16,0	252,5	29	39,9	352,2	45	75,3	620,1
14	15,6	277,7	30	42,6	405,3	46	77,0	726,0
15	17,4	247,0	31	46,5	303,3	47	77,2	783,6
16	19,8	312,1	32	49,1	307,7	-	-	-

By means of the Excel MS analysis package we get the result presented in the Picture 7 below:
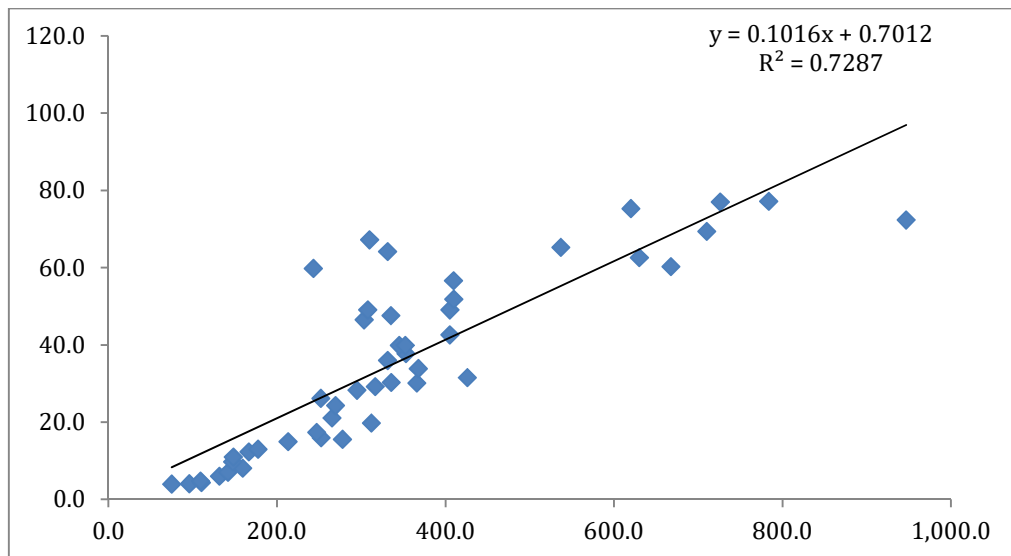
Picture 7 – The Simple Linear Regression Model 1

We get $R^2 = 0,7287$ which means that more than almost 73% of the sample can be described by the gotten equation:

$$y = 0,1016x + 0,7012, \tag{13}$$

where y – personal consumption expenditures on jewelry;

x – personal saving.

Now we check the relationship between the personal consumption expenditures on jewelry and personal income (Table 9):

Table 9 – Variables for the construction of the Simple Linear Regression Model 2

Observation	Y	X	Observation	Y	X	Observation	Y	X
1	4,0	800,3	17	21,1	3 516,3	33	47,6	8 991,6
2	4,1	864,6	18	24,3	3 725,7	34	49,1	9 153,9
3	4,4	932,1	19	26,2	3 955,9	35	51,9	9 491,1
4	4,8	1 023,6	20	28,3	4 276,3	36	56,6	10 052,9
5	6,0	1 138,5	21	29,2	4 619,9	37	59,8	10 614,0
6	7,0	1 249,3	22	30,3	4 906,4	38	64,2	11 393,9
7	8,1	1 366,9	23	30,2	5 073,4	39	67,2	12 000,2
8	9,8	1 498,5	24	31,6	5 413,0	40	65,3	12 502,2
9	11,0	1 654,6	25	33,9	5 649,0	41	60,3	12 094,8
10	12,3	1 859,7	26	36,0	5 937,3	42	62,6	12 477,1
11	13,0	2 078,2	27	37,8	6 281,0	43	69,4	13 254,5
12	15,0	2 317,5	28	39,9	6 667,0	44	72,4	13 915,1

The rest of the table 9

13	16,0	2 596,5		29	39,9	7 080,7		45	75,3	14 073,7
14	15,6	2 779,5		30	42,6	7 593,7		46	77,0	14 809,7
15	17,4	2 970,3		31	46,5	7 988,4		47	77,2	15 458,5
16	19,8	3 281,8		32	49,1	8 637,1		-	-	-

Build the Simple Linear Regression Model 2. The result we can see in the picture 6 below.

We get $R^2 = 0,99$ which means that almost whole sample can be described by the equation (Formula 14):

$$y = 0,0051x + 2,8499, \qquad (14)$$

This result is even better though we can assume there is some dependence between the variables we did not take into consideration; we will not consider this equation for the further analysis (Picture 8).
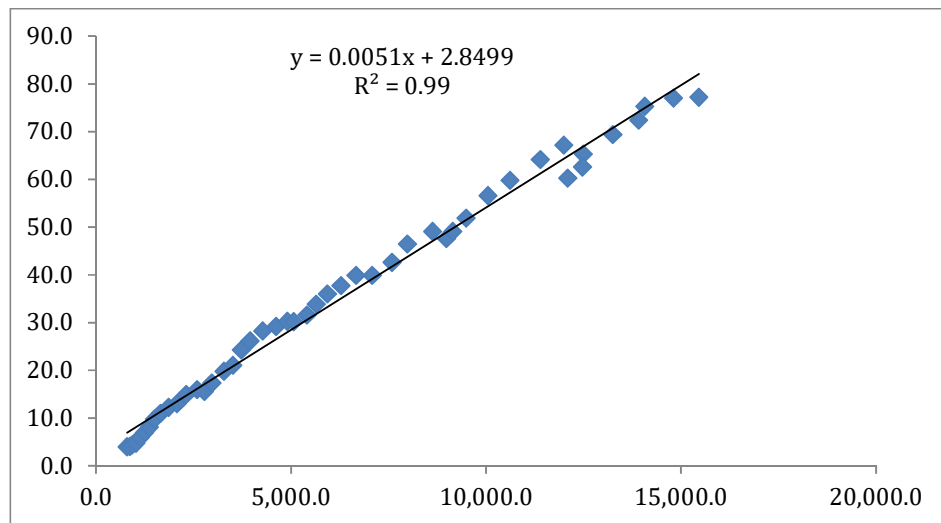
Picture 8 – The Simple Linear Regression Model 2

Let us have a closer look at the calculation of the parameters for this model in the Tables 10 and 11.

Table 10 – Calculation of the Simple Liner Regression Model's 1 Parameters: intermediate steps

i	x	y	$x \times y$	x^2	y^2
1	75,0	4,0	300	5625	16
2	96,1	4,1	394,01	9235,21	16,81

The rest of the table 10

3	110,1	4,4	484,44	12122,01	19,36
4	109,2	4,8	524,16	11924,64	23,04
5	131,8	6,0	790,8	17371,24	36
6	141,7	7,0	991,9	20078,89	49
7	159,0	8,1	1287,9	25281	65,61
8	147,3	9,8	1443,54	21697,29	96,04
9	148,2	11,0	1630,2	21963,24	121
10	166,6	12,3	2049,18	27755,56	151,29
11	177,5	13,0	2307,5	31506,25	169
12	213,2	15,0	3198	45454,24	225
13	252,5	16,0	4040	63756,25	256
14	277,7	15,6	4332,12	77117,29	243,36
15	247,0	17,4	4297,8	61009	302,76
16	312,1	19,8	6179,58	97406,41	392,04
17	265,1	21,1	5593,61	70278,01	445,21
18	269,4	24,3	6546,42	72576,36	590,49
19	252,1	26,2	6605,02	63554,41	686,44
20	294,8	28,3	8342,84	86907,04	800,89
21	316,5	29,2	9241,8	100172,3	852,64
22	335,4	30,3	10162,62	112493,2	918,09
23	365,9	30,2	11050,18	133882,8	912,04
24	426,0	31,6	13461,6	181476	998,56
25	367,6	33,9	12461,64	135129,8	1149,21
26	331,4	36,0	11930,4	109826	1296
27	352,9	37,8	13339,62	124538,4	1428,84
28	345,2	39,9	13773,48	119163	1592,01
29	352,2	39,9	14052,78	124044,8	1592,01
30	405,3	42,6	17265,78	164268,1	1814,76
31	303,3	46,5	14103,45	91990,89	2162,25
2	307,7	49,1	15108,07	94679,29	2410,81
33	335,2	47,6	15955,52	112359	2265,76
34	405,3	49,1	19900,23	164268,1	2410,81
35	409,6	51,9	21258,24	167772,2	2693,61

The rest of the table 10

36	409,4	56,6	23172,04	167608,4	3203,56
37	243,1	59,8	14537,38	59097,61	3576,04
38	331,4	64,2	21275,88	109826	4121,64
39	309,8	67,2	20818,56	95976,04	4515,84
40	536,7	65,3	35046,51	288046,9	4264,09
41	667,4	60,3	40244,22	445422,8	3636,09
42	630,0	62,6	39438	396900	3918,76
43	710,1	69,4	49280,94	504242	4816,36
44	946,7	72,4	68541,08	896240,9	5241,76
45	620,1	75,3	46693,53	384524	5670,09
46	726,0	77,0	55902	527076	5929
47	783,6	77,2	60493,92	614029	5959,84

In the Table 11 the calculation of the parameters is presented:

Table 11 – Calculation of the Simple Liner Regression Model's 1 Parameters

n	S(x)	S(y)	S(x × y)	S(x²)	S(y²)
47	16 120,2	1 671,1	749 848,5	7 267 672,6	84 055,8
	S(x)²	S(y)²			
	259 860 848	2 792 575,2			
m	0,101620615				
b	0,70117782				
r	0,853654474				
R²	0,728725961				

We can see that the manual calculating of parameters for the Simple Linear Regression Model 1 gives the same result as the inbuilt MS Excel function [21].

Substitute the calculated values into the general equation (Formula 15) [45].

$$y = m \times x + b, \tag{15}$$

where m – slope;

b – y-int.

We get the following equation for the Model 1 (Formula 16):

$$y = 0,1016x + 0,7012, \tag{16}$$

$R^2 = 0{,}7287$ means that more than 72% of the sample can be described by the gotten equation.

Thus, using the equation we can affirm that the change by one unit of x will cause the change value 1,1016 of y. When the x's value is equal zero, y will be equal 0,7012.

The next step of the work will be acquiring a multiple regression model; it is presented in the next paragraph.

3.1.2 Algorithms of the Econometric Modeling Process

In the previous paragraph we analyzed the relationship between the variables using Simple Linear Regression Model. Now we are going to build more complex model of multiple regression [31].

The multiple regression model in its general form is (Formula 17):

$$y = \beta_1 + \beta_2 x_2 + \beta_3 x_3 + u, \qquad (17)$$

where β– the model's parameters;

u – the error.

It is assumed that the error is independent with constant variance.

Now we are going to estimate the multiple regression line using the MS Excel functions. For the model we will use the all the variables we have: personal consumption expenditures on jewelry, personal saving, and personal income (Table 12).

Table 12 – The data set for the Multiple Regression Model 1

Number of observation	Time	Personal Consumption Expenditures on Jewelry, billions of dollars	Personal saving, billions of dollars	Personal Income, billions of dollars
n	t	y	x_1	x_2
1	1969	4,0	75,0	800,3
2	1970	4,1	96,1	864,6
3	1971	4,4	110,1	932,1
4	1972	4,8	109,2	1 023,6
5	1973	6,0	131,8	1 138,5
6	1974	7,0	141,7	1 249,3

7	1975	8,1	159,0	1 366,9
8	1976	9,8	147,3	1 498,5
9	1977	11,0	148,2	1 654,6
10	1978	12,3	166,6	1 859,7
11	1979	13,0	177,5	2 078,2
12	1980	15,0	213,2	2 317,5
13	1981	16,0	252,5	2 596,5
14	1982	15,6	277,7	2 779,5
15	1983	17,4	247,0	2 970,3
16	1984	19,8	312,1	3 281,8
17	1985	21,1	265,1	3 516,3
18	1986	24,3	269,4	3 725,7
19	1987	26,2	252,1	3 955,9
20	1988	28,3	294,8	4 276,3
21	1989	29,2	316,5	4 619,9
22	1990	30,3	335,4	4 906,4
23	1991	30,2	365,9	5 073,4
24	1992	31,6	426,0	5 413,0
25	1993	33,9	367,6	5 649,0
26	1994	36,0	331,4	5 937,3
27	1995	37,8	352,9	6 281,0
28	1996	39,9	345,2	6 667,0
29	1997	39,9	352,2	7 080,7
30	1998	42,6	405,3	7 593,7
31	1999	46,5	303,3	7 988,4
32	2000	49,1	307,7	8 637,1
33	2001	47,6	335,2	8 991,6
34	2002	49,1	405,3	9 153,9
35	2003	51,9	409,6	9 491,1
36	2004	56,6	409,4	10 052,9
37	2005	59,8	243,1	10 614,0
38	2006	64,2	331,4	11 393,9
39	2007	67,2	309,8	12 000,2
40	2008	65,3	536,7	12 502,2
41	2009	60,3	667,4	12 094,8
42	2010	62,6	630,0	12 477,1
43	2011	69,4	710,1	13 254,5
44	2012	72,4	946,7	13 915,1
45	2013	75,3	620,1	14 073,7
46	2014	77,0	726,0	14 809,7
47	2015	77,2	783,6	15 458,5

By the means of MS Excel, using Regression function, we build the multiple regression model and get the parameters presented in the next tables.

The regression statistics indicate multiple correlation coefficient (Multiple R) and determination (R-squared) between the Y and the array factor variables [26].

To compare models with different numbers of factors so that the number of them did not affect the statistics of R^2, the adjusted coefficient of determination is usually used (Table 13).

Table 13 – Regression statistics for the Multiple Regression Model 1

Indicator	Value
Multiple R	0,996
R-Square	0,991
Adjusted R- Square	0,991
Standard Error	2,234
Observations	47

Multiple R shows the correlation between y and y-hat that is 0,996 in the case. When multiple R is squared – gives 0,991 that means 99% of the sample can be described by the relationship in the model. Standard error here refers to the estimated standard deviation of the error term u – the standard error of the regression.

The next part of the Results is presented below (Table 14).

Table 14 – ANOVA table for the Multiple Regression Model 1

Indicator	df	SS	MS	F	Significance F
Regression	2	24419,660	12209,83	2445,786	0,000
Residual	44	219,656	4,992		
Total	46	24639,316			

The ANOVA (analysis of variance) table splits the sum of squares into its components. Total sums of squares = Residual (or error) sum of squares + Regression (or explained) sum of squares [20]. The general formula for R^2 (Formula 18)]:

$$R^2 = 1 - \frac{Residual\ SS}{Total\ SS}, \tag{18}$$

In our case R^2 can be calculated (Formula 19):

$$R^2 = 1 - \frac{Residual\ SS}{Total\ SS} = 1 - \frac{219,656}{24639,316} = 0,991, \tag{19}$$

The column labeled F gives the overall F-test of $H_0: \beta_0 = 0$ and $\beta_3 = 0$, versus H_1: at least one of β_2 and β_3 does not equal zero.

The general formula for F (Formula 20):

$$F = \frac{Regression\ SS / (k-1)}{Residual\ SS / (n-k)}, \tag{20}$$

For our case F can be calculated (Formula 21):

$$F = \frac{24419{,}66 / (3-1)}{219{,}656 / (47-3)} = 2445{,}786, \tag{21}$$

Since significance F is equal $0{,}00 < 0{,}05$, we reject H_0 at significance level 0,05.

The column labeled significance F has the associated P-value.

The next step of the analysis is interpretation of the regression coefficients, which are presented in the table below (Table 15).

Table 15 – Regression coefficient table for the Multiple Regression Model 1

Indicator	Coefficients	Standard error	t-Stat	P-Value	Lower 95%	Upper 95%
Y-intercept	3,661	0,671	5,453	0,000	2,308	5,014
x_1	-0,008	0,003	-2,288	0,027	-0,015	-0,001
x_2	0,005	0,000	35,985	0,000	0,005	0,006

Column "Coefficient" gives us the least square estimates of the regressors. Column "Standard error" gives the standard errors (i.e. the estimated standard deviation) of the least squares estimates of the regressors [6].

Column "t Stat" gives the computed t-statistic for $H_0: \beta_j = 0$, against $H_1: \beta j \neq 0$. This is the coefficient divided by the standard error. It is compared to a t with *(n-k)* degrees of freedom where here n = 47 and k = 3.

Column "P-value" gives the p-value for test of $H_0: \beta_j = 0$, against $H_1: \beta j \neq 0$. This equals the (Formula 22):

$$Pr\{|t| > t - Stat\}, \tag{22}$$

Where t is a *t-distributed* random variable with *n-k* degrees of freedom and *t-*Stat is the computed value of the t-statistic given in the previous column.

Columns "Lower 95%" and "Upper 95%" values define a 95% confidence interval for βj.

After the conducted interpretation we can say that the best-fitted line is (Formula 23):

$$y = 3{,}661 - 0{,}008x_1 + 0{,}005x_2, \tag{23}$$

Describe the confidence intervals for the slope parameters β_1, β_2, β_3:

95% confidence interval for slope coefficient β_1 – 2,308, 5,014; for β_2 – -0,015, -0,001; for β_3 – 0,005, 0,006.

It is also possible to obtain a different confidence interval, for example, 99%.

Now we are going to take a look at the test hypothesis of zero slope coefficients ("test of statistical significance") [25].

The coefficient of x_1 has estimated standard error of 0,003, t-statistic of -2,288 and p-value of 0,027. It is therefore statistically significant at significance level $\alpha = 0{,}05$ as $p = 0{,}027 < 0{,}05$.

The coefficient of x_2 has estimated standard error of 0,000, t-statistic of 35,985 and p-value of 0,000. It is therefore statistically significant at significance level $\alpha = 0{,}05$ as $p = 0{,}000 < 0{,}05$.

There are 47 observations and 3 regressors so we use t(47-3)=t(44).

Next we will conduct the test hypothesis on a regression parameter (Formula 24).

We test whether x_1 has coefficient $\beta_2 = 1{,}0$. $H_0: \beta_2 = 0$ against $H_1: \beta_2 \neq 0$ at significance level $\alpha = 0{,}05$.

$$t = \frac{b_2 - H_{0\ value\ of\ \beta2}}{Standard\ error\ of\ b_2}, \tag{24}$$

In our case for x_1 t can be calculated (Formula 25):

$$t = \frac{-0{,}008 - 0}{0{,}003} = -2{,}288, \tag{25}$$

For x_2 t can be calculated (Formula 26):

$$t = \frac{0{,}005 - 0}{0{,}000} = 35{,}985, \tag{26}$$

After this test we need to conduct the overall test of significance of the regression parameters. We test $H_0: \beta_2 = 0, \beta_3 = 0 \; and \; \beta_4 = 0$ versus $H_1: at \; least \; one \; of \; \beta_2, \beta_3, \beta_4 \neq 0$.

From the ANOVA table the F-test statistic is 2445,786 with p-value 0,000. Since the p-value is less than 0.05 we reject the null hypothesis that the regression parameters are zero at significance level 0,05 [20]. Conclude that the parameters are jointly statistically significant at significance level 0,05.

All the calculations were made by means of the regression analysis package in the MS Excel program. It is necessary to note, that the Excel program is a widespread and common analytical tool for the cases like this one. However, it has a number of disadvantages such as [26]:

– restricted number of the regressors (up to 16) – that can be a serious drawback in some cases of analysis;

– also, data analysis package receives only the data as input of the consecutive interval. It cannot be separated by a semicolon list arrays that are in different locations file. Furthermore, columns from top to bottom must register each component;

– there should be the same number of values for each input variable in every column. If you need to enter the variables of the current period and lagged, they should build on the same level, and the only sign, where the current variable, and where the lag;

– Excel standard errors, t-statistics and p-values are based on the assumption that the error is independent with constant variance (homoscedastic). Excel does not provide alternatives, such as heteroskedastic-robust or autocorrelation-robust standard errors and t-statistics and p-values;

– Excel package has a large number of built-in functions, but since statistical analysis is not a specialty of this package, the number of built-in statistical models is not that big.

Among the advantages of MS Excel, we can mention:

– its prevalence: currently, the vast number of computers has this software;

– cross-platform possibilities: there are versions of Excel for Microsoft Windows, as well as analogues for the Mac and Unix/Linux;

– intuitional and easy usage: no need to have special knowledge of programming to be able to work with this package;

– stable performance and a small number of errors in the code (especially when compared with free software) [27].

Nevertheless, for some special analysis more specific, professional software is needed.

Now as the equation is obtained here, we can move to the next step – the prediction of the indicators.

3.2 Forecasting of the direct jewelry industry and its contribution

3.2.1. The prediction of the independent variables using the time series

The prediction will be based on the time series method. Time series forecasting is the use of a model to predict future values based on previously observed values [28].

Knowing the regression line, we can predict the values of y – personal consumption expenditures on jewelry for the next periods. According to the tendency (decreasing or increasing), based on the model, the figures will be added to the time line. The forecast will be conducted up till the 2025 year (Table 16) [29].

Table 16 – The data set for the prediction of the variable "Personal Consumption Expenditures on Jewelry"

Number of observation	Period	Personal Consumption Expenditures on Jewelry, $
n	x	y
1	1969	4,0
2	1970	4,1
3	1971	4,4
4	1972	4,8

The rest of the table 16

5	1973		6,0
6	1974		7,0
7	1975		8,1
8	1976		9,8
9	1977		11,0
10	1978		12,3
11	1979		13,0
12	1980		15,0
13	1981		16,0
14	1982		15,6
15	1983		17,4
16	1984		19,8
17	1985		21,1
18	1986		24,3
19	1987		26,2
20	1988		28,3
21	1989		29,2
22	1990		30,3
23	1991		30,2
24	1992		31,6
25	1993		33,9
26	1994		36,0
27	1995		37,8
28	1996		39,9
29	1997		39,9
30	1998		42,6
31	1999		46,5
32	2000		49,1
33	2001		47,6
34	2002		49,1
35	2003		51,9
36	2004		56,6
37	2005		59,8
38	2006		64,2
39	2007		67,2
40	2008		65,3
41	2009		60,3
42	2010		62,6
43	2011		69,4
44	2012		72,4
45	2013		75,3
46	2014		77,0
47	2015		77,2

Using the tools of the MS Excel, we obtain the simple linear regression line presented in the picture below (Picture 9).
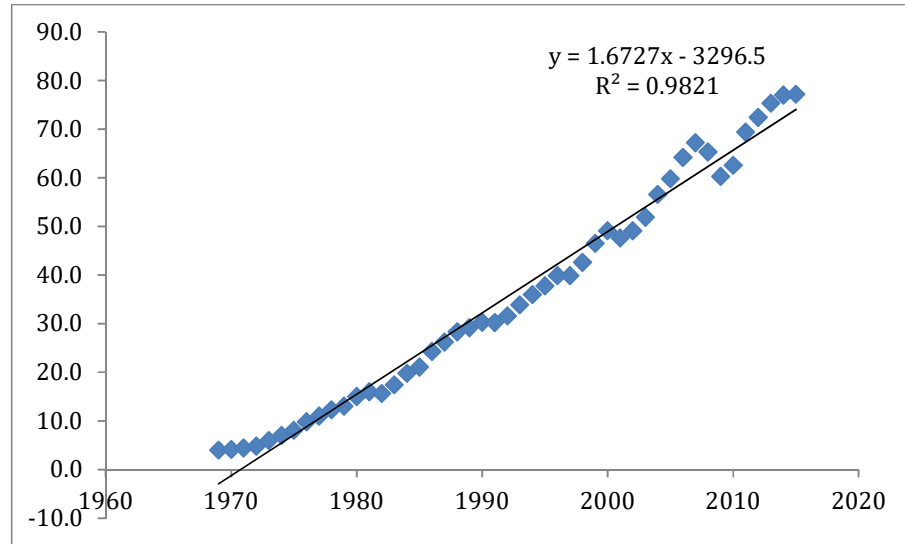
Picture 9 – Simple Linear Model for the prediction of personal consumption expenditures on jewelry

Now we have the equation (Formula 27):

$$y = 1{,}6727x - 3296{,}5, \qquad (27)$$

where x – period;

y – personal consumption expenditures on jewelry.

With $R^2 = 0{,}9821$, that is a good result. Now, with the help of the equation obtained, we can predict the values for Personal Consumption Expenditures on Jewelry in the next periods, up till the 2025 (Table 17) [29].

Table 17 – The predicted values of the variable "Personal Consumption Expenditures on Jewelry"

Number of observation	Period	Personal Consumption Expenditures on Jewelry, $
n	*x*	*y*
48	2016	75,6632
49	2017	77,3359
50	2018	79,0086
51	2019	80,6813
52	2020	82,354
53	2021	84,0267
54	2022	85,6994
55	2023	87,3721

The rest of the table 17

56	2024	89,0448
57	2025	90,7175

We can see that the value of Personal Consumption Expenditures on Jewelry is increasing with time that happens in accordance with the general tendency.

To predict the value of Personal Consumption Expenditures on Jewelry using the Multiple Regression Model it is necessary to find the possible values of the independent variables that present in the equation which was obtained in the previous paragraph: Personal saving, Personal Income [29].

After that, the predicted values are put into the equation of the multiple regression model and the predicted y – Personal Consumption Expenditures on Jewelry, can be found.

According to the tendency (decreasing or increasing), based on the model, the figures will be added to the time line. The forecast will be conducted up till the 2025 year (Table 18). Then we are going to use the equation of the Multiple Regression Model.

Table 18 – The data set for the prediction of the variable "Personal saving"

Number of observation	Period	Personal saving, $
n	x	y
1	1969	75,0
2	1970	96,1
3	1971	110,1
4	1972	109,2
5	1973	131,8
6	1974	141,7
7	1975	159,0
8	1976	147,3
9	1977	148,2
10	1978	166,6
11	1979	177,5
12	1980	213,2
13	1981	252,5
14	1982	277,7
15	1983	247,0
16	1984	312,1
17	1985	265,1
18	1986	269,4

The rest of the table 18

19	1987	252,1
20	1988	294,8
21	1989	316,5
22	1990	335,4
23	1991	365,9
24	1992	426,0
25	1993	367,6
26	1994	331,4
27	1995	352,9
28	1996	345,2
29	1997	352,2
30	1998	405,3
31	1999	303,3
32	2000	307,7
33	2001	335,2
34	2002	405,3
35	2003	409,6
36	2004	409,4
37	2005	243,1
38	2006	331,4
39	2007	309,8
40	2008	536,7
41	2009	667,4
42	2010	630,0
43	2011	710,1
44	2012	946,7
45	2013	620,1
46	2014	726,0
47	2015	783,6

Using the tools of the MS Excel, we obtain the simple linear regression line presented in the Picture 10 below.
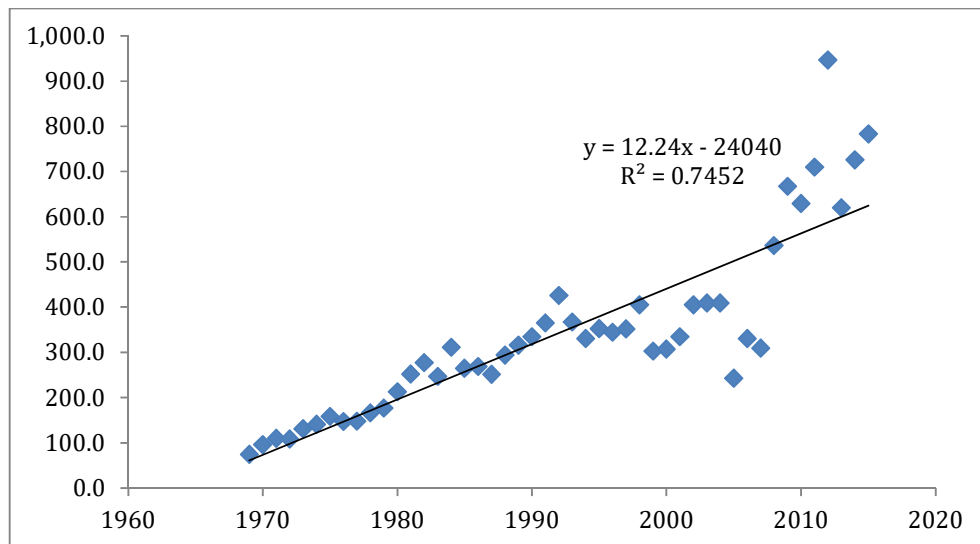
Picture 10 – Simple Linear Regression Model for the prediction of Personal saving

Using the equation (Formula 28):

$$y = 12{,}24x - 24040, \qquad (28)$$

where x – period;

y – personal saving.

$R^2 = 0{,}7452$, that is a good result. Now, with the help of the equation obtained, we can predict the values for Personal saving (Table 19).

Table 19 – The predicted values of the variable "Personal saving"

Number of observation	Period	Personal saving, $
n	*x*	*y*
48	2016	635,84
49	2017	648,08
50	2018	660,32
51	2019	672,56
52	2020	684,8
53	2021	697,04
54	2022	709,28
55	2023	721,52
56	2024	733,76
57	2025	746

Here we can observe the increasing tendency.

69

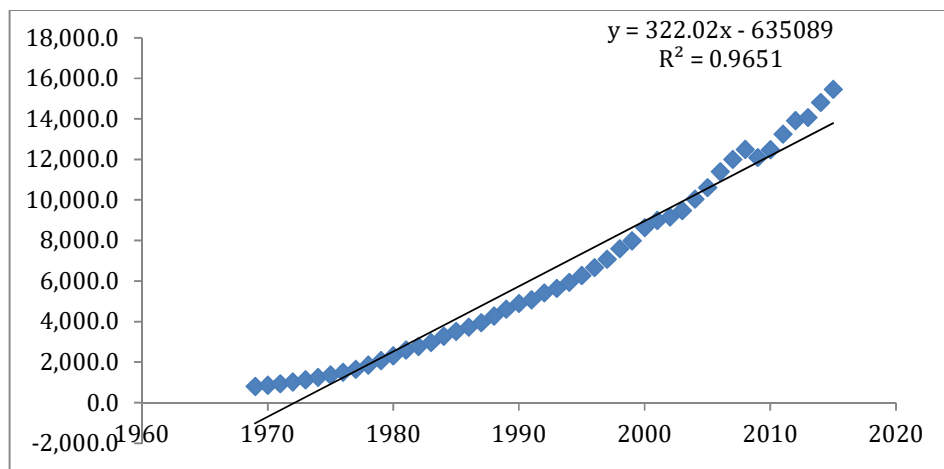The next step is the prediction of the next variable – Personal income (Table 20).

Table 20 – The data set for the prediction of the variable "Personal income"

Number of observation	Period	Personal income, $
n	x	y
1	1969	800,3
2	1970	864,6
3	1971	932,1
4	1972	1 023,6
5	1973	1 138,5
6	1974	1 249,3
7	1975	1 366,9
8	1976	1 498,5
9	1977	1 654,6
10	1978	1 859,7
11	1979	2 078,2
12	1980	2 317,5
13	1981	2 596,5
14	1982	2 779,5
15	1983	2 970,3
16	1984	3 281,8
17	1985	3 516,3
18	1986	3 725,7
19	1987	3 955,9
20	1988	4 276,3
21	1989	4 619,9
22	1990	4 906,4
23	1991	5 073,4
24	1992	5 413,0
25	1993	5 649,0
26	1994	5 937,3
27	1995	6 281,0
28	1996	6 667,0
29	1997	7 080,7
30	1998	7 593,7
31	1999	7 988,4
32	2000	8 637,1
33	2001	8 991,6
34	2002	9 153,9
35	2003	9 491,1
6	2004	10 052,9
37	2005	10 614,0

The rest of the table 20

38	2006	11 393,9
39	2007	12 000,2
40	2008	12 502,2
41	2009	12 094,8
42	2010	12 477,1
43	2011	13 254,5
44	2012	13 915,1
45	2013	14 073,7
46	2014	14 809,7
47	2015	15 458,5

Using the tools of the MS Excel, we obtain the simple linear regression line presented in the Picture 11 below.

$$y = 322.02x - 635089$$
$$R^2 = 0.9651$$

Picture 11 – Simple Linear Regression Model for the prediction of Personal income

Using the equation (Formula 29):

$$y = 322{,}02x - 635089, \qquad (29)$$

where x – period;

y – personal income.

$R^2 = 0{,}9651$, that is a good result. Now, with the help of the equation obtained, we can predict the values for Personal saving (Table 21).

Table 21 – The predicted values of the variable "Personal income"

Number of observation	Period	Personal income, $
n	x	y
48	2016	14103,32
49	2017	14425,34
50	2018	14747,36

71

The rest of the table 21

51	2019	15069,38
52	2020	15391,4
53	2021	15713,42
54	2022	16035,44
55	2023	16357,46
56	2024	16679,48
57	2025	17001,5

Now, as we have all the independent variables predicted, we can forecast the Personal Consumption Expenditures on Jewelry using the equation of the Multiple Regression Model, obtained in the previous paragraph (Formula 30) [59]:

$$y = 3,661 - 0,008x_1 + 0,005x_2, \qquad (30)$$

where y – personal consumption expenditures on jewelry;

x_1 – personal saving;

x_2 – personal income.

Filling in the predicted values of the independent variables we get the following result (Table 22).

Table 22 – The predicted values of the variable "Personal Consumption Expenditures on Jewelry"

Number of observation	Predicted Personal Consumption Expenditures on Jewelry, $	Predicted personal saving, $	Predicted personal income, $
n	y	x_1	x_2
48	69,09	635,84	14103,32
49	70,60	648,08	14425,34
50	72,12	660,32	14747,36
51	73,63	672,56	15069,38
52	75,14	684,8	15391,4
53	76,65	697,04	15713,42
54	78,16	709,28	16035,44
55	79,68	721,52	16357,46
56	81,19	733,76	16679,48
57	82,70	746	17001,5

The variable "Personal Consumption Expenditures on Jewelry" demonstrates the increasing tendency and in 2025 is estimated to be 82,70 (billion of dollars) if

the tendency continues. That is a positive tendency for the company as it provides more opportunities and needs for its services on the market.

According to the figures, the firm's return on capital (ROC) is an excellent indicator of the size and strength of its moat. If a company is able to generate returns of 15-20% year after year, it has a great system for transforming investor capital into profits. However, as we could see this indicator has not risen above 13.7% recently. That is why the Company's management should direct efforts to improve its ROC [4].

A similar situation is observed with respect to Return on equity. For Tiffany & Co. the ROE indicator showed decline in 12%. Return on assets (ROA), which indicates how profitable a company is relative to its total assets, unfortunately shows decreasing tendency either. We could see the same tendency with operating profit margin ratio, also expressing as a percentage of sales and then showing the efficiency of a company controlling the costs and expenses associated with business operations. Thus, it can be concluded that the company's management should make the most effort to improve the above-mentioned indicators.

Despite the negative indicators, the Company continues to grow. In order to promote further development the first area Tiffany needs to focus on is its established markets. Tiffany's is currently experiencing dramatic growth in Europe and non-Japanese Asian markets, but struggles in US and Japanese markets where it has been established since 1837 and 1972 respectively [24].

Therefore, while the Company experiences a strong reputation and large customer base, it encounters significant competition in all product categories and geographies. By focusing on enhanced marketing communications, product development and optimization of its store base and digital capabilities, the Company's objective is to be an industry leader in key markets.

3.2.2 Suggestions and recommendations for improving the brand value for jewelry industry

Brand value is easier for a company to estimate. The company can determine the fair market value of the brand by asking other companies what price they would pay to purchase the brand. The company can also add up its costs of hiring marketers, consultants and advertising experts to develop a brand it already owns, or estimate the cost for the company to produce a new brand for its products.

Brand equity is more difficult to estimate because it relies on customers' beliefs. The company does not know whether a customer makes a purchase because he recognizes the company's brand or whether the customer uses other criteria, such as price and convenience, to make his decision [33]. According to the University of Georgia, the company can attempt to estimate its brand equity by sending surveys to its customers to see if they recognize the brand [52].

Therefore, it might have been more than beneficial to pay attention to the following recommendations. Looking at the ways a brand can help drive short-term financial performance and mitigate this tendency:

1) in regard to brand loyalty the company in jewelry market can reduce marketing costs, provide trade leverage, attract new customers via awareness & reassurance, use time to respond to competitive threats;

2) in regard to brand visibility the company can be anchor to which other associations can be attached, use familiarity which leads to liking, promote visibility that helps gain consideration, make a signal of substance/commitment;

3) in regard to brand associations the company can help communicate information, express differentiate/position, use reason-to-buy method, create positive attitude/feelings, be a basis for extensions.

One of the ongoing challenges of brand equity proponents is to demonstrate that there is long-term value in creating brand equity. The basic problems are that brand is only one driver of profits, completive actions intervene, and strategic

decisions cannot wait for years. There are, however, some perspectives that can be employed to understand and measure the long-term value of brand equity.

Speaking about methodology that we used in our research, in general, it is a systematic approach consisting of the following steps, which might have been used by the company from jewelry market segment:

1) Statement of the problem under consideration. The first important step in conducting any regression analysis is to specify the problem and the objectives to be addressed by the regression analysis. The wrong formulation or the wrong understanding of the problem will give the wrong statistical inferences. The choice of variables depends upon the objectives of study and understanding of the problem.

2) Choice of relevant variables. Once the problem is carefully formulated and objectives have been decided, the next question is to choose the relevant variables. It has to keep in mind that the correct choice of variables will determine the statistical inferences correctly.

3) Collection of data on relevant variables. Once the objective of study is clearly stated and the variables are chosen, the next question arises is to collect data on such relevant variables. In order to select the data for our model, we used the method of simple linear regression [56].

In arriving at values, the appraiser of the company should use a good range of price sources and the following is a list of sources of pricing, both general and specific: wholesale dealers of colored stones, on and off shore; wholesale dealers of diamonds, on and off shore; suppliers of jewelry metals; suppliers of findings and mountings; suppliers of finished gold items; antique and vintage jewelry dealers; auction catalogues; internet, standardized price listings: (use as reference only, not as a sole source of information).

When the item being appraised is a «branded» or a unique designer/goldsmith item and trademarked and/or a known registered design, the exact cost of replacing the item from the designer or company should be obtained [41]. The appraiser should contact the designer, jeweler, or manufacturer to determine the selling price, as that is the only location to replace the item. If the exact item is no longer produced, or

not available for other reasons, then the appraisal should provide a statement of price for replacing the item with the nearest equivalent item currently available from the same manufacturer, designer, or retailer.

To summarize the study we can assume that brand equity continues to be a driver of much of marketing, indeed business strategy. For it to work, it needs to be understood conceptually and operationally. In addition, it is important that it be tied to brand value in credible ways.

CONCLUSION

Jewelry industry is highly cyclical in its nature and that is mostly driven by the increasing wealth. This fact affects the industry in the world economy both in good and bad times. Recently, several factors have affected the performance of both Tiffany's and the luxury goods industry. Typically, spending in general and on luxury goods in particular depends greatly on consumer confidence in the economy as a whole.

A brand can often be seen as something intangible and it is difficult for people to understand the value that brand brings into a company. It is important when sitting down to create a brand valuation to determine what your brand includes. It could include trademark, logo, packaging, marketing strategy, digital assets, brand colors, etc. It is really anything that consumers associate with brand image of the company.

Brands embody a core promise of values and benefits consistently delivered. Brands provide clarity and guidance for choices made by companies, consumers, investors and other stakeholders. At the heart of a brand's value is its ability to appeal to relevant customers and potential customers. Brands that succeed in creating the greatest attraction power are those that are:

1) Meaningful: In any category, these brands appeal more, generate greater "love" and meet the individual's expectations and needs.

2) Different: these brands are unique in a positive way and "set the trends", staying ahead of the curve for the benefit of the consumer.

3) Salient: they come spontaneously to mind as the brand of choice for key needs.

Brand valuation is a metric that quantifies the worth of these powerful but intangible corporate assets. It enables brand owners, the investment community and others to evaluate and compare brands and make faster and better-informed decisions.

Therefore, increasing recognition of brands as assets has lead to realization that the return from marketing should be seen as the incremental net profit or loss

together with the change in the value of the brand. This factor seeks to bridge the gap between marketing and finance by justifying marketing investment and resource allocation in financial terms and then using the same method for judging performance. Having all metrics in the same currency, as distinct from measures such as customer satisfaction, is clearly attractive to management.

One of the ongoing challenges of brand equity proponents is to demonstrate that there is long-term value in creating brand equity. The basic problems are that brand is only one driver of profits, completive actions intervene, and strategic decisions cannot wait for years. There are, however, some perspectives that can be employed to understand and measure the long-term value of brand equity.

Speaking about methodology that we used in our research, in general, it is a systematic approach consisting of the following steps, which might have been used by the company from jewelry market segment:

1) Statement of the problem under consideration. The first important step in conducting any regression analysis is to specify the problem and the objectives to be addressed by the regression analysis. The choice of variables depends upon the objectives of study and understanding of the problem.

2) Choice of relevant variables. Once the problem is carefully formulated and objectives have been decided, the next question is to choose the relevant variables. It has to keep in mind that the correct choice of variables will determine the statistical inferences correctly.

3) Collection of data on relevant variables. Once the objective of study is clearly stated and the variables are chosen, the next question arises is to collect data on such relevant variables. In order to select the data for our model, we used the method of simple linear regression.

In the current study, the author presented a brief performance of the jewelry industry, kinds of its activity in an international scale, pursue an economical and macro-economic analysis, as well as make a competitive analysis of the related market, analyze the efficiency of sales and conduct SWOT-analysis about the targeted markets of products or services the industry provides.

Besides, we investigated the nature of the market brand value, difference between brand equity and brand value. Therefore, brand equity and brand value are similar, but not the same. Brand equity is a set of assets or liabilities in the form of brand visibility, brand associations and customer loyalty that add or subtract from value of a current or potential product or service driven by the brand. It is a key construct in the management of not only marketing, but also business strategy. Brand value, on the other hand, is the financial worth of the brand. To determine brand value, businesses need to estimate how much the brand is worth in the market. It is important to note that a positive brand value does not automatically equal positive brand equity.

Then we scrutinize evaluation methods of the brands' market value. Popular valuation methods and approaches include cost based brand valuation, market-based brand valuation and income approach in brand valuation. The main idea is that it is important to identify the objective of the valuation and use the appropriate method and assumptions to determine a fair value.

Afterwards we described the methodology for assessing the market value of brands in the jewelry industry. Here we can distinguish three main steps: "Calculating financial value", "Calculating brand contribution" and "Calculating brand value".

Talking about main trends shaping the jewelry industry as a whole, we can deduce that increasing demand for branded jewelry due to distinctive designs, credibility, and quality. We also mention the increased focus on e-commerce sales in both developed and developing markets.

Therefore, Tiffany & Co. operates in many countries, with 295 company-operated stores. Its Americas segment includes sales from company-operated retail stores in the United States, Canada, Mexico, and Brazil. It also includes sales in these markets through business-to-business, Internet, catalog, and wholesale operations. According to the fact that Tiffany's has grown steadily alongside the American economy, we are mostly interested in analyzing Tiffany's Americas segment as its largest one.

Third chapter was dedicated to build the simple linear regression. As the result we've got the equation №13: $y = 0{,}1016x + 0{,}7012$. The determination coefficient of this model $R^2 = 0{,}7287$ which means that more than almost 73% of the sample can be described by the gotten equation.

Thus, using the equation we can affirm that the change by one unit of x will cause the change value 0,1016 of y. When the x's value is equal zero, y will be equal 0,7012.

After acquiring the simple regression model, the multiple one was constructed. The line was described by the equation №23: $y = 3{,}661 - 0{,}008x_1 + 0{,}005x_2$. Where y – "Personal Consumption Expenditures on Jewelry", billions of dollars, x_1– "Personal saving", billions of dollars, x_2– "Personal Income", billions of dollars.

Knowing the regression line, we can predict the values of y – personal consumption expenditures on jewelry for the next periods. According to the tendency (decreasing or increasing), based on the model, the figures were added to the time line. The forecast was conducted up until the 2025 year. The variable "Personal Consumption Expenditures on Jewelry" demonstrates the increasing tendency and in 2025 is estimated to be 82,70 (billion of dollars) if the tendency continues. That is a positive tendency for the company as it provides more opportunities and needs for its services on the market.

According to the findings, we assume that presented data would be beneficial for both sides: for current business entities and for those who is eager to establish a start-up in jewelry industry. Moreover, the model captured from the calculations could be implemented as a draft or a toolkit, which might take a ubiquitous tendency among entrepreneurs in the USA, as well as in the European Union or the Russian Federation. The author anticipate the tendency would grow out and become a valuable dimension in everyday life of an entrepreneur or start-up investor related to the jewelry industry.

LIST OF THE LITERATURE RESOURCES

1. Aaker D. Aaker on Branding: 20 Principles That Drive Success. July 15. New York, 2014.

2. Aaker D. Building Strong Brands. New York, 1996.

3. Ambler T., Barwise P. The trouble with brand valuation // *Journal of Brand Management,* 5(5), 1998.

4. Annual report of Tiffany & Co. on form 10-K (approved by the General Meeting of Shareholders dated January 31, 2018). URL: https://investor.tiffany.com/static-files/09e06d06-4bdc-409b-9952-3a233728a1af. Accessed: 30.05.2019.

5. Arm's Length Transaction. URL: https://corporatefinanceinstitute.com/resources/knowledge/deals/arms-length-transaction. Accessed: 20.05.2019.

6. Ashley R. Fundamentals of applied econometrics. Hoboken, NJ, 2012.

7. Asteriou D., Hall S.G. Applied econometrics. New York, 2011.

8. Baltagi B. Econometric Analysis of Panel Data, third edition. New York, 2005.

9. Barwise P., Higson C., Likierman A., Marsh P. Accounting for Brands, London Business School. The Institute of Chartered Accountants in England and Wales, 1989.

10. Beccacece F., Borgonovo E., Reggiani F. Risk Analysis in Brand Valuation. Bocconi University, Milano, Italy. July 2016.

11. Birkin M. Assessing Brand Value / in Brand Power. New York University Press, 1994.

12. Boos M. International Transfer Pricing: The Valuation of Intangible Assets. Hague, 2014.

13. Brand Finance. Current Practice in Brand Valuation. London. URL: https://brandfinance.com. Accessed: 10.06.2019.

14. Callaman S. Firm devises equation to quantify brand value // *BtoB Magazine*, 15 July 2012.

15. Cravens K.S., Guilding, C. Strategic brand valuation: a cross-functional perspective // *Business Horizons*, 42 (4 July-August), 1999.

16. Dauriz L., Remy N., Tochtermann T. A multifaceted future: The jewelry industry in 2020. URL: http://www.mckinsey.com/industries/retail/our-insights/a-multifaceted-future-the-jewelry-industry-in-2020. Accessed: 31.05.2019.

17. Dougherty C. Introduction to econometrics / 3rd ed. Oxford University press, 1992.

18. Draper N. R., Smith H. Applied regression analysis. 2nd ed. London, 1981.

19. Erickson G., Jacobson R. Gaining Comparative Advantage Through Discretionary Expenditures: The Returns to R&D and Advertising // *Management Science*. Vol. 38, No. 9. Sep., 1992. P. 1264-1279.

20. Faraway J.J. Practical regression and Anova Using R. URL: https://cran.r-project.org/doc/contrib/Faraway-PRA.pdf. Accessed: 15.06.2019.

21. Farebrother R.W. Linear Least squares computations. Dekker, 1988.

22. Feldwick P. Do we really need brand equity? // *The Journal of Brand Management,* 4(1), 9-28, 2013.

23. Fernández P. Valuation of Brands and Intellectual Capital (December), 2001.

24. Financials of Tiffany & Co. 2013-2018 // URL: http://financials.morningstar.com/incomestatement/is.html?t=TIF&region=usa&culture=en-US. Accessed: 31/05/2019.

25. Fischer M. Valuing brands: A Cost-Effective and Easy-to-Implement Measurement Approach // *Marketing Science Institute*. Report N07-107, Cambridge, Mass, 2007.

26. Gallo A. A refresher on Regression Analysis // *Harvard Business Review*. Nov. 2015. URL: https://portal.mpsv.cz/eures/pracecr/en_zapp.pdf. Accessed: 06.06.2019.

27. Garson D.G. Weighted Least Squares Regression. Statistical Associates Publishers, 2013

28. Greene W.H. Econometric analysis. 7th ed. Harlow, 2012.

29. Haigh D. Accounting and Forecasting for Brands / in Raymond Perrier, ed., Brand Valuation, London, 2001. P. 35-42.

30. Hennig-Thurau T., Houston M.B., Heitjans T. Conceptualizing and Measuring the Monetary Value of Brand Extensions: The Case of Motion Pictures // *Journal of Marketing*. Vol. 73, No. 6, Nov. 2009. P.167-183.

31. Hill G.J. Data Analysis Using Regression and Multilevel/Hierarchical Models. Cambridge University Press, 2007.

32. Jobber D. Principles and practice of marketing. London, 2013. P. 159-167.

33. Jokinen H. Consumer Perceptions and Behaviour in Respect to Ethical, Social, and Environmental Matters in Jewelry Business. URL: http://epub.lib.aalto.fi/fi/ethesis/pdf/12665/hse_ethesis_12665.pdf. Accessed: 10.06.2019.

34. Joyeux R., Milunovich G. Econometric methods / In W-B. Zhang (Ed.), Mathematical models in economics (Encyclopedia of life support systems (EOLSS)). Oxford, UK, 2007. P. 1-11.

35. Kennedy P. A guide to econometrics. Malden, MA, 2008.

36. Key D. Tiffany's Competitive Position: Porter's Five Forces Analysis. URL: http://marketrealist.com/2015/12/tiffanys-competitive-position-porters-five-forces-analysis. Accessed: 10.06.2019.

37. Koop G. Introduction to econometrics. West Sussex, 2008.

38. Maddala G.S., Lahiri K. Introduction to econometrics. Chichester, West Sussex, 2009.

39. Magnus Y., Katishev P., Peresetsky A. Econometrics. Moscow, 2004.

40. Martin V., Hurn S., Harris D. Econometric modelling with time series: specification, estimation and testing. Cambridge University Press, 2012.

41. McDonald M., Mouncey P., Maklan S. Marketing Value Metrics: A New Metrics Model to Measure Marketing Effectiveness. 2nd ed. London, 2016. P. 254-257.

42. Munn N. Retail jewelry industry in the U.S. URL: https://vk.com/doc246498825_441871557?hash=f567f396ca924986a7&dl=e0af0f1297f4f5fff9. Accessed: 05.06.2019.

43. Nau R. Notes on linear regression analysis. URL: http://people.duke.edu/~rnau/Notes_on_linear_regression_analysis--Robert_Nau.pdf. Accessed: 05.06.2019.

44. Overview of Tiffany & Co.: A Leader in the Luxury Retail Market, 2016 // URL: https://marketrealist.com/2016/12/must-know-business-overview-tiffany-co. Accessed 03/05/2019.

45. Radhakrishna C., Toutenburg R.H. Linear Models: Least Squares and Alternatives / 2nd ed. London, 1999.

46. Rawlings J.O., Pantula S.G., Dickey D.A. Applied Regression Analysis. A Research Tool. Springer, 1998.

47. Salinas G. The International Brand Valuation Manual: A complete overview and analysis of brand valuation techniques, methodologies and applications. London, 2016.

48. Seetharaman A., Nadzir Z., Gunalan, S. A conceptual study on brand valuation // *The Journal of Product and Brand Management*, 10(4), 2015. P. 243-256.

49. Semertzaki E., Gavrili M., Nadali A. Econometrics. URL: http://www.bankofgreece.gr/BogDocumentDOMLIbraryMonthlySubject/econometrics_english.pdf. Accessed: 10.06.2019.

50. Stock J.H., Watson M.W. Introduction to econometrics. Boston, 2012.

51. Tiffany&Co. Demand analysis. URL: https://brandtiffanyandco.wordpress.com/demand-analysis. Accessed: 05.06.2019.

52. University of Georgia. Brand Positioning. URL: https://brand.uga.edu/writing-style/#brand-positioning. Accessed: 05.05.2019.

53. Verbeek M. A guide to modern econometrics. Chichester, 2012.

54. Völckner F., Sattler H. Drivers of Brand Extension Success // *Journal of Marketing*. Vol. 70, 2006. P. 18-34.

55. Watsham T.J. Quantitative methods in finance. Thomson, 1997.

56. Weisberg S. Applied linear regression / Sanford Weisberg. 3rd ed. Ney Jersey, 2005.

57. Whitwell S. Understanding Brand Equity and Valuation. London, 2013.

58. Wilcox J., Damassa S., Hyder Z. Strategic Report for Tiffany & Company. URL: http://economics-files.pomona.edu/jlikens/SeniorSeminars/harknessconsulting2008/pdfs/Tiffany_and_Co.pdf. Accessed: 10.06.2019.

59. Wooldridge J.M. Econometric analysis of cross section and panel data. Cambridge, 2010.

60. Wooldridge J.M. Introductory econometrics: a modern approach. Australia, 2013.

APPENDIX A: FINACIAL SHEETS

Financial statements and supplementary data of Tiffany & Co. on January 31, 2016, 2015

CONSOLIDATED BALANCE SHEETS

		January 31,	
(in millions, except per share amounts)		2016	2015
ASSETS			
Current assets:			
Cash and cash equivalents	$	843.6 $	730.0
Short-term investments		43.0	1.5
Accounts receivable, less allowances of $11.5 and $10.6		206.4	195.2
Inventories, net		2,225.0	2,362.1
Prepaid expenses and other current assets		190.4	220.0
Total current assets		3,508.4	3,508.8
Property, plant and equipment, net		935.8	899.5
Deferred income taxes		382.8	426.1
Other assets, net		302.7	346.2
	$	5,129.7 $	5,180.6
LIABILITIES AND STOCKHOLDERS' EQUITY			
Current liabilities:			
Short-term borrowings	$	221.6 $	234.0
Current portion of long-term debt		84.2	—
Accounts payable and accrued liabilities		329.1	318.0
Income taxes payable		27.1	39.9
Merchandise credits and deferred revenue		67.9	66.1
Total current liabilities		729.9	658.0
Long-term debt		798.1	882.5
Pension/postretirement benefit obligations		428.1	524.2
Deferred gains on sale-leasebacks		55.1	64.5
Other long-term liabilities		189.0	200.7
Commitments and contingencies			
Stockholders' equity:			
Preferred Stock, $0.01 par value; authorized 2.0 shares, none issued and outstanding		—	—
Common Stock, $0.01 par value; authorized 240.0 shares, issued and outstanding 126.8 and 129.3		1.3	1.3
Additional paid-in capital		1,175.7	1,173.6
Retained earnings		2,012.5	1,950.7
Accumulated other comprehensive loss, net of tax		(278.1)	(290.5)
Total Tiffany & Co. stockholders' equity		2,911.4	2,835.1
Non-controlling interests		18.1	15.6
Total stockholders' equity		2,929.5	2,850.7
	$	5,129.7 $	5,180.6

See notes to consolidated financial statements.

TIFFANY & CO.
K-55

FORM 10-K

86

Tiffany & Co.'s consolidated statements of earnings on January 31, 2014 – 2016

CONSOLIDATED STATEMENTS OF EARNINGS

		Years Ended January 31,		
(in millions, except per share amounts)		2016	2015	2014
Net sales	$	4,104.9 $	4,249.9 $	4,031.1
Cost of sales		1,613.6	1,712.7	1,690.7
Gross profit		2,491.3	2,537.2	2,340.4
Selling, general and administrative expenses		1,731.2	1,645.8	1,555.9
Arbitration award expense		—	—	480.2
Earnings from operations		760.1	891.4	304.3
Interest expense and financing costs		49.0	62.9	62.6
Other expense (income), net		1.2	(2.8)	(13.2)
Loss on extinguishment of debt		—	93.8	—
Earnings from operations before income taxes		709.9	737.5	254.9
Provision for income taxes		246.0	253.3	73.5
Net earnings	$	463.9 $	484.2 $	181.4
Net earnings per share:				
Basic	$	3.61 $	3.75 $	1.42
Diluted	$	3.59 $	3.73 $	1.41
Weighted-average number of common shares:				
Basic		128.6	129.2	127.8
Diluted		129.1	129.9	128.9

See notes to consolidated financial statements.

Selected Financial data of Tiffany & Co. on January 31, 2013 – 2017

Item 6. Selected Financial Data.

The following table sets forth selected financial data, certain of which have been derived from the Company's consolidated financial statements for fiscal years 2013-2017, which ended on January 31 of the following calendar year:

(in millions, except per share amounts, percentages, ratios, stores and employees)	2017 [a]	2016 [b]	2015 [c]	2014 [d]	2013 [e]
EARNINGS DATA					
Net sales	$ 4,169.8	$ 4,001.8	$ 4,104.9	$ 4,249.9	$ 4,031.1
Gross profit	2,604.7	2,490.3	2,491.3	2,537.2	2,340.4
Selling, general & administrative expenses	1,810.2	1,769.1	1,731.2	1,645.8	1,555.9
Net earnings	370.1	446.1	463.9	484.2	181.4
Net earnings per diluted share	2.96	3.55	3.59	3.73	1.41
Weighted-average number of diluted common shares	125.1	125.5	129.1	129.9	128.9
BALANCE SHEET AND CASH FLOW DATA					
Total assets	$ 5,468.1	$ 5,097.6	$ 5,121.6	$ 5,171.8	$ 4,745.1
Cash and cash equivalents	970.7	928.0	843.6	730.0	345.8
Inventories, net	2,253.5	2,157.6	2,225.0	2,362.1	2,326.6
Short-term borrowings and long-term debt (including current portion)	1,003.5	1,107.1	1,095.8	1,107.8	996.3
Stockholders' equity	3,248.2	3,028.4	2,929.5	2,850.7	2,734.0
Working capital	3,258.5	2,940.8	2,778.5	2,850.8	2,431.1
Cash flows from operating activities *	932.2	705.7	817.4	633.5	174.1
Capital expenditures	239.3	222.8	252.7	247.4	221.4
Stockholders' equity per share	26.10	24.33	23.10	22.04	21.31
Cash dividends paid per share	1.95	1.75	1.58	1.48	1.34
RATIO ANALYSIS AND OTHER DATA					
As a percentage of net sales:					
Gross profit	62.5%	62.2%	60.7%	59.7%	58.1%
Selling, general & administrative expenses	43.4%	44.2%	42.2%	38.7%	38.6%
Earnings from operations	19.1%	18.0%	18.5%	21.0%	7.5%
Net earnings	8.9%	11.1%	11.3%	11.4%	4.5%
Capital expenditures	5.7%	5.6%	6.2%	5.8%	5.5%
Return on average assets	7.0%	8.7%	9.0%	9.8%	3.9%
Return on average stockholders' equity	11.8%	15.0%	16.1%	17.3%	6.8%
Total debt-to-equity ratio	30.9%	36.6%	37.4%	38.9%	36.4%
Dividends as a percentage of net earnings	65.5%	49.0%	43.8%	39.5%	93.9%
Company-operated TIFFANY & CO. stores	315	313	307	295	289
Number of employees	13,100	11,900	12,200	12,000	10,600

* The Company adopted ASU No. 2016-09 – *Compensation - Stock Compensation: Improvements to Employee Share-Based Payment Accounting*, as of February 1, 2017. Accordingly, cash payments made to taxing authorities on employees' behalf for shares withheld for taxes were reclassified retrospectively from operating activities to financing activities on the Consolidated Statements of Cash Flows in each of the years presented. Additionally, the Company elected to classify excess tax benefits as an operating activity instead of as a financing activity on the Consolidated Statements of Cash Flows and such amounts were reclassified retrospectively in each of the years presented. See "Item 8. Financial Statements and Supplementary Data - Note B. Summary of Significant Accounting Policies" for additional information.

FORM 10-K

Consolidated balance sheets of Tiffany & Co. on January 31, 2017 – 2018

CONSOLIDATED BALANCE SHEETS

	January 31,	
(in millions, except per share amounts)	2018	2017
ASSETS		
Current assets:		
Cash and cash equivalents	$ 970.7	$ 928.0
Short-term investments	320.5	57.8
Accounts receivable, less allowances of $17.2 and $11.5	231.2	226.8
Inventories, net	2,253.5	2,157.6
Prepaid expenses and other current assets	207.4	203.4
Total current assets	3,983.3	3,573.6
Property, plant and equipment, net	990.5	931.8
Deferred income taxes	188.2	301.8
Other assets, net	306.1	290.4
	$ 5,468.1	$ 5,097.6
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Short-term borrowings	$ 120.6	$ 228.7
Accounts payable and accrued liabilities	437.4	312.8
Income taxes payable	89.4	22.1
Merchandise credits and deferred revenue	77.4	69.2
Total current liabilities	724.8	632.8
Long-term debt	882.9	878.4
Pension/postretirement benefit obligations	287.4	318.6
Deferred gains on sale-leasebacks	40.5	45.9
Other long-term liabilities	284.3	193.5
Commitments and contingencies		
Stockholders' equity:		
Preferred Stock, $0.01 par value; authorized 2.0 shares, none issued and outstanding	—	—
Common Stock, $0.01 par value; authorized 240.0 shares, issued and outstanding 124.5 and 124.5	1.2	1.2
Additional paid-in capital	1,256.0	1,190.2
Retained earnings	2,114.2	2,078.3
Accumulated other comprehensive loss, net of tax	(138.0)	(256.2)
Total Tiffany & Co. stockholders' equity	3,233.4	3,013.5
Non-controlling interests	14.8	14.9
Total stockholders' equity	3,248.2	3,028.4
	$ 5,468.1	$ 5,097.6

See notes to consolidated financial statements.

TIFFANY & CO.
K-52

Tiffany & Co.'s consolidated statements of earnings on January 31, 2017 – 2018

CONSOLIDATED STATEMENTS OF EARNINGS

				Years Ended January 31,	
(in millions, except per share amounts)		2018		2017	2016
Net sales	$	4,169.8	$	4,001.8 $	4,104.9
Cost of sales		1,565.1		1,511.5	1,613.6
Gross profit		2,604.7		2,490.3	2,491.3
Selling, general and administrative expenses		1,810.2		1,769.1	1,731.2
Earnings from operations		794.5		721.2	760.1
Interest expense and financing costs		42.0		46.0	49.0
Other (income) expense, net		(8.0)		(1.4)	1.2
Earnings from operations before income taxes		760.5		676.6	709.9
Provision for income taxes		390.4		230.5	246.0
Net earnings	$	370.1	$	446.1 $	463.9
Net earnings per share:					
Basic	$	2.97	$	3.57 $	3.61
Diluted	$	2.96	$	3.55 $	3.59
Weighted-average number of common shares:					
Basic		124.5		125.1	128.6
Diluted		125.1		125.5	129.1

See notes to consolidated financial statements.

FORM 10-K