Title: A Critical Review of " Suppliers' Contributions to Product Development: An Exploratory Study" -3

Course: EMGT 520/620
Term: Fall
Year: 1997
Author(s): J. Danh

Report No: P97069

Abstract: A paper titled "Suppliers' Contributions to Product Development: An Exploratory Study" is critically reviewed in this individual report.

A Critical Review of " Suppliers' Contributions to Product Development: An Exploratory Study"-3

J Danh

EMP-P9769

INDIVIDUAL RESEACH PAPER

EMGT 520/620

Professor: Dundar F. Kocaoglu

Jaclyn N. Danh

11/17/97

A

I. Research Paper Summary

In this research the authors were trying to determine how supplier involvement affect supplier's perceived contributions to product development and the overall project technical success . The three main categories were studied:

1) Timing of a supplier's involvement
2) Supplier's design responsibility
3) Communication frequency.

Author cited a research that could not provide statistically significant relationship between supplier involvement and product-development. Another research claimed that increased supplier involvement resulted in a slower development.

From referenced papers, hypotheses have been drawn to study the 3 categories of supplier involvement mentioned above.

II. Research Methodology/Measurement

Phone calls were made to engineering managers asking for participation. Self-report questionnaires designed for 20 min to complete were then sent to 160 U.S. companies. 79 returned usable surveys. 95% of the respondents were design engineers, engineering managers, or product-development managers. The responded companies were small to mid size companies that were selected for the research survey. The reason for this was that it would be too difficult contacting managers from larger companies. 11% of the companies had annual sales of $20 million or less, 5% had annual sales greater than $500 million, and 73% with annual sales of $100 million or less.

Survey questionnaires were on product-development project. Respondents were asked to focus on the most recently completed projects within two years of the survey. 82% were completed within one year or less of receipt of the survey. The types of products developed included injection molding presses, electronic insertion equipment, grinders, power tools, and cutting tools.

All measurements were split into two main group: the low degree of component change, <20% redesign, and high degree of component change, > 20% change. To measure the timing of supplier's involvement, three category stages were used:

1) idea generation and project planning
2) model building and detailed design
3) prototype building or later

To measure for suppliers' responsibility for the design, four categories were used:

1) standard parts
2) parts designed by the buyer
3) parts designed jointly by the buyer and the supplier

4) parts designed by the supplier to meet the buyer's functional requirements.

To measure the frequency of communication, three categories were used:

1) at least weekly
2) more than weekly but less than monthly
3) monthly or less often. Continuous measures were used for the supplier's perceived contributions to product development and the overall project technical success.

III. Research Contribution/Results

a. Low Degree of component change

Timing of the supplier's involvement ($p<0.05$) was statistically significantly to supplier's perceived contributions to. Supplier involvement at the early stage showed a highest mean of contribution compared to involvement at later stages.

Supplier's responsibility for design ($p<0.01$) was also claimed to be statistically significant to product development. Though the research claimed that increasing supplier's responsibility for component design didn't show an increased contribution to product success. The research found that the highest contributions to the project were for the projects in which the buyers made the design changes themselves. This is contradicting to me.

Frequent communication did not show statistical significance in contribution to product success.

Statistic showed that there was a significant relationship between supplier's involvement and the overall project technical success ($p<0.05$) but adjusted R2 =0.08. This suggested that even though it was statistical significance, for managers there may be little practical significance.

b. High Degree of component change

The timing of supplier's involvement had a statistical significance ($p<0.05$) but neither of the supplier's responsibility for design nor frequency of communication showed statistical contribution to product success.

IV. Conclusion

Including suppliers in the early stages of product development would increase the supplier's perceived contributions to product development. However, increasing the supplier's perceived contributions would not necessarily affect the project as a

whole. Therefore, as managers, it's a good idea to involve suppliers at the early stages but managers should not shift design activities to suppliers.

V. Research Strengths and Weaknesses

One of the strengths of this research was the concepts studied. These concepts are practical and would be very useful to industries. A good number of references were looked at before authors generated their hypotheses for this research. Authors explained well the categories that they used to measure outcomes.

The weaknesses included a non-random and relatively small sample size. Other researches had at least 500 respondents but this research had only 79 respondent. Also, the inputs were only from the product development engineers. Respondents should be at least from planing, purchasing, marketing people who would have a better knowledge of product success and cost savings. Another weakness was the mid size companies they chose. It seems to me that larger companies would have a much bigger program for supplier's involvement, their projects would be bigger and it would be easier to measure the degree of significance due to suppliers' contribution. It was confusing to me that the supplier's responsibility for design showed a $p<0.01$ but authors claimed that it didn't contribute to product success. How did the 1% null analysis come about? It would be helpful for readers if a copy of the questionnaire was attached so that the content of survey would be better understood and analyzed for completeness. It seems to me that the survey for this research was too small in scale and therefore data was not sufficient to draw conclusions on relatively big concepts set out to measure/determine in this research.

VI. How This Research Compared to Other Publications in the Field

Other researches/literature agreed with this research that supplier's involvement in the early stages contributes to product success. But all of the referenced researches recognized the important of supplier's involvement in all of the design stages. Though frequency of communication wasn't studied separately, but the fact that suppliers were working closely together with the buyers suggested that communication was vital to project success . Supplier's perceived contributions were seen more commonly with the Auto industries especially with the new model design projects.

Tom Gale, executive vice president of Chrysler, stated that " No one element of the vehicle will achieve the overall goals - everything must be re-evaluated and improved as part of the PNGV (Partnership for a New Generation of Vehicles) process. That process begins and ends with the engineers and suppliers who are executing the creation and development of the product. It is essential that they understand, embrace, and work with us on meeting our goals"[1].

Takeshi Yamada, president of Honda of America Manufacturing stresses that suppliers work with Honda at all levels- research and development, purchasing, and manufacturing during new model development" [2].

A manager from General Motor whose group has completed a supplier development project with more than 2000 suppliers cited and average supplier productivity improvements of more than 50%, lead time reductions of up to 75%, and inventory reduction of 70% [3] .

A survey on "Supplier development: current practices and outcomes" had a 527 responses from purchasing executives showed the following improvement from supplier involvement: 1) incoming defects decreases 6%, 2) percent on-time delivery increases 12%, and 3) cycle time decreases 12%. Of these improvement, estimated perceived contribution from suppliers was ~80%[4].

Another survey came up with this statement for their research concept " Good things come to those who listen to their suppliers". After going through 500 responses from purchasing/supply executives and nearly 1,000 suppliers. The author confirmed that the statement above was true. More executives recognized and promoted supplier participation in new product design improvement, on continuous improvement teams and projects, periodic performance review meeting, and in executive management overview meetings[5].

VII. Research Ideas for Future Work

I thought it would be interesting to see future research to compare the differences in suppliers contribution/involvement to products development/success in different industries: automobiles, electronics/semiconductors, tooling companies, food industries, retails...etc. It would also be nice to see the differences in different companies sizes (small to large) within a industries and how much supplier interaction and contribution each has.

REFERENCES:

[1] Joseph F. McKenna, " Manufacturing a joyride". Tooling & Production, April 1997, vol. 63, no. 1, pp. 57~60.

[2] Kami Buchholz, "Guest engineering for the global market". Automotive Engineering, March 1996, vol.. 104, no. 3, pp. 99~100.

[3] Janet L. Hartley and Thomas Y. Chol, " Supplier development: customers as a catalyst of process change". Business Horizons, July~August 1996, vol. 39, no. 4, pp. 37~44.

[4] Daniel R. Krause, "Supplier development: current practices and outcomes". International Journal of Purchasing and Materials Management, Spring 1997, vol. 33, no. 2, pp.12~19.

[5] Jim Morgan, " Nine ways suppliers can improve competiviveness". Purchasing, Nov. 24, vol. 117, no. 8, pp. 7~9.