# BUSINESS SURVIVAL IN THE CONSTRUCTION INDUSTRY IN RELATION TO OTHER BUSINESSES: A COMPARATIVE ANALYSIS

A Thesis

by

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## ABSTRACT

The construction industry is one of the largest industry in the United States; it employs close to seven million people and contributes the most to the growth of the country's economy. In spite of the huge impact that the industry has on the US economy, construction businesses have a hard time surviving in the market, with construction companies having the lowest survival rate among all the industries. Only 36.4% of new construction companies had survived in the past 5 years since 2012. This study aims at providing evidence that the construction industry suffers the most as compared to the other industries in terms of business survival rate. The statistical techniques used are Chi-Square test for independence and a General Linear Model. Results show a significant difference between the construction industry and other industries, proving that the construction industry businesses have the lowest survival rate.

## DEDICATION

To me friends, for supporting me through my journey at Texas A&M University.

To my professors and teachers, who have helped me reach where I am today.

My mother Beena Kakkad

My father Anand Kakkad

To my family, for their undying support & love,

“Family is where Life begins & Love never ends”

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## CONTRIBUTORS AND FUNDING SOURCES

### Contributors

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# CHAPTER I

# INTRODUCTION

According to Clusel et al. (2011), failure in business is considered as a state of insolvency, which is when a company using its assets is unable to meet its liabilities. The reasons for company failure are causes that are more often than not predictable. Thus the inability of a company to address these predictable certain risks which in the future turn into causes are the main reasons for business failure. Frederikslust (1978) defines failure of a business as the inability of the business to meet its obligations. From an economic point of view, Altman (1971) defines a business failure when the return on investment for the business is lower when compared to a similar investment with a high rate of return. Similarly, Storey (1994) defines business failure as shortage of revenue to meet the demands of cost or where the return on investment of a business is less as compared to the company's cost of capital.

The reasons for business failure often vary from business to business and also the industry in which the business operates. Some of the common reasons for business failure as suggested by Frederikslust (1978) are recession, loss of an important client, management errors and inabilities, inadequate supply or demand, etc. Child (1972) emphasizes that the failure of businesses is often because of managerial inability and errors. In another study by Peterson (1983), it was seen that the common reasons for business failure are lack of managerial expertise, high interest rates, recession, undercapitalization, taxes, competition, cash flow, regulations and overhead.

The failure of businesses has a significant impact on the country's economy. Business failures leads to unemployment and unpaid debts. Business failure in the construction industry, the highest contributor to the US economy and having seven million employees, will have significant impact on the economy of the nation.

**Objectives of the Study**

Failure in business is a concept which is not acknowledged by many businesses. But, in construction, failure of business is a big possibility. The construction industry is a dynamic industry, which involves the input of a number of parties' before, during and after construction. Further, the construction industry is extremely dependent on the country's economy, has huge competitiveness and has a relative ease of entrance for new firms. All these factors considered, make construction industry a prime candidate for business failures.

The study aims at proving that businesses in construction have the lowest rate of survival when compared to businesses in other industries. The study further discusses the various risks involved in construction that make it the most vulnerable industry. The study will help inform construction industry professionals about the various risks leading to business failure and will help them better manage their businesses.

## Research Questions

Being the leading contributor to the nation's economy, what makes the construction industry the most vulnerable amongst all the industries? The construction industry is an amalgam of contractors, subcontractors, owners, clients, labors and so on. High number of parties, large investments, environment, make construction an extremely risky business. This study aims at answering questions related to construction businesses, such as, is the business survival rate of businesses in the construction industry the lowest? What makes the construction industry different as compared to other industries? What risks are peculiar to construction?

## Scope and Limitations

The study covers business survival rates of industries within the United States only. The data used for the study is confined to only agriculture, mining, construction, manufacturing, transportation, communication and utilities (TCU), wholesale, retail, finance, insurance and real estate (FIRE) and services industries and does not consider data for any industry other than the ones mentioned above. The data used is limited from the years 1977 to 2014. The trend followed in these years may have since then changed and conclusions may vary accordingly.

## CHAPTER II

## LITERATURE REVIEW

Starting any business has its risks and the survival of companies is difficult, as shown in Figure 1, this is especially portrayed in the construction industry, where it is seen that for a time period of 5 years, construction industry has the lowest survival rate. (Shane S. 2012)

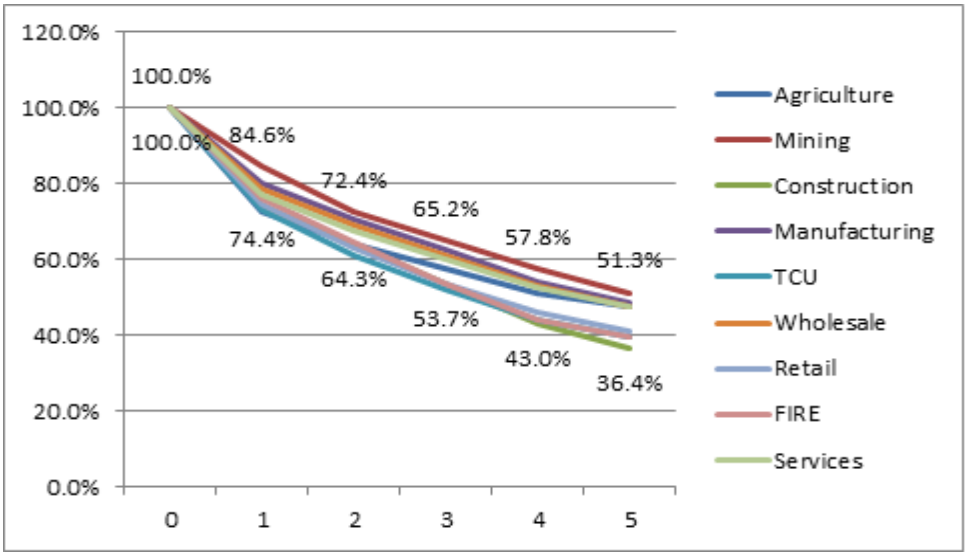


Figure 1: Comparison of Business Survival Rates (Shane S. 2012)

In a research by Knaup & Piazzi (2006), monitoring the survival rates of different sectors of the industry, it was found that the construction industry showed the 2nd to last survival rate when compared to other sectors of the industry. The study,

which looked at businesses launched in the second quarter of 1998, projected that 30 percent of construction companies survive after seven years. Again, that was better only than the information sector, with 25 percent surviving after seven years.

The construction industry is a high risk and high hazard industry, with different risks which won't be seen in other industries. The risks often seen in construction include,

**On-Site Worker Injuries**

According to Kisner & Fosbroke (1994), the construction industry is plagued with injuries and hazards. The construction industry has the highest fatal injuries and work days lost out of all the industries. Also, the construction industry had the highest injury incidence rate. In another study by Dong, Largay & Windau (2014), it was found that construction workers are at high risk. It was found that in 2011, the construction industry had a total fatalities of 781, which is more than any other industry in the United States. Because of the difference in occupational hazards and exposures that construction has, safety of workers and the liability associated with injuries and fatalities can be one the largest risks that the construction industry faces.

**Seasonal Slowness of Construction**

Another risk that sets the construction industry apart from other industries is the seasonal slowness that is seen in construction in the months of winter. According to Kraus (2016), work in winter is often stalled or slowed down because of the extreme weather conditions in most of the United States. In 2014 and 2015, the extreme conditions in weather, produced a real slowdown in the work. Construction companies

that are unable to cope up with the unavailability of work and increased competition during this season, might find it difficult to keep their business up. Hence seasonal slowness is one of the risks that can have a massive impact on construction businesses.

**Excessive Change Orders**

In construction often times, as a result of faulty work, contractors have to process change orders. The risk associated with change orders is of one the most commonly occurring risks in the construction industry. The impact of this risk will depend upon the type of work that needs a change order. According to Moselhi, Assem & El-Rayes (2005), change orders often have a negative impact on the productivity and efficiency of a project. Further change orders often cause problems to the contractors and the owners which results in cost and time overruns. In another study by Serag et al. (2010), change orders are the most commonly occurring expense in construction and can often lead to overall increase in contract price by 5-10%. Thus, the risk associated with change orders can often times be too much for some construction businesses to undertake.

**Delays in Projects**

Project delays is another risk in construction that occurs frequently. Because construction projects are long and can last for years, the chance of delays in project completion can be high. In a study by Srdic & Selih (2015), it was seen that delays in projects can often lead to additional costs, conflicts and litigation. The cost associated with a delay can often times make businesses vulnerable and can lead to businesses hanging on for their survival.

**Labor, Equipment and Material Availability**

In a study by Alonso et al. (2007), it was mentioned that the unavailability of materials has a visible effect on the construction industry, this is mainly because of the high tonnages of materials that construction requires and also because of the high degree of alternatives available. Further, all product supply chains are vulnerable to the unavailability of materials but not all businesses have found a way to adapt with the unavailability of materials.

Equipment in construction plays an extremely important role. According to Tatari & Skibniewski (2006), construction equipment is of the most important and valuable assets that a construction company can own. 50% of top 400 contractors in the United States own their own equipment, hence the proper availability and management of equipment is extremely important for the success of construction businesses where the profit margins are low.

Availability of skilled workers can play a critical role in the way construction projects are planned and carried out. In a study by Rasdorf, Hummer & Vereen (2016), it was identified that an adequate supply of skilled workers is one of the key dimensions to the aging transportation system in the United States. Further, the unavailability of skilled workers in 2013, posed a problem for the construction of chemical facilities on the US gulf coast. Hence, it is extremely essential to plan for the requirement of labor in construction.

## Labor and Equipment Productivity

Labor productivity has an important role in the construction industry. As construction is a labor intensive industry, the productivity of labor plays a critical role in construction projects. It was found that labor productivity can have an impact of up to 10-15% on the construction costs and schedules. Thus construction businesses can save valuable resources and time by investing in labor productivity. (Thomas, 2012)

Equipment in construction are needed in large quantities. Hence, it is necessary that construction equipment deliver the productivity expected from them. Productivity in equipment refers to the amount of work done by an equipment in a given period of time. Hence to save on costs and delays, it is necessary that construction equipment have good productivity and minimal repairs. (Kannan 2011)

## Acts of God

Natural disasters don't occur frequently but when they do they have a massive impact on construction projects. Theses disasters are risks that have a low probability of occurrence but can have a huge negative impact. The disasters included in acts of god include, heavy floods, landslides, hurricanes and earthquakes. Any business that has the misfortune to come across an act of god can have huge financial losses if not insured. Hence, the risks related to an act of god is not to be understated. (Balaoi & Price, 2003)

**Quality of Work**

Quality of work in construction is of foremost importance as compared to other industries. Construction is not a rapid production industry, products of construction are singular and can take years to develop, and hence the quality required in these products is of grave importance.

Poor quality can gravely affect the cost and schedule of the project. As poor quality of work leads to increased change orders and increased work hours for labors and equipment, the overall expenses for a contractor keep on increasing. (Love et al., 2016), regulation, rapid growth and lack of experience also play a huge role in the overall way a construction business is operated.

All these risks add up in a construction business and can lead to major losses and reduce the overall business survival rates of businesses in the construction industry. Thus, in order to prove that the construction industry has the lowest business survival rate amongst all the industries, data containing the business survival rate of all the industries was obtained from the United States Census Bureau.

# CHAPTER III

# METHODOLOGY

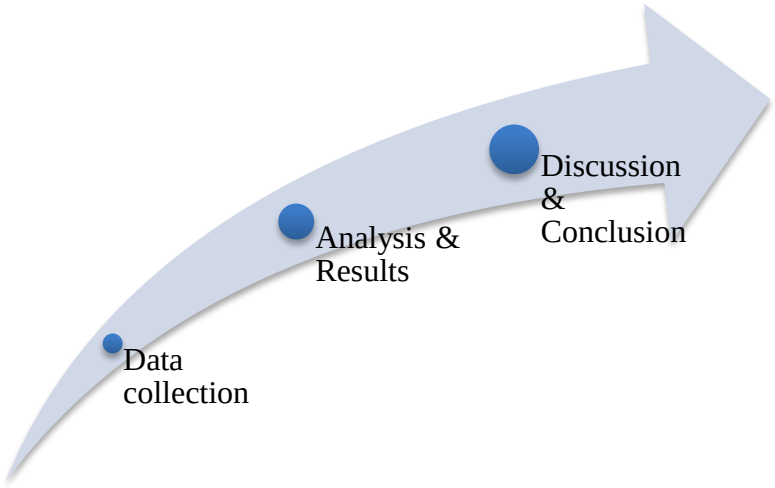


Figure 2: Stages of Research

The research is carried out in 3 stages as depicted in Figure 2.

## Data Collection

The data for the study was collected from the United States Census Bureau. The data for the study consisted of business survival rates for all the industries within the U.S such as agriculture, mining, construction, manufacturing, transportation, communication and utilities (TCU), wholesale, retail, finance, insurance and real estate (FIRE) and services from the year 1977 to 2014.

**Variables and Measurement**

The variables for the study consists of business survival rates for agriculture, mining, construction, manufacturing, transportation, communication and utilities (TCU), wholesale, retail, finance, insurance and real estate (FIRE) and services from the year 1977 to 2014.

For the purpose of the study, business survival rate for a particular year is defined as the difference between the number of businesses that entered and the number of businesses that exited for any particular year. The business survival rate is considered 'high' if the difference is positive and is considered 'low' if the difference is either 0 or negative.

Business survival rate is given by the formula:

*Business Survival Rate =*

Number of Businesses Entering – Number of Businesses Exiting

The data collected for each industry is as shown in the Tables 1, 2 & 3.

| | Construction | | Agriculture | | Mining | |
|---|---|---|---|---|---|---|
| Year | Business Survival Rate | Survival | Business Survival Rate | Survival | Business Survival Rate | Survival |
| 1977 | 24984 | HIGH | 223 | HIGH | 1154 | HIGH |
| 1978 | 27793 | HIGH | 1159 | HIGH | 362 | HIGH |
| 1979 | 26726 | HIGH | 2445 | HIGH | 1555 | HIGH |
| 1980 | -6026 | LOW | 1129 | HIGH | 1008 | HIGH |
| 1981 | -21294 | LOW | 504 | HIGH | 2547 | HIGH |
| 1982 | -11682 | LOW | 2262 | HIGH | 3585 | HIGH |
| 1983 | -2526 | LOW | 2141 | HIGH | -1074 | LOW |
| 1984 | 26571 | HIGH | 3289 | HIGH | -81 | LOW |
| 1985 | 25183 | HIGH | 4046 | HIGH | 244 | HIGH |
| 1986 | 21481 | HIGH | 3777 | HIGH | -1215 | LOW |
| 1987 | 28607 | HIGH | 4745 | HIGH | -2830 | LOW |
| 1988 | 10918 | HIGH | 2975 | HIGH | -765 | LOW |
| 1989 | 4214 | HIGH | 2724 | HIGH | -760 | LOW |
| 1990 | 20628 | HIGH | 5808 | HIGH | -135 | LOW |
| 1991 | -4167 | LOW | 3101 | HIGH | 21 | HIGH |
| 1992 | 3429 | HIGH | 3084 | HIGH | -924 | LOW |
| 1993 | 12124 | HIGH | 2357 | HIGH | -598 | LOW |
| 1994 | 18045 | HIGH | 3292 | HIGH | -456 | LOW |
| 1995 | 23366 | HIGH | 4506 | HIGH | -480 | LOW |
| 1996 | 12439 | HIGH | 3058 | HIGH | -509 | LOW |
| 1997 | 15839 | HIGH | 3537 | HIGH | -193 | LOW |
| 1998 | 9667 | HIGH | 2474 | HIGH | -405 | LOW |
| 1999 | 12074 | HIGH | 2776 | HIGH | -826 | LOW |
| 2000 | 4116 | HIGH | 2489 | HIGH | -110 | LOW |
| 2001 | -6145 | LOW | 1477 | HIGH | 19 | HIGH |
| 2002 | -4919 | LOW | -61 | LOW | -25 | LOW |
| 2003 | -6987 | LOW | 3172 | HIGH | 100 | HIGH |
| 2004 | -6481 | LOW | 4110 | HIGH | 333 | HIGH |
| 2005 | -10282 | LOW | 4056 | HIGH | 850 | HIGH |
| 2006 | -3473 | LOW | 5025 | HIGH | 1438 | HIGH |
| 2007 | -11767 | LOW | 3146 | HIGH | 1214 | HIGH |
| 2008 | -24222 | LOW | 2050 | HIGH | 1037 | HIGH |
| 2009 | -45364 | LOW | -1710 | LOW | 378 | HIGH |
| 2010 | -30127 | LOW | 328 | HIGH | -150 | LOW |
| 2011 | -19615 | LOW | 140 | HIGH | 656 | HIGH |
| 2012 | -5629 | LOW | 4363 | HIGH | 1069 | HIGH |
| 2013 | -10841 | LOW | -491 | LOW | 188 | HIGH |
| 2014 | -2695 | LOW | 2335 | HIGH | 577 | HIGH |

Table 1: Business Survival Rate - I

| | Manufacturing | | TCU | | Services | |
|---|---|---|---|---|---|---|
| Year | Business Survival Rate | Survival | Business Survival Rate | Survival | Business Survival Rate | Survival |
| 1977 | 7614 | HIGH | 64114 | HIGH | 7287 | HIGH |
| 1978 | 2184 | HIGH | 35865 | HIGH | 3606 | HIGH |
| 1979 | 8365 | HIGH | 62507 | HIGH | 6548 | HIGH |
| 1980 | 3149 | HIGH | 41543 | HIGH | 2599 | HIGH |
| 1981 | -2107 | LOW | 22436 | HIGH | -538 | LOW |
| 1982 | 6475 | HIGH | 89701 | HIGH | 7454 | HIGH |
| 1983 | -2128 | LOW | 47791 | HIGH | 3609 | HIGH |
| 1984 | 6389 | HIGH | 80106 | HIGH | 7579 | HIGH |
| 1985 | 7335 | HIGH | 67727 | HIGH | 6396 | HIGH |
| 1986 | 2446 | HIGH | 70558 | HIGH | 6600 | HIGH |
| 1987 | 3141 | HIGH | 75957 | HIGH | 9799 | HIGH |
| 1988 | 4797 | HIGH | 36155 | HIGH | 2417 | HIGH |
| 1989 | 986 | HIGH | 28959 | HIGH | 4519 | HIGH |
| 1990 | 7294 | HIGH | 72648 | HIGH | 6383 | HIGH |
| 1991 | 359 | HIGH | 56494 | HIGH | 8872 | HIGH |
| 1992 | -2079 | LOW | 51280 | HIGH | 9199 | HIGH |
| 1993 | 2396 | HIGH | 42508 | HIGH | 5381 | HIGH |
| 1994 | 3031 | HIGH | 49217 | HIGH | 8610 | HIGH |
| 1995 | 4359 | HIGH | 59924 | HIGH | 9449 | HIGH |
| 1996 | 1395 | HIGH | 54579 | HIGH | 6300 | HIGH |
| 1997 | -416 | LOW | 64273 | HIGH | 4902 | HIGH |
| 1998 | 56 | HIGH | 45894 | HIGH | 8207 | HIGH |
| 1999 | -3370 | LOW | 33620 | HIGH | 3997 | HIGH |
| 2000 | -3763 | LOW | 20570 | HIGH | 2222 | HIGH |
| 2001 | -6344 | LOW | 13624 | HIGH | 6100 | HIGH |
| 2002 | -9200 | LOW | 40532 | HIGH | -1078 | LOW |
| 2003 | -3201 | LOW | 83857 | HIGH | 5186 | HIGH |
| 2004 | -1633 | LOW | 95447 | HIGH | 4010 | HIGH |
| 2005 | 264 | HIGH | 111255 | HIGH | 5469 | HIGH |
| 2006 | 713 | HIGH | 89450 | HIGH | 8667 | HIGH |
| 2007 | -1729 | LOW | 69298 | HIGH | 6040 | HIGH |
| 2008 | -3834 | LOW | 45098 | HIGH | 2029 | HIGH |
| 2009 | -10720 | LOW | -19104 | LOW | -5863 | LOW |
| 2010 | -9044 | LOW | 12102 | HIGH | -2927 | LOW |
| 2011 | -4050 | LOW | 24134 | HIGH | 5906 | HIGH |
| 2012 | -2867 | LOW | 39313 | HIGH | 3815 | HIGH |
| 2013 | -4378 | LOW | 25119 | HIGH | 3871 | HIGH |
| 2014 | -2814 | LOW | 41875 | HIGH | 9969 | HIGH |

Table 2: Business Survival Rate - II

| | Wholesale | | Retail | | FIRE | |
|---|---|---|---|---|---|---|
| Year | Business Survival Rate | Survival | Business Survival Rate | Survival | Business Survival Rate | Survival |
| 1977 | 13784 | HIGH | 42692 | HIGH | 9889 | HIGH |
| 1978 | 5147 | HIGH | -7623 | LOW | 9354 | HIGH |
| 1979 | 12339 | HIGH | 31212 | HIGH | 18195 | HIGH |
| 1980 | 6008 | HIGH | 1305 | HIGH | 5234 | HIGH |
| 1981 | 237 | HIGH | -31380 | LOW | -2108 | LOW |
| 1982 | 18170 | HIGH | 55767 | HIGH | 3025 | HIGH |
| 1983 | 159 | HIGH | 3382 | HIGH | 5011 | HIGH |
| 1984 | 8261 | HIGH | 13534 | HIGH | 13509 | HIGH |
| 1985 | 8162 | HIGH | 9399 | HIGH | 14382 | HIGH |
| 1986 | 9133 | HIGH | 27153 | HIGH | 12735 | HIGH |
| 1987 | 7493 | HIGH | 37385 | HIGH | 12879 | HIGH |
| 1988 | 4941 | HIGH | 9189 | HIGH | 18093 | HIGH |
| 1989 | 5031 | HIGH | 7417 | HIGH | 2173 | HIGH |
| 1990 | 12569 | HIGH | 22340 | HIGH | 13533 | HIGH |
| 1991 | 7321 | HIGH | 7583 | HIGH | 29923 | HIGH |
| 1992 | 1290 | HIGH | -963 | LOW | 16336 | HIGH |
| 1993 | 3644 | HIGH | -1708 | LOW | 4830 | HIGH |
| 1994 | 5388 | HIGH | 10743 | HIGH | 17263 | HIGH |
| 1995 | 9162 | HIGH | 12617 | HIGH | 14026 | HIGH |
| 1996 | 6783 | HIGH | 13529 | HIGH | 10592 | HIGH |
| 1997 | 1123 | HIGH | 4310 | HIGH | 17838 | HIGH |
| 1998 | -3468 | LOW | -2982 | LOW | 8509 | HIGH |
| 1999 | -4246 | LOW | -4688 | LOW | 16788 | HIGH |
| 2000 | -6843 | LOW | 1563 | HIGH | 5348 | HIGH |
| 2001 | -7308 | LOW | -6461 | LOW | 8103 | HIGH |
| 2002 | -5846 | LOW | 10209 | HIGH | 13731 | HIGH |
| 2003 | 1967 | HIGH | 36270 | HIGH | 33588 | HIGH |
| 2004 | 3035 | HIGH | 23445 | HIGH | 18775 | HIGH |
| 2005 | 6074 | HIGH | 39951 | HIGH | 31491 | HIGH |
| 2006 | 5287 | HIGH | 20652 | HIGH | 32876 | HIGH |
| 2007 | 769 | HIGH | 28346 | HIGH | 23142 | HIGH |
| 2008 | 92 | HIGH | 16128 | HIGH | -1829 | LOW |
| 2009 | -8267 | LOW | -8603 | LOW | -20897 | LOW |
| 2010 | -4439 | LOW | 5607 | HIGH | -5152 | LOW |
| 2011 | -1004 | LOW | 12296 | HIGH | -3404 | LOW |
| 2012 | -2357 | LOW | 15466 | HIGH | 13569 | HIGH |
| 2013 | -2220 | LOW | 2165 | HIGH | 5424 | HIGH |
| 2014 | -69 | LOW | -28535 | LOW | 13148 | HIGH |

Table 3: Business Survival Rate - III

# CHAPTER IV

# ANALYSIS AND RESULTS

In order to prove that construction industry has the lowest survival rate amongst all the industries, a Chi-Square test of independence was conducted. For further comparison between the construction industry and other industries a general linear model was run.

## Chi-Square Test for Independence

A Chi-Square test for independence compares two variables to see if they are related or not. A Chi-Square test for independence is based on the formula,

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

where, X = Chi-Square value, c = degrees of freedom, O = observed value and E = expected value.

The null hypothesis in this case is,

H0: There is no significant difference between construction and other industries, that the rate of survival of companies is similar for all the industries.

The results from running the Chi-Square test for independence are shown in Table 4.

| | Value | Df | Asymptotic Significance (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 55.297 | 8 | .000 |
| N of Valid Cases | 342 | | |

Table 4: Chi-Square Tests

A Chi-square value of 55.297 which is greater than the critical value of 17.535 for df = 8, $\alpha = 0.05$, signifies that the null hypothesis is rejected and that there is a significant difference between the construction industry and other industries. A significant difference indicates that survival rate for construction companies from 1977-2014 has been significantly different as compared to other industries.

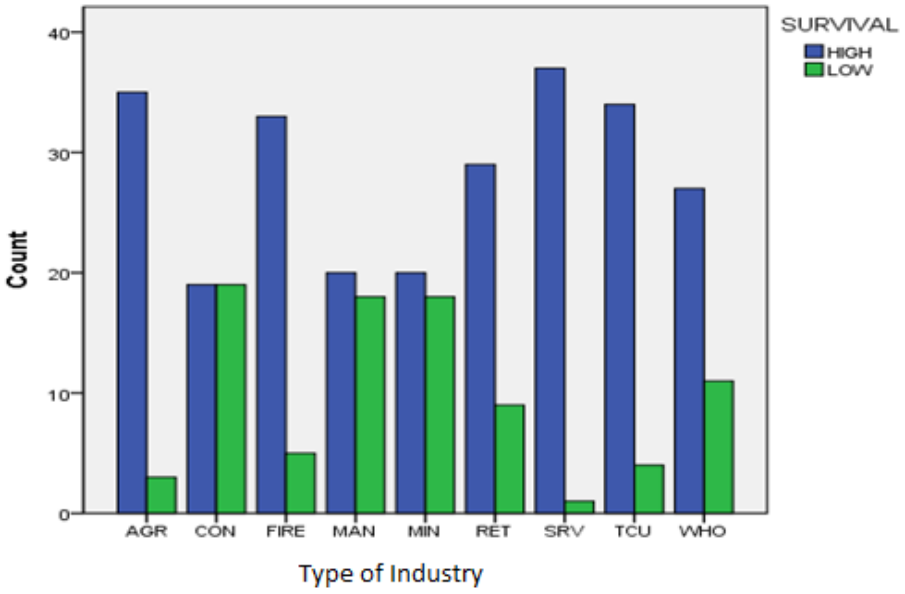


Figure 3: Comparison of Survival Rates

Out of 38 years of business survival data seen through Figure 1, agriculture had high survival in 35 years and low in 3 years, meaning that more businesses opened rather than closed in 35 out of the 38 years, proving that agriculture had a high business survival rate from 1977-2014.

FIRE had high survival in 33 years and low in 5 years, meaning that more businesses were opened rather than closed in 33 out of the 38 years, proving that FIRE had a high business survival rate from 1977-2014

Retail had high survival in 37 years and low survival in 1 year, meaning that more businesses opened rather than closed in 37 out of the 38 years, proving that retail had a high business survival rate from 1977-2014.

TCU had high survival in 34 years and low survival in 4 years, meaning that more businesses opened rather than closed in 34 out of the 38 years, proving that TCU had a high business survival rate from 1977-2014.

Wholesale had high survival in 27 years and low in 11 years, meaning that more businesses opened rather than closed in 27 out of the 38 years, proving that whole sale had a high survival rate for a majority of the years from 1977-2014.

Manufacturing and Mining had high survival in 20 years and low survival in 18 years, meaning that more number of businesses opened rather than closed in 20 out of the 38 years, which is a majority but still low as compared to some of the other industries.

The construction industry had high survival in 19 years and low survival in 19 years, meaning that more number of businesses opened rather than closed in 19 of the 38 years from 1977-2014. Thus, proving that construction industry has the lowest survival amongst all the industries.

Further, a pairwise comparison between the construction industry and other industries using general linear model was done. The results are shown in Table 4.

**Pairwise Comparison using a General Linear Model**

| General Linear Model - Pairwise Comparison | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | 95% Confidence Interval for Difference | |
| Type (i) | Type (ii) | Mean Difference (i-ii) | Std. Error | Sig. | Lower Bound | Upper Bound |
| Construction | Agriculture | -0.421 | 0.093 | 0 | -0.604 | -0.238 |
| | FIRE | -0.368 | 0.093 | 0 | -0.551 | -0.185 |
| | Manufacturing | -0.026 | 0.093 | 0.778 | -0.209 | 0.157 |
| | Mining | -0.026 | 0.093 | 0.778 | -0.209 | 0.157 |
| | Retail | -0.263 | 0.093 | 0.005 | -0.446 | -0.08 |
| | Services | -0.474 | 0.093 | 0 | -0.657 | -0.291 |
| | TCU | -0.395 | 0.093 | 0 | -0.578 | -0.212 |
| | Wholesale | -0.211 | 0.093 | 0.024 | -0.394 | -0.027 |

Table 5: Construction vs Other Industries

A comparison of construction against other industries is done through a pairwise comparison using the general linear model. A general linear model is a statistical technique used to test the relationship between two or more variables. General linear modelling was needed in this study to specifically measure the relationship between the survival rates of construction businesses and the survival rate of businesses in other industries.

It can be seen from Table 5 that for industries such as, agriculture, FIRE, retail, service, TCU and wholesale, the p-value is less than $\alpha = 0.025$. Hence, this rejects the null hypothesis that there is no significant difference between these industries and the construction industry. This indicates that the construction industry is significantly

different from these industries except for manufacturing and mining where the p-value is greater than $\alpha = 0.05$. The negative mean difference between the construction industry and other industries proves that the survival rate for businesses is much less in construction as compared to other industries.

# CHAPTER V

## DISCUSSION AND CONCLUSION

The above results from the Chi-square test for independence and the pairwise comparison using general linear model, prove that the construction industry has the lowest business survival rate amongst all the industries.

According to Knaup & Piazza (2007), industries which start with survival rates less than the national average tend to continue below average, those which began at the national average tend to continue at national average and those which started with survival rates more than the national average tend to continue with survival rate greater than the national average. Thus, the construction industry will continue to portray this trend, unless some major changes concerning these businesses are made.

According to Kangari (1992), the construction industry has characteristics that differ it from other industries. The construction industry is extremely sensitive to the economic cycle and is also fragmented. It is also an extremely competitive industry because of the large number of firms and because of the ease of entry into the industry. These characteristics particular to construction make the rate of business failure in construction very high. Further when compared to the other industries, because of the complexity and longevity of construction projects, clients face a greater risk in construction as compared to other industries.

The construction industry is one of the few industries that is labor intensive and has projects involving the product to be built right from scratch. Because of the high number of parties involved in every project, the number of risks and their impact

increases significantly. According to Awad et al. (2005), construction is a labor intensive industry, in that the only way a construction schedule be accelerated is through increased labor productivity and equipment productivity. Thus, construction business risks tend to cover labor and equipment risks in depth as compared to other industries. Further, in construction, work is affected by the site conditions and the environment, unworkable site conditions may result in work being halted for months and unstable environment such as natural disasters can lead to entire projects being put on hold resulting in severe losses to construction businesses.

Some of the common reasons for construction business failure as suggested by Kangari (1992) are as shown in Figure 4.

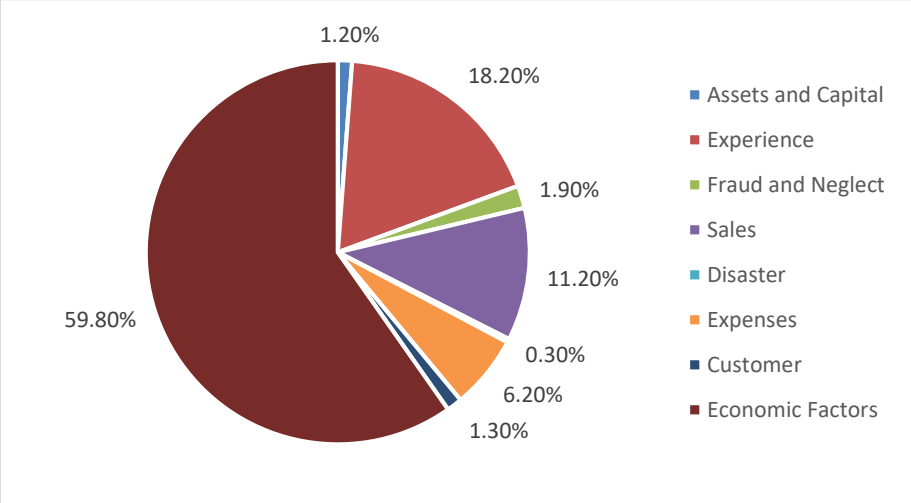


Figure 4: Reasons for Construction Business Failure (Kangari, 1992)

It can be seen from Figure 4 that economic factors is the leading reason for construction business failures.

Similarly, in a research by Arditi et al. (2000), it was seen that 80% of construction businesses fail because of low returns, high operation costs, insufficient capital, industry weakness and high debts. Out of the five major reasons for business failure, four were monetary issues. Thus economic well-being plays a significant role in deciding whether a business succeeds or not.

In conclusion, the construction industry is an extremely volatile industry. With risks varying from capital, high number of personnel, equipment, time, productivity, environment and natural disasters, the list of risks in construction is endless. While, other industries also have a lot of risks, construction seems to encompass them all and have room to spare. With larger investments and larger risks, construction professionals need to take a deeper look at the way businesses are run and need to try and fix the underlying causes for failure. Having the highest rate of failure and still contributing the most to nation's GDP, the potential that the construction industry possess is enormous and the measures taken to help construction businesses survive will only help the nation's economy.

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