Board of Editors

Editor-in-Chief Kitano Yuji

Editors Ohkawa Toshitaka Katou Michiya

Fukuda Michiyo Hayashida Haruo Takahashi Koji Miyajima Masahiro

Tanabe Satoru Oogaki Akira Satou Akihiko Adachi Takashi

Fukumori Tooru Morikawa Katsuyoshi

All rights reserved. No part of this publication may be reproduced or transmitted, in any form or by any means, without prior permission in writing from the publisher.

Annual Research Bulletin of Osaka Sangyo University

No. 4

March 31, 2012

Publisher Academic Society of

Osaka Sangyo University

3-1-1 Nakagaito, Daito-shi, Osaka, 574-8530 Japan

phone 072-875-3001 fax 072-875-6551

Printing Firm TOMONO PRINT Co.ltd

1-23 Takayanaginishimachi, Okayama-shi, kita-ku,

700-0035 Japan phone 086-255-1101 fax 086-253-2965