Acoustical Considerations Lead to Strengthening the Volume of Bass-Range Parts

Re: Telemann's double, or sometimes triple, bass parts for his Hamburg cantatas, assuming that only one bass sang from each part.

The following quotation is taken from p. 282 from Jürgen Neubacher's *Georg Philipp Telemanns Hamburger Kirchenmusik und ihre Aufführungsbedingungen (1721-1767)*:

"Eine Besonderheit der bei den Kirchenmusiken in Hamburg praktizierten Vokalbesetzungen war deren vokalbaßverstärkte Variante, die sowohl bei einfacher als auch bei doppelter Besetzung der Singstimmen zur Anwendung kam. Schon Thomas Selle hatte 1642 hinsichtlich der Besetzung seiner Kirchenmusiken propagiert, daß 'der Baß allzeit gedoppelt muß besetzt werden'. Offenbar war die Akustik einiger Hamburger Kirchen so baßschwach, daß später auch Telemann den Vokalbaß in bestimmten Situationen stärker zu besetzen pflegte als die übrigen Singstimmen....Bei doppelter Besetzung aller Singstimmen trat in solchen Fällen zum Ersten und Zweiten Bassisten noch ein Ripieno-Bassist hinzu, was zusammengenommen somit drei Baßsänger beziehungsweise bis zu neun Sänger insgesamt ergab."

["An unusual circumstance prevailing in the way the vocal parts were orchestrated and assigned for figural music performed in the Hamburg churches is the option {a variation from the usual norm of assigning one vocal part for each vocal range – SATB} for increasing the number of bass parts/singers. This option was applied no matter whether the vocal parts called for a single bass or for two separate bass parts. As early as 1642, {the Hamburg cantor} Thomas Selle {originally from Leipzig – *Thomasschule* and University of Leipzig} promoted the idea that 'any bass vocal part must always have double the number of singers'. Obviously the acoustics of several churches in Hamburg were so weak in carrying the sound of the bass singers {as well as that of bass instruments}, that even Telemann later on tended to strengthen the basses in certain situations more than the other vocal parts....In the situation when all vocal parts {SATB} were doubled {*solisti* & *ripieni*}, there would be an additional *ripieno* bass to accompany both the 1st and 2nd basses, which, when considering all the possibilities, would result in a total number of three bass singers, or as the case may be, a total number of nine singers: 2 sopranos, 2 altos, 2 tenors, 3 basses."]

In 1721, Johann Mattheson, in his own appendix to Friedrich Erhard Niedt's *Musicalische Handleitung (Zur Variation des General-Basses....*Hamburg, 1721) listing the registrations of more than 60 church organs in Germany towns and cities, indicates the massive size and power of the pedal stops on some of the church organs in Hamburg:

Nikolaikirche (66 ranks, built by Arp Schnitker in 1686) had two 32' stops (Principal & Posaune) and four 16' stops (Octava, Sub-bass, Posaune, Dulcian).
Jakobikirche (60 ranks) had the same large pedal stops as the *Nikolaikirche*.
Katharinenkirche (58 ranks) had the same large pedal stops (slightly different names).
Michaeliskirche (der 'Michel') (52 ranks) one less 32' stop, otherwise the same.

What are the acoustic factors responsible for weakening the transference of (for causing the loss of) bass range sounds from instrument and voice to the listening audience in several of the largest churches in Hamburg?