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**Retail Telephony:
Dynamics and Costs of Inbound Call Failure**

White Paper 06-002

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August 2006



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EXECUTIVE SUMMARY

Retailers have long sought to understand and maximize customer satisfaction, recently through practices grouped under the term customer relationship management, or CRM. CRM invites retailers to manage customer interactions regardless of the communications channel their customers may select. While advances in computer network technology have dramatically improved POS and Web channels, inbound retail telephony at the store level has been largely ignored, and has not been fully integrated into most firms' channel management strategies.

The telephone has long been an access point for customer service, but with ongoing improvements in e-commerce and in Point Of Sale (POS) techniques, it increasingly has become a third, largely untapped, sales channel for large, multi-site businesses. However, recent advances in computer-telephony integration (CTI), speech recognition and computer-based Interactive Voice Response (IVR) technologies have dramatically upgraded the ability of automated systems to intelligently handle telephone caller inquiries.

Currently, retail stores are likely to have the capacity to place calls on hold and perhaps transfer them throughout the store. But it is unlikely that inbound calls are parsed and handled differently in response to caller characteristics such as patronage and repeat purchase patterns, or that data are collected and stored on call volumes, purposes, outcomes or customer characteristics. As a result, call failures occur and CRM suffers, along with potential revenues.

An average store receives several hundred calls every day. We found that a substantial number of these calls are from prospective customers seeking basic information - typically hours of operation or driving directions. Other calls inquiring about availability of products and services may lead more directly to potential sales. Apart from likely contributing to the loss of these sales, call failures are likely to have a long-range, but largely unquantifiable, deleterious effect on customer relations.

Inbound call failure is a type of service failure. The drive to understand service failure and service recovery in face-to-face, business-to-consumer (B2C), business-to-business (B2B) and on-line B2C transactions has stimulated a considerable body of research. However, little of this research focuses specifically on inbound retail store telephone channels. Studies of inbound calling to call centers suggest that "of all the critical operational determinants only 'percentage of calls closed on first contact' and 'average abandonment' have a significant, albeit weak, influence on caller satisfaction" (Feinberg, et al., 2000, p. 131). But calls into retail stores can be more complex than into call centers, because they may involve several stages of forwarding, holds, waits and therefore, more opportunities for call failure.

In this paper, we report research results that specifically address two aspects of inbound retail telephony. First, how successful are inbound customer calls to retailers across different retail categories? Second, what are the potential consequences to retailers of these outcomes? To implement this investigation, we report on several series of call studies to different categories of retail chain stores, including grocery (including full-service grocery), department stores, restaurant and specialty retailers.

We found that failed calls may represent a surprisingly large potential revenue opportunity. We also found that the use of an automated attendant and interactive voice response (IVR) protocols can preempt a substantial proportion of call failures. The paper concludes with an outline of managerial implications.

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I. RESEARCH PROCEDURE

The goal of our research is to analyze the effect on revenue of existing call handling systems for different types of retail chain stores. Our procedure was to assess the overall call success/failure rate of different retail organizations by prescreening and conducting call studies on randomized samples of stores, and then projecting the impact of the call success/failure rate on revenue, based on current, general financial parameters such as caller conversion rate and average market basket.

Pre-field Screening

Factors for analysis were determined during the pre-field study screening of stores. Our goal was to identify meaningful samples of stores in different retail segments. Sample size ranged from a handful to a national probability sample.

Generation of Randomized Data Set

After pre-field screening, researchers chose a randomized sample of stores listed in a reference database. Stores with inactive phone numbers and/or nonexistent stores were omitted from the study. A random sample of stores was devised, using a standard statistical sample size calculator and random number table generator software. Special issues were considered that could determine whether to perform a study on a particular store such as unique store configuration, personnel training, the presence of an auto attendant and operating procedures. Researchers used the total population of stores listed in the reference database and verified with the chain's online store locator. During actual phone calls, research assistants collected data for analysis.

Calling Protocol

In the calling protocol of this survey, *call failure* is defined as a busy signal, no initial pick up after 8 rings or hold time of more than 65 seconds (75 seconds in older studies) during any transfer, or disconnection by the phone system or store employee. These results are coded as "busy," "abandoned" and "dropped" respectively. We are unable to determine whether a dropped calls are due to equipment failure, employee negligence or employee error during call handling. The following key parameters were noted and analyzed.

1. NUMBER OF STORE RINGS BEFORE PICKUP. More than 8 rings is designated a call failure.

2. HOLD OR WAIT TIME (SECONDS) FOR TRANSFERS. In general, when the hold time for a transfer exceeded 75 or more recently 65 seconds, the call was considered to have failed. Often first and subsequent transfers were included in our calling requests. When useful, a separate study was conducted to analyze a first transfer and a follow up transfer to a second department within a store such as a pharmacy.

Why set the wait time threshold at 75 seconds or 65 seconds in later studies? Patience is an inherently subjective behavioral trait and varies widely among different callers and at different times. For example, customers who expect a short wait will react more negatively than others to waits of equal duration (Durrande-Moreau 1999). Waiting in a phone queue with "dead air" and no provision of positive environmental cues is likely to have a negative effect on callers, but the provision of feedback cues does not seem to have a conclusive ameliorative effect on patience (Whiting and Donthu 2006). Further, a retailer's reputation for poor phone service is likely to have a negative impact on retail phone customer patience (Durrande-Moreau 1999).

One review article on call center waits found: "The impatience functions of [priority and regular] customers ... have two peaks: the first near the origin, due to those who simply decide not to wait, and the second at about 60 seconds (Gans, Koole and Mandelbaum 2003, p. 128). This 60-second period is shorter than the 75 seconds used in the call studies, but the cut-off point is not actually generous. U.S. callers appear to be increasingly impatient, as reported in a recent U.S. survey aired on CNN ("Impatient Nation," May 29, 2006), which found that virtually no callers were willing to wait on line for call center responses for more than 300 seconds.

Patience is differentially distributed. In one Israeli study, 20% of callers hung up before 100 seconds, but about 80% of customers were willing to wait 300 seconds and 50% were willing to wait approximately 1,000 seconds before abandoning their call (Brown, et al., 2002)!

A global picture emerges from a survey called "The Merchants Global Contact Center Benchmarking Report 2005," performed by a research group called Dimension Data (*Call Center Magazine*, April 7, 2005). The survey includes data gathered from interviews of managers of 166 call centers around the world; most were outside the U.S., with half of the sample in the U.K. and Europe. The survey found that consumer impatience contributes to a record 13.3% of calls being abandoned *before being answered* and that callers were **willing to wait only 65 seconds** on average in 2005, compared with 71 seconds in 2003. The downward trend in caller patience is being exacerbated by increases in inbound call volume of 20% or more per year, reported by about 58% of the participating call centers, and a drive for cost control by the call center management. According to the survey authors, "Abandons are rising because nearly half of call centers surveyed (48%) cite cost reduction and increased efficiency as their main commercial driver. Six of ten centers have cost reduction targets built into their business strategies. And metrics that measure performance are based on call handling and throughput, rather than on outcome or first-call resolution rates (FCR). FCR is used by only 17% of organizations surveyed." The authors then report that most call center lines are TDM- and not IP-based, so that for these centers, increases in efficiency cannot be addressed by IP-based functionality such as automated intelligent call routing and interactive voice response (IVR) applications.

3. EXISTENCE, TYPE AND EFFECT OF AN AUTO ATTENDANT. Callers recorded the instances of call handling by an auto-attendant and we determined that where employed, an auto attendant did provide a measurably positive effect on initial call completion.

Statistical Analysis

Results were analyzed for factors contributing to call success or failure using Microsoft® Excel and SPSS® statistical software, and have been independently analyzed by several analysts to determine the call failure rate (CI:95, ±4%), and a number of other measures. The potential influence of call failure impact on revenue was then assessed taking into account the store's current average market basket dollar amount where known, or generally accepted industry figures and assuming a conservative 5% conversion rate of successful calls to store visits.

II. CALL SURVEYS

CASE 1. Specialty Retailer: Major Pet Products Retailer

During the Fall of 2005, a two-phase calling study of a major pet products retailer chain having a total of 804 stores, 742 in the U.S. and the balance in Canada was conducted. In the first phase, researcher assistants called a random sample of 330 stores that was created using a sample size calculator and random table generator software; stores in Canada and all stores with boarding facilities were omitted. A second study of all 31 U.S. stores having boarding facilities, of which 30 also had accessible retail departments was then conducted.

Calls to the 330 U.S. stores without boarding facilities reflected a typical customer experience and consisted of three general phases: call initiation, first department query and second department query. Calls to stores with boarding facilities consisted of two phases: call initiation and transfer to retail store. Results were analyzed for factors contributing to call success or failure in any call phase. Of the 330 call attempts, 190 failed for various reasons as indicated in Table 1. The average hold time for successful first department transfers was 34.4 seconds. The average hold time for successful second department transfers was 39.02 seconds. It is noteworthy that an auto attendant successfully answered 51 (15.8%) of the 322 calls.

Table 1: Call Failure Rates for 330 Stores Without Boarding Facilities

	Busy	Abandoned	Unable to Transfer	Dropped	Cumulative Failure	Cumulative Failure Rate
PHASE 1: Initiation	1	6	-	1	8	2.4% (CI:95, ± 1.2%)
PHASE 2: First Department Query	-	75	11	2	88	29.1% (CI:95, ± 3.7%)
PHASE 3: Second Department Query	-	57	31	6	94	57.6% (CI:95, ± 4.0%)
Totals	1	138	42	9	190	

Table 2: Projected Impact on Revenue from Call Failures for 742 Stores Without Boarding Facilities

	Call Failure Rate	Failed Calls per Year	Potential Number of Store Visits from 5% Conversion of Failed Calls	Increase in Sales Revenue if 5% of Failed Calls Were Converted to Average Sale
PHASE 1: Initiation	2.4%	1,923,264	96,163	\$2,431,000
PHASE 2: First Department Query	29.1%	23,319,576	1,165,979	\$29,475,949
PHASE 3: Second Department Query	57.6%	46,158,336	2,307,917	\$58,344,137

The projected impact of failed calls on revenue is substantial (see Table 2). Based on an industry value of 300 average calls per store per day, we estimate that this major pet products retailer receives 80,136,000 calls to its 742 U.S. stores without boarding facilities each year (assuming 360 days of operation per year). In our projections we assumed a conservative 5% conversion rate of calls to store visits; however, anecdotal industry wisdom is that the conversion rate may actually be as high as 15%.

The average market basket value is estimated from several sources. A Unilever study estimates average U.S. grocery store market basket at \$38 and a study of pet care product expenditures suggests an annual weekly market basket of \$32 (Market Research.com, 2006; Unilever, 2006). We used a lower estimate of \$25.28, which is derived from other proprietary sources. The \$29.5 million revenue projection from converting first department transfer failures to successful sales would increase to a staggering \$111.9 million if the conversion rate and market basket size were adjusted to 15% and \$32, respectively.

CASE 2. Specialty Retailer: National Book Retailer

Two calling surveys of a well-known bookseller chain were conducted. In each study we called 100 different stores, for a total sample of 200 stores. The sample includes stores in all states in which the retailer currently operates. Analysis of two departments for hold times for searches - usually conducted by the same attendant - and for the ability to transfer between departments was analyzed. The ability to make a third transfer to the bookstore's café was also analyzed.

In the first study of 100 stores, calls were abandoned per study protocol after 75 seconds on hold or after 8 rings. One department was analyzed for hold times required to transfer to a second, different department. Table 4 displays call failure rates based on the 75-second call abandonment rule.

In Study 2, average hold times for first and second searches were 79.1 seconds and 75.3 seconds respectively. However, abandonment decisions during item searches based a 75-second hold time may have been premature, as studies have shown that consumers are patient if they believe they are being served. Therefore, in this study recorded complete hold times for calls that would be classified by the 75-second rule as "abandoned" were recorded because

some seemingly excessive hold times were incurred due to delays as attendants were responding to caller requests and were actively locating specific book, music and movie items on the floor, and not due to deficiencies in the phone system or personnel responsiveness. Table 5 shows that revenues would increase by \$259,373 if calls with these longer hold times were considered successful and led to sales in just 5% of cases, which we consider to be a conservative estimate of incremental revenue.

Table 6 shows revenue projections, based on the assumption that calls with wait times as high as 79.1 seconds during store searches were considered to be successful. Under this liberal assumption, company-wide revenue would increase to \$1.1 million if just 5% of successful calls led to store visits and purchase. Obviously if a conversion rate of 15% is more accurate, the revenue opportunity is much greater.

Table 3: National Book Retailer Call Survey Results

	Total Calls Completed	Calls Dropped	Calls Abandoned	Total Call Failures	Overall Call Failure Rate	Call Failure Rate of Stores with Auto Attendant
STUDY 1 (100 stores)	98	2	57	59	60%	21 (23%)
STUDY 2 (100 other stores)	99	5	70	75	76%	21 (22%)

STUDY 1: None of the store lines was busy, but 8 of the stores did not answer before 8 rings, 5 of which were made during local business hours. Of the remaining 90 calls, 21 were answered by an auto attendant.

STUDY 2: None of the store lines was busy, but 4 of the stores did not answer before 8 rings, 3 of which were made during local business hours. In both studies, stores with an auto attendant produced significantly higher initial call completions than stores that did not have an auto attendant.

The effectiveness of an auto attendant was demonstrated in both Study 1 and Study 2. Of the calls answered in Study 1 by an auto attendant, only 15 were abandoned and one was dropped by the auto attendant because the store was closed. In comparison, of the 71 stores without an auto attendant, 34 calls were abandoned and one was dropped. In Study 2, of the stores without an auto attendant, 54 were abandoned and four were dropped. Of the remaining 95 stores, 21 had an auto attendant; of these, only 12 calls were abandoned and one was dropped.

Table 4: National Book Retailer Call Outcome, Conservative Assumption

	Total Calls Completed	Calls Dropped	Calls Abandoned (corrected)	Total Call Failures	Call Failure Rate	Stores with Auto Attendant
STUDY 1	98	2	27	29	30%	21 (23%)
STUDY 2	99	5	10	15	15%	21 (22%)

Table 5: Average Revenue Implications for National Book Retailer, Conservative Assumption

	Cumulate Call Failure (corrected)	Unsuccessful Calls per Year	Potential Number of Store Visits from 5% Conversion of Failed Calls	Increase in Sales Revenue if 5% of Failed Calls Were Converted to Average Sale
Phase 1 (Initial pickup)	6%	82,080	4,104	\$103,749
Phase 2 (First transfer)	11%	150,480	7,524	\$190,207
Phase 3 (Second transfer)	15%	205,200	10,260	\$259,373

Results are based on 1,368,000 calls per year (300 calls x 475 stores x 360 days), a 5% conversion rate of calls to store visits, and an average market basket of \$25.28 per visit.

Table 6: Average Revenue Implications for National Book Retailer, Liberal Assumption

	Cumulate Call Failure (corrected)	Unsuccessful Calls per Year	Potential Number of Store Visits from 5% Conversion of Failed Calls	Increase in Sales Revenue if 5% of Failed Calls Were Converted to Average Sale
Phase 1 (n=11)	11 %	150,480	7,524	\$190,207
Phase 2 (n=40)	52 %	711,360	35,568	\$899,159
Phase 3 (n=14)	66 %	902,880	45,144	\$1,141,240

Results assume that calls with hold times longer than 75 seconds are successful if the store representative is engaged in an active search for requested item(s), and are based on 1,368,000 calls per year (300 calls x 475 stores x 360 days), a 5% conversion rate of calls to store visits, and an average market basket of \$25.28 per visit.

CASE 3. Regional Grocery Chain

During the spring of 2005, research assistants conducted two call studies of a regional grocery chain. In the first study they called all 138 stores, of which 36 did not have a pharmacy; in the second we called all 102 that had a pharmacy. Data were collected by research assistants during actual phone calls. Study 1 calls consisted of three phases: call initiation, first department query and second department query. Study 2 calls, which were made only to stores with pharmacies, had four phases: call initiation, first department query, transfer to grocery and transfer to pharmacy. Stores were analyzed for factors contributing to call success or failure in any phase.

Study 1. Call study of all 138 stores. Table 7 shows the results of calls made in Study 1, which demonstrated an overall call failure rate of 20.2%. 133 stores were also surveyed to determine if they had a grocery auto attendant and we determined that 72, or 54.1%, did have one. However, all of the stores with an auto attendant also had a pharmacy. None of the stores without a pharmacy had a grocery auto attendant.

Table 7: Study 1 -- Cumulative Call Failure Rates in Grocery Section by Call Phase

	Busy	Abandoned	Unable to Transfer	Dropped	Total Failures	Cumulative Call Failure Rate
Phase 1: Initiation	1	2	-	3	6	4.3%
Phase 2: First query	-	13	2	1	16	15.9%
Total Call Failures	1	15	2	4	22	20.2%

In this study, we called all 138 stores; 36 did not have a pharmacy. There was an overall 20.2% failure rate. Call initiation includes all variables from time of dial to answer by auto attendant or store attendant. The first query includes all variables from attempt to transfer to first department until first department query complete.

Table 8 outlines the revenue implications of the call failures shown in Table 7. It shows that if successfully handled, inbound calls would have increased by a minimum of 640,872 to a maximum of 2,369,736 across the 138 stores in the chain. Table 8 employs a conservative conversion rate of successful calls to store visits of 5%, and shows that if converted call failures represent a revenue opportunity of from \$1.2 to \$5.7 million. In this projection we use recent results from Unilever (2005) of \$38 average grocery market basket size.

Table 8: Study 1 -- Revenue Implications of Call Failure Rates Shown in Table 7

	Cumulative Call Failure Rate	Unsuccessful Calls per Year	Potential Number of Store Visits from 5% Conversion of Failed Calls	Increase in Sales Revenue if 5% of Failed Calls Were Converted to Average Sale
Phase 1: Initiation	4.3%	640,872	32,044	\$1,217,657
Phase 2: First query	15.9%	2,369,736	118,487	\$4,502,498
Total Call Failures	20.2%	3,010,608	150,530	\$5,720,155

Projection assumptions included 14,904,000 calls per year (300 calls x 138 stores x 360 days), a 5% conversion rate of calls to store visits and an average market basket of \$38.00 per visit (Unilever, 2005).

STUDY 2: CALL STUDY OF ALL 102 STORES WITH A PHARMACY. In this study, researchers called all 102 stores that had a pharmacy. We surveyed 98 of these stores to determine if they had a grocery auto attendant, and found that 72 (73.5%) did have one.

Table 9: Study 2 - Cumulative Call Failure Rates in Grocery Section by Call Phase

	Busy	Abandoned	Unable to Transfer	Dropped	Total Failures	Cumulative Call Failure Rate
Phase 1: Initiation	1	2	-	1	4	3.9%
Phase 2: First Query	-	11	2	1	14	17.6%
Phase 3: Pharmacy Query	-	13	20	2	35	52.0%
Total Call Failures by Type	1	26	22	4	53	

Initiation includes all variables from time of dial to answer by auto attendant or store attendant. First query results includes all variables from attempt to transfer to first department until the first department query was completed. The Pharmacy query includes all variables from attempt to transfer to pharmacy section until the pharmacy query was completed.

Table 9 presents the call failure results of Study 2, which probed the ability of the chain's phone system to handle multiple query calls requiring employees to answer a query and then transfer the call to the pharmacy division for another query. This is a common occurrence in multi-department retail venues. As can be seen in the table, a cumulative total of 52% of calls failed.

As shown in Table 10, the revenue implications of Study 2 mirrors those of Study 1. Projected revenues would increase from \$1.1 to \$4.9 million if call success rates could be improved across the first two call phases. Indeed, if third phase calls were successfully completed, the data suggest that projected revenues increase by \$14.7 million.

Table 10: Study 2 - Revenue Implications of Call Failure Rates Shown in Table 9

	Cumulative Call Failure Rate	Unsuccessful Calls per Year	Potential Number of Store Visits from 5% Conversion of Failed Calls	Increase in Sales Revenue if 5% of Failed Calls Were Converted to Average Sale
Phase 1: Initiation	3.9%	581,256	29,063	\$1,104,386
Phase 2: First Query	17.6%	2,632,104	131,155	\$4,893,898
Phase 3: Pharmacy Query	52.0%	7,750,080	387,504	\$14,725,152

Projections were made assuming a total of 14,904,000 inbound calls per year (300 calls x 138 stores x 360 days), a 5% conversion rate of calls to store visits and an average market basket of \$38.00 per visit (Unilever, 2005).

CASE 4. Traditional National Department Store

In 2005, another call study investigated an old line department store that combines white goods, clothing, tools and auto repair facilities among its services. It employed the same methods as reported above. Nationwide, the firm manages 870 stores, of which we sampled 219, or about 25%. Table 11 below summarizes the results of the calls. The cumulative call failure rate across phases is high, about 69%. A second study of this firm's stores in Canada produced a similar cumulative failure rate, so the results are probably not anomalous.

Several data points stand out in this table. First, the reported inability of the employee to transfer the call is troubling. This reported inability to transfer accounted for 21% of all call failures. This seems like a significant problem for a multi-department retailer whose customers may be expected to be interested in multiple product categories handled by the firm, such as men's clothing and women's shoes, for instance. The high number of dropped calls is another problem. A third problem is a high rate of abandonment due to hold times longer than 75 seconds.

Table 11: Cumulative Call Failure Rates by Call Phase to Department Store

	Busy	Abandoned	Unable to Transfer	Dropped	TOTAL FAILURES by Phase	Cumulative Call Failure Rate by Phase
PHASE 1: Initiation	2	13	1	0	16	7.3% (CI:95, ± 3.0%)
PHASE 2: First Query	-	57	10	7	74	41.1% (CI:95, ± 5.6%)
PHASE 3: Second Query	-	31	22	8	61	68.9% (CI:95, ± 5.3%)
TOTAL CALL FAILURES	2	101	33	15	151	

Phase 1 results include all variables from time of dial to answer by auto attendant or store attendant. Phase 2 results include all variables from attempt to transfer to first department until first department query was completed. Phase 3 results include all variables from attempt to transfer to second department until second department query was completed.

Table 12 estimates the revenue implications of the call failure data shown in Table 11. Estimates of average market basket for mass merchandising retail department stores are difficult to obtain. However, one study conducted in 2004 reported empirical results showing the average consumer expenditure per visit to typical mass merchandisers at about \$81.00 (Fox, Montgomery and Lodish, 2004). If we adopt this estimate, projections of incremental annual revenues increase from \$27 million to \$262 million if 5% of failed calls could be converted to an average in-store sale. Estimates from other sources allow us to estimate per store sales for this retailer (2001-2002) as about \$13,877,703 (<http://www.bizstats.com/realworld.htm>). If accurate, we very simply divide the number in the bottom right cell of Table 12 by the number of stores in the chain, 870, we get an annual projected sales increase of \$301,368 per store, a very substantial 2%.

Table 12: Revenue Implications of Call Failure Rates Shown in Table 11

	Cumulative Call Failure Rate	Unsuccessful Calls per Year*	Potential Number of Store Visits from 5% Conversion of Failed Calls	Increase in Sales Revenue if 5% of Failed Calls Were Converted to Average Sale
PHASE 1: Initiation	7.3%	6,859,080	342,954	\$27,779,274
PHASE 2: First Query	41.1%	38,617,560	1,930,878	\$156,401,118
PHASE 3: Second Query	68.9%	64,738,440	3,236,922	\$262,190,682

Results assume 93,960,000 calls per year (300 calls x 870 stores x 360 days), a 5% conversion rate of calls to store visits and an average market basket sale of \$81.00 per visit (Fox, Montgomery and Lodish, 2004).

CASE 5. Leading National Pharmacy Chain

A sample of 398 stores in a large national pharmacy chain was compiled using a reference database listing of 706 stores nationwide, a 56% sample. Of an original sample of 400, two stores were deleted from study since they were not yet open for business. This chain is aggressively acquiring new outlets, and these were included among the outlets sampled.

Data were collected by two research assistants during phone calls, and entered into a Microsoft Excel database during the last week of June, 2006. Calls to pharmacies consisted of three general phases: Call Initiation, Pharmacy Staff Query and Grocery Store Query. Stores were analyzed for factors contributing to call success or failure in any of the call phases. Call failure was defined as a busy signal, hold time of 65 seconds or more during any transfer or no initial pick up after 8 rings, inability to transfer to another department, or disconnection by the phone

system or store employee during a typical customer experience. These occurrences were coded as "busy," "abandoned," "unable to transfer" and "dropped," respectively, and frequency counts were recorded for each type of call failure, with failure occurring only once per call. Other factors analyzed included the number of store rings, existence of auto attendant (Y/N), average hold time for first department (pharmacy), and average hold time for second department (store). Prior experience led to a modification of our research procedure followed in this case study. In this study hold times were carefully assessed for each transfer and each service episode and cumulative call times were calculated as well.

Average total hold time and related measures are shown in Table 13. Several points are notable. The average hold time is relatively low, about 38 seconds, but times vary dramatically from 2 to 415 seconds. While half the hold times were less than 14.5 seconds, the other half were higher. Thus, the variance in hold times is high. The large variance means there is a long tail of calls that vary markedly in duration, suggestive of considerable diversity in call purpose or call handling by staff, and consequently, the potential for Interactive Voice Response (IVR) protocols to improve handling.

Table 13: Average total hold time, National Pharmacy Chain

Mean (seconds)	37.84782609
Standard Error	4.515257979
Median	14.5
Mode	8
Standard Deviation	61.24793915
Sample Variance	3751.31005
Kurtosis	14.09761219
Skewness	3.467673833
Range	415
Minimum	2
Maximum	417

Table 14: Cumulative Call Failure Rates to and from Pharmacy

	Busy	Abandoned	Unable to Transfer	Dropped	Total Failures	Cumulative Call Failure Rate
PHASE 1: Initiation	5	4	1	0	10	2.5% (CI:95, ± 1.0%)
PHASE 2: Pharmacy Staff Query	-	26	3	1	30	10.1% (CI:95, ± 2.0%)
PHASE 3: Retail Store Query	-	56	5	3	64	26.1% (CI:95, ± 2.9%)
TOTAL CALL FAILURES	5	86	9	4	112	

Call initiation includes all variables from time of dial to answer by auto attendant or store attendant. A pharmacy staff query includes all variables from attempt to transfer to pharmacy staff until the pharmacy staff query was completed. Follow-up retail store query includes all variables from the attempt to transfer to the retail store until the retail store query was completed.

A total of 398 calls were completed to the pharmacy section of the sample stores (see Table 14). Out of a 390-call survey for auto attendant, 98.7% of the calls were answered by an auto

attendant with auto refill services. (There was some variety among stores with the types of auto attendant services and options available.)

A total of 30 call failures occurred during the pharmacy staff query. Of these failed calls, 26 were abandoned due to excessive hold times greater than 65 seconds for the pharmacy staff, three were unable to transfer to the pharmacy staff and 1 was dropped. The average hold time for pharmacy staff was 29.7 seconds in Phase 2. The average hold time was 41.2 seconds in Phase 3.

The call failure rate increased with successive transfers so that the total call failure rate reflects a typical customer experience for the pharmacy. The call failure rate was 2.5% for call initiation, 10.1% for both call initiation and the pharmacy staff query and 26.1% for all three call phases.

It should be noted that the firm intends to impose much stricter norms on speed of call handling post-takeover than recorded in this phase of research. Thus, while callers sometimes waited for more than 8 rings and sometimes remained on the line for more than 65 seconds, these wait times are longer than projected firm norms.

Table 15 reports the revenue implications of call failure noted in Table 14. Reductions in call failure that result in conversions of calls to successful sales should result in an increase in revenues. Average sales figures are inferred from a Unilever study (2005) of market basket sizes for "quick" shopping trips and in light of the company's goal of becoming a one-stop convenience store. Increases will depend upon the assumptions one makes about the nature of calls and customer reactions. If most calls are relatively simple in purpose, and call failure rates low, then improved efficiency may result in modest revenue gains of \$2 million. However, if more calls are complex in purpose requiring several periods of waiting and transfer between departments resulting in increased caller defection, then improved call handling could result in gains of as much as \$68 million annually.

Table 15: Revenue Implications of Call Failure Rates Shown in Table 14

	Cumulative Call Failure Rate	Unsuccessful Calls per Year	Potential Number of Store Visits from 5% Conversion of Failed Calls	Increase in Sales Revenue if 5% of Failed Calls Were Converted to Average Sale
PHASE 1: Initiation	2.5%	1,906,200	95,310	\$2,005,322
PHASE 2: Pharmacy Staff Query	10.1%	7,701,048	1,930,878	\$40,625,673
PHASE 3: Retail Store Query	26.1%	19,900,728	3,236,922	\$68,104,839

Results are projected assuming 93,960,000 calls per year (300 calls x 706 stores x 360 days), a 5% conversion rate of calls to store visits and an average market basket of \$21.04 per visit (Unilever, 2005).

CASE 6. Retail Imaging Solution Outlets

Retail call data can reveal specific inefficiencies in inbound call management. For example, data from calls to 51% of the 237 outlets of a major provider of retail imaging solutions shows that although callers sometimes may be able to get through to an employee quickly, responses to these calls need improvement and may even be professionally inappropriate. For example, in 91 (40%) of completed calls, employees explained to the caller that they were "busy right now," and couldn't provide immediate service. Research suggests that customers respond more negatively to reaching a person but receiving no service than being placed in a queue.

The wisdom of a call response strategy requiring a busy technician to take inbound telephone calls is called into question when one discerns that most calls to the national retail imaging solutions provider are less than 30 seconds in duration, and thus likely include inquiries about opening hours, availability of copy machines or other general information (see Figure 1). Further study and segmentation of inbound calls would be useful to this retailer to confirm which types

could be handled by an auto attendant, allowing employees to handle more complex inbound calls immediately.

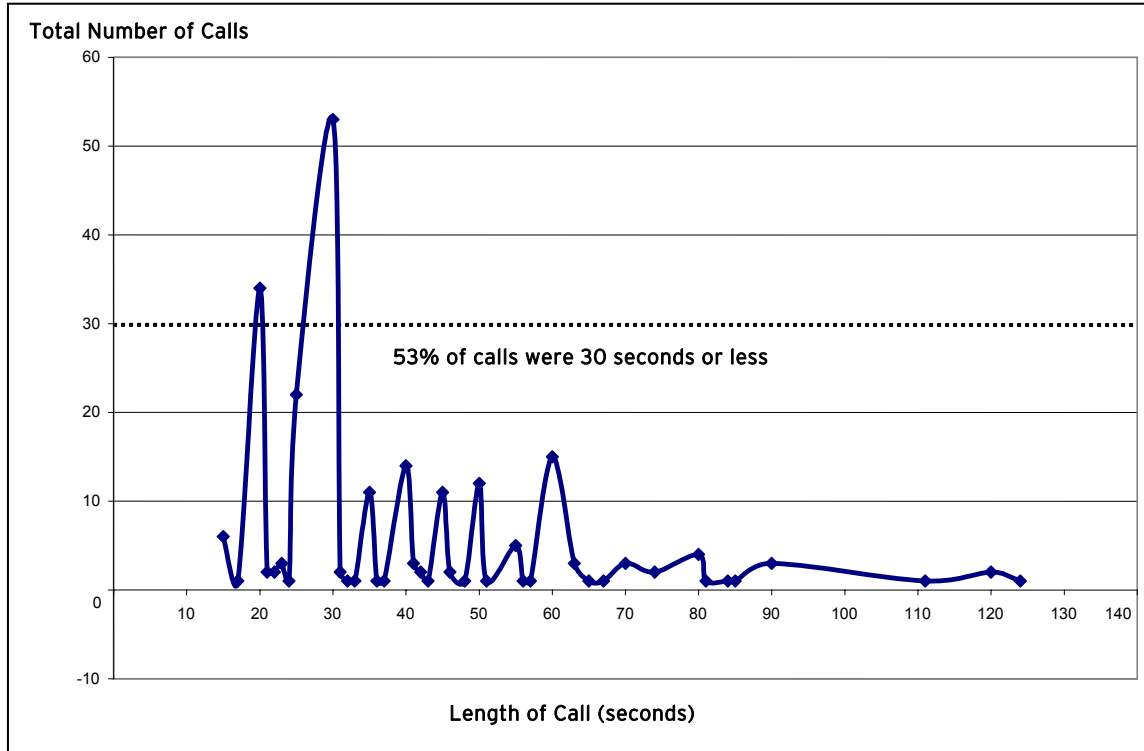


Figure 1: National Retail Imaging Solutions Provider - Distribution of Total Call Time. Most calls to a national retail imaging solutions provider are less than 30 seconds in duration, and likely include inquiries about opening hours, availability of copy machines or other general information that could be handled by an auto attendant,

CASE 7. National Family Restaurant Chain

Data from a survey of a national family restaurant chain show that nearly 20% of lunchtime callers spend more than 20% of their call time on hold, as do about 16% of dinner time callers. Since calls to such restaurants often concern obtaining a menu by fax, making a reservation, or scheduling catering, it would make sense to route inbound calls to different respondents, depending on the service required. This parsing of calls could be readily automated and deployed in an auto attendant system.

CASE 8. National Office Supply Chain

A call survey of a national office supply provider focused on asking for the availability of a specific product, a toner cartridge (TN-460) for a Brother MFC 8600 printer. Previous research suggests that customers asking for specific information of this type have a higher patience threshold since they have a reasonable chance of obtaining a specific piece of information than the caller with a more general question. But how patient do they have to be? Average hold time for this specific piece of information required 12,800 seconds out of a total of 30,187 seconds, or 42%, of total call time. Presumably, this wait also meant that other calls could not be answered by the store attendant, with some negative effect on customer satisfaction and overall call handling, and by extension, store sales.

III. ADDITIONAL COMMENTS ON CALL FAILURE ANALYSIS

The data from our studies enables us to offer some tentative comparisons of the outcomes of inbound telephone calls between stores of similar type within categories. However, not all of

the data were collected in conformance with random sampling procedures, so the precision of the statistical measures should be assessed with caution.

Auto Attendant Benefits

Nevertheless, some conclusions may be drawn from our findings. For example, an auto attendant clearly had a beneficial effect on call completion rates. We calculated the total call failure rate for two large chains in the drug store category. Total call failure rate is defined as:

$$\Sigma \{(\text{busy} + \text{abandoned} + \text{dropped calls})/\text{number of stores contacted}\}.$$

We found that the rate varied from 34.62% for one chain to 47.65% for another, a significant difference. Some proportion of the difference may be explained by the presence of an auto attendant in stores belonging to the first chain, a technological intervention that reduces the number of rings before answering. The average number of rings at the first chain before pickup was 2.0; this figure falls to a remarkably low 0.70 ring when an auto-attendant was deployed. The average number of rings at the second chain (again, which did not have an auto attendant) was 1.5. This difference is significant ($F = 21.809$; $df = 1$; $p = 0.000$). We also analyzed the difference in transfer time from store to first department between the two chains and found that the transfer time was significantly lower in the first chain than in the second ($F = 50.296$; $df = 1$; $p = 0.000$).

Complexity of Call Failure

Sometimes differences in call failure rate among similar types of stores and organizations have no obvious explanation. Lacking detailed data on complex factors such as managerial procedures, level of employee training and staffing patterns, as well as caller intentions, which we strongly suspect affected calling outcomes, we cannot account for some substantial variations.

For example, consider the following comparison of total call failure rates for three regional and one national grocery chain. We found total call failure rates of 15.20%, 17.40% and 21.53% among the regional chains and reached 40.95% for the national chain. These differences were significant ($F = 8.65$; $df = 3$; $p = 0.000$). But determining clear reasons for the disparities was not possible, based on data we had been able to collect from our call surveys.

We found that all of the chains except one had an auto-attendant in their stores, yet there were no significant differences in the number of initial rings before pickup among stores in this chain, one of the other regional chains and the national chain. One of the regional chains answered more quickly than the other regional chains, but no more quickly than the national chain.

We also compared the hold time for completion of the first transfer to a department within the stores. There was a significant difference in the first transfer hold time (second phase of call) among retailers in the supermarket category ($F = 8.002$; $df = 3$; $p = 0.000$). Transfer time at one of the regional chains was significantly shorter than at the other stores. The bottom line is that call failures can result from a complex combination of subjective factors related to the caller as well as more readily quantifiable factors related to the store's call handling system and personnel.

IV. IMPLICATIONS

This review of findings accumulated from ongoing studies of retail telephony leads to a number of tentative conclusions:

- Many retailers appear to lack clear management procedures for handling inbound telephone calls.
- Many retailers appear to lack the technology for tracking and collecting data about inbound telephone calls.

- Call times and destinations vary dramatically between retailers across categories, e.g., calls searching out specific media (e.g., books or music) at national book retailing chains are likely to last longer than calls to national retail imaging facilities.
- Call hold times as a percentage of total call time vary across retail categories and in some cases could be reduced significantly through installation of auto-attendant and call handling technologies.
- Call failure rates vary across stores in the same category and suggest a tactical point of differentiation between retail brands within retail categories.
- Many calls are likely to end in failure due to a combination of factors including customer impatience and technological weaknesses of existing telephone infrastructure.
- Failed calls may contribute to widespread reports of decline in retail customer satisfaction (<http://www.theacsi.org/overview.htm>).
- Failed calls represent sizeable revenue potential based on conservative assumptions of caller conversions to walk-in customers and size of average customer market basket.
- If more inbound calls were successfully handled, store level retail sales could be positively impacted, in some cases dramatically.

APPENDIX: TYPES OF CALL FAILURES

Busy	Busy signal received on initiation of call.
Abandoned	Hold time during any department transfer, or store-initiated hold, of more than 75 seconds. Eight or more store rings during initial contact phase.
Dropped	Disconnection of call by store attendant or store phone system during any phase of call.
Unable to Transfer	Stated or implied inability of store attendant to complete any transfer request made for another department.

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